

Sixth (6th) Grade

Mathematics Warm-ups

Fall Semester

Blaine Helwig
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Introduction, Rationale and Recommendations – Sixth Grade Math Warm-Ups

These *full semester* mathematical warm-ups are designed for a five (5) part instructional and curricular system, but the warm-ups can also function independently. Ideally, they serve as part of an integrated classroom and global framework. This system addresses the lack of instructional consistency and accountability across elementary feeder schools, where many students complete six or seven years of public education without mastering essential grade-level math skills. Hence, each school year, sixth grade teachers are inheriting each school year a flood of transitioning elementary that are not on grade level. This preparation gap leaves many incoming sixth-graders ill-equipped for the challenges of Tier 1 middle school curriculum.

Fortunately, sixth grade math serves as the final opportunity to master arithmetic foundations before students encounter the rigors of algebra and geometry. To successfully bridge this gap and ensure students reach grade-level proficiency, schools must implement a deliberate, structured instructional curricular resource plan that must consistently be implemented for each incoming class of sixth graders. Therefore, sixth-grade math teachers need superior pedagogical skills and core competencies, including analytical thinking, organization, communication, deep subject knowledge, adept classroom management, and a strong work ethic.

This five-part program targets two persistent challenges in middle school mathematics. First, it systematically rectifies academic skill gaps remaining from elementary school. Second, it utilizes spaced repetition, a dynamic and efficient pedagogical method, to ensure mastery for all students, including students in gifted and talented, general education, and special education programs. For a deeper analysis of these two topics, refer to the essay "*Understanding Learning and Practice*," which is available in the reference section of this document after the Appendix.

Sixth Grade – Five (5) Part Mathematics Instruction and Resource System

Part 1 – Daily Math Warm-ups: The enclosed math warm-ups (two per page to save on paper copies) are designed for middle school rotational systems to ensure immediate student engagement upon arrival. Because standard 45- to 60-minute class periods require high time-on-task, these activities are built to be completed in just five minutes. The warm-up content sequencing begins with elementary arithmetic to establish classroom routines and set high expectations for work quality before including current content. *The curricular resource will review and identify prior math processing skills that were not mastered, as well as provide repetitions of current grade level content.* If students struggle with foundational or grade level content skills, these topics should be integrated into Tier 2 spaced repetition to achieve mastery thresholds for all students. Finally, a problem-solving word may be added to the daily warm-ups to provide extra practice in that learning area. However, it is highly recommended that students engage in one to two traditional word problems daily. Display it on the whiteboard or document camera and have them solve it on paper. This mimics the 'screen-to-paper' workflow they'll face during computerized standardized testing

Implementation Highlights:

- **Flexibility:** While generally not recorded as a formal grade, teachers can collect them at any time to encourage consistent effort.
- **Efficiency:** After grading or reviewing the warm-up, students flip the page to the blank side to engage in the Tier 2 – Spaced Repetition session.

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- **Concept Support:** The warm-ups include pedagogical insertions to help novice teachers demonstrate conceptual understanding and reinforcing essential grade-level skills.

Part 2 – Spaced Repetition - Pedagogy: This dynamic 5- to 10-minute spiral review bridges 6th-grade core content with essential elementary skill remediation. For maximum student engagement, teachers should utilize a daily "cheat sheet" to track specific skills and maintain a highly organized pace.

- **Active Engagement:** After completing the daily Math Warm-up, students flip the paper to use the blank side as a workspace for active skill work.
- **Formative Checks:** Employ diverse Formative Assessment Strategies, such as small white boards (dry erase markers), hand signals, or visually ‘poll’ students to gauge their comprehension instantly.
- **Skill Mastery:** Closely monitor struggling students. Once a skill is mastered, "retire" it and introduce a new concept to ensure continuous growth.

The ultimate goal of this 5-part system is to achieve mastery of prior grade-level gaps while simultaneously maintaining mastery of grade level content. With practice, a teacher of any experience level is highly adept at this pedagogical practice. When students struggle with daily warm-ups, it shows they need more practice, not less. Teachers generally see mastery in whatever they prioritize; conversely, what is neglected remains unlearned.

Part 3 – Daily Numeracy – Math Facts and Math Processing Skills: Elementary foundations in arithmetic—specifically mastering addition, subtraction, multiplication, and division math facts—are vital, yet many sixth graders arrive to middle school without them. While achieving mastery is straightforward with a targeted, global system in an elementary school, the transition to middle school complicates the execution. Unlike the self-contained or adjacent structures of elementary schools, middle schools require a dedicated intervention period, mandated by administration, to replicate that systematic success. There is a white paper entitled, “*Math Fact Mastery – Easy to Do!*” that expatiates on this process. That document can be found in the Reference Section after the Appendix of this packet.

Sixth-grade mathematics should lead with multiplication and division math fact mastery. Because students frequently lack the required fluency in these areas compared to their "marginal competence" in addition and subtraction, **prioritizing multiplication and division facts is essential**. After mastering multiplication and division, students will circle back to addition and subtraction facts to ensure total fluency. Detailed implementation strategies and tracking protocols are outlined in the referenced white paper.

Finally, the white paper's recommended numerical fluency program also targets the essential sixth grade math processing skills core content. A daily intervention period can efficiently cover both areas (i.e., math facts and math processing skills) while leaving ample time for the problem-solving activities, detailed in Part 5. Moreover, since the referenced paper’s numerical fluency program is individualized, it affords tracking of each student with little effort or preparation from the intervention teacher.

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Part 4 – Tier 1 Sixth Grade Level Curriculum: The selection of the grade level curriculum is left solely to the discretion of district or school personnel. The design of the 5-stage program is independent and completely agnostic in the classroom curricular selection.

Part 5 – Daily Problem Solving: The efficiency of this process hinges on the duration of the sixth-grade math block. While a 60-minute period comfortably accommodates a more structured session where students tackle three to six traditional word problems, a 45-minute period creates significant time constraints. However, it is advisable in either a 45 or 60-minute math period, educators shift problem-solving activities to the intervention period to ensure they possess sufficient time to deliver high-quality core instruction.

Despite modern digital testing methods, using commercial paper and pencil problem-solving resources remains highly advisable for several key reasons. **First**, it allows for easier monitoring, holding students accountable for clearly demonstrating quality work. **Second**, physical work is simpler to review over time for parent-teacher conferences or other cognitive assessments. **Third**, paper-pencil training is invaluable for teaching off-screen work habits, which translates to heightened benefits during high-stakes standardized digital testing. **Finally**, this traditional approach gives teachers more control in establishing problem-solving strategies; transitioning to a computer format later becomes seamless once a clear system is in place.

Final Thoughts on Student Performance: Too many Title 1 educators have accepted standardized pass rates of between 40 - 70% as the status quo. The issue isn't a lack of student ability; it's a failure of pedagogy, curriculum, and accountability. We cannot close the achievement gap by clinging to 'rinse and repeat' methods that haven't evolved in fifty years. While the arithmetic concepts taught are multi-millennia years old and are not complicated at any elementary or middle school grade level, industry resistance to proven pedagogical and resource curricular methods is what truly holds our students academically back. If your outcomes aren't meeting the mark, it's time to stop doing what you want to work and start doing what actually is effective. However, for these warm-ups to be effective, curricular resources require an educator's intentional effort and prioritization. *If a teacher simply distributes warm-ups without reviewing or analyzing student performance, the activity becomes largely ineffective.*

Finally, sixth grade teachers must recognize that the curriculum for the first half of the fall semester demands heavy arithmetic computation. Unfortunately, these are the exact areas where incoming students often struggle. Skill deficiencies in elementary-level skills—such as math facts, place value, multiples, multi-digit computation, and factor strings—can hinder a student's progress throughout middle and high school if not addressed immediately. To rectify these numeracy gaps, the first 40 warm-ups, teaching tips, and spaced repetition sessions are specifically designed to target and rebuild these essential processing skills. In short, prioritizing these foundational numeracy skills creates a smoother path for both teacher and student alike for the rest of the school year. *However, the first 40 warmups may take a bit longer each day, but it is a necessary time 'cost' to correct students' prior grade level academic numeracy gaps.*



Blaine A. Helwig, PE

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Compute the difference of 415 and 57.

Rewrite equation vertically.

2.) Compute the sum of 706 and 135.

Rewrite equation vertically.

3.) Write the multiples of each number on the line provided.

2: 0, 2, 4, , , , , , , , , 20

5: 0, 5, , , , , , , , , , , 50

3: 0, , , , , , , , , , , , 30

4.) Circle the even numbers below.

3 12 7 8 15
116 25 36 2 115

5.) Fill in the box for each number sentence that correctly completes the equation.

$7 + 3 = \square$

$9 - 3 = \square$

$3 \times 3 = \square$

$10 \div 2 = \square$

$\square + 3 = 11$

$\square - 7 = 8$

$3 \times \square = 15$

$12 \div \square = 6$

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$3 \times \square = 15$

$12 \div \square = 6$

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Compute the difference of 415 and 57.

Rewrite equation vertically.
$$\begin{array}{r} 415 \\ - 57 \\ \hline 358 \end{array}$$
 Write difference in the corner of on the white board – define “answer in subtraction.”

2.) Compute the sum of 706 and 135.

Rewrite equation vertically.
$$\begin{array}{r} 706 \\ + 135 \\ \hline 841 \end{array}$$
 Write sum in the corner of on the white board – define “answer in addition.”

3.) Write the multiples of each number on the line provided.

2: 0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20

5: 0, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50

3: 0, 3, 6, 9, 12, 15, 18, 21, 24, 27, 30

All multiples begin with zero. Practice until mastered by all stds.

4.) Circle the even numbers below.

3 12 7 8 15
116 25 36 2 115

Only one’s digit matters: $115 = 100 + 10 + 5$
 (5 not divisible by 2) – 115 is odd!

5.) Fill in the box for each number sentence that correctly completes the equation.

$7 + 3 = \boxed{10}$

$9 - 3 = \boxed{6}$

$3 \times 3 = \boxed{9}$

$10 \div 2 = \boxed{5}$

$\boxed{8} + 3 = 11$

$\boxed{15} - 7 = 8$

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All multiples begin with zero. Practice until mastered by all stds.

4.) Circle the even numbers below.

3 12 7 8 15
116 25 36 2 115

Only one’s digit matters: $115 = 100 + 10 + 5$
 (5 not divisible by 2) – 115 is odd!

5.) Fill in the box for each number sentence that correctly completes the equation.

$7 + 3 = \boxed{10}$

$9 - 3 = \boxed{6}$

$3 \times 3 = \boxed{9}$

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Teaching Tip Number 1

Even and Odd Numbers – Pedagogy – Elementary School Content –

There are two easy methods to demonstrate that a whole number of any size can be classified as an even or odd number, and more importantly, that it is the whole number's **one's digit** that controls that classification.

Method 1: Place Value Expansion of the Given Number

The number can be expanded into its individual values, and those numbers halved. An even number is divisible by 2. Thus, separate each expanded number into equal halves. If the number can be separated in this manner on all expansion values, *it is an even number*. If not, it is an odd number. **Note:** The ability to adeptly halve whole numbers is a prerequisite skill.

Example 1: 1,534

• Expand $1,534 = 1,000 + 500 + 30 + 4$

$500 \quad 500 \quad 250 \quad 250 \quad 15 \quad 15 \quad 2 \quad 2$

Since each constituent expanded number of 1,534 can be divided into half (i.e., divisible by 2 of a whole number), the number 1,534 can as well. 1,532 is an **even number**.

Example 2: 6,875

• Expand $6,875 = 6,000 + 800 + 70 + 5$

$3,000 \quad 3,000 \quad 400 \quad 400 \quad 35 \quad 35 \quad 2.5 \quad 2.5$

Since the one's place (5) cannot be divided into half (i.e., divisible by 2 of a whole number), the number 6,875 cannot as well. 6,875 is classified as an **odd number**.

All whole numbers can be halved **except for the one's digit**. *Thus, it is that digit that determines if the number is classified as even or odd.* Once students understand they need only evaluate the one's digit to determine if the number is even or odd, I recommend demonstrating this fact to them in the following manner: Write 34 on the whiteboard. Tch: "Is this number even or odd?" Sts: *Even*. **Add a digit.** Write 534 on the whiteboard. Tch: "Is this number even or odd?" Sts: *Even*. **Add a digit.** Write 7,534 on the whiteboard. Tch: "Is this number even or odd?" Sts: *Even*. **Add a digit.** Write 27,534 on the whiteboard. Tch: "Is this number even or odd?" Sts: *Even*. Continue until students understand that only the one's digit in any whole number determines if the given number is classified as either even or odd.

Method 2: Proving whether a single digit (e.g., 0, 1, 2, ... 9) whole number is an even or odd number.

Students can use both hands and count off the given whole number (e.g., 5) using a finger on each hand BUT alternating each hand as they count to the targeted whole number. For example, Given the whole number 3. The student raises their **left hand** and extends their index finger and counts 1. Then the student raises their **right hand** and extends that hand's index finger and counts 2. Alternating **back to the left hand**, the student extends the middle finger and counts 3 (i.e., the targeted whole number). At that point the student joins the fingertips of each hand. Only the index fingers on each hand are paired. The middle finger on the **right hand** is **NOT** paired. *Therefore, the whole number 3 is NOT divisible by 2, or it cannot be halved and obtain a whole number – it is classified as an odd number. (1, 3, 5, 7 and 9 are odd numbers) (0, 2, 4, 6, and 8 are even).*

Teaching Tip Number 2

Content Focus on Spaced Repetition – Pedagogy

Many incoming sixth graders lack mastery of essential elementary math skills. However, with consistent effort and focused practice on these foundational concepts, they can attain grade-level proficiency. By incorporating dynamic, spaced-repetition instruction at the start of every class, teachers can bridge these deficient academic gaps. Since these students are new to middle school, *they will adapt quickly to this "catch-up" routine if expectations are clearly established on the **very first day** of middle school.*

Daily spaced repetition should focus on the elementary math skills numbered below – add in 6th grade skill work to as needed to effectively spiral Tier 1 curricular content. To maintain engagement for high-performing students, keep these sessions brief and high-energy. This pedagogical approach follows the principle of "**getting rich slowly**" by building skills granularly. During these reviews, identify students who struggle due to academic gaps; once they demonstrate consistent mastery, those specific skills can be retired from the rotation. Finally, to ensure continuous student engagement, teachers must be fully prepared to implement this pedagogy daily. Students should provide visible responses, using hand signals, small whiteboards, or the reverse side of warm-up sheets – to allow the teacher to perform frequent comprehension checks.

- 1.) **Whole number place value: Expansion Place Value Form.** Start with simple three-digit numbers—like **205**—and gradually increase the complexity each day until you reach the **billions**. As students write the expanded form (e.g., **205 = 200 + 0 + 5**), ensure they include the zero so struggling learners recognize it as a vital **place holder**. Use a "rapid-fire" approach for one or two problems daily to keep students engaged and active until everyone has achieved mastery.
- 2.) **Whole Number Place Value Standard Form.** Students should know the place value position and its value using standard form. The value of the digit was covered in number 1.) above. Consequently, provide a couple examples each day in conjunction with expansion that focuses on value, place name of digit. Example. Write 320 on the White Board or Lady Bug projector. Underline a digit. **320**. *What is the place value name AND value of the 3?* *Students respond with the 'hundreds place' and '300.'* Use zeroes in examples: 5,021 and 205. In doing so, students understand that the place value name or position does not change, but the value does – even if the value is zero. Example: **20,045**. *Students respond with 'thousands place' and '0'.* The value is zero, but it is a place holder for the thousands place.

Write the correct spelling in the corner of the white board: ones, tens, hundreds, thousands, ten-thousands, hundred-thousands, millions, etc. If not, the students will invariably misspell these words. Two to three quick examples in a daily routine of two to three place value examples will bridge the gap between standard and expanded forms. Note: Place Value Name never changes. But the Value does (0 through 9).

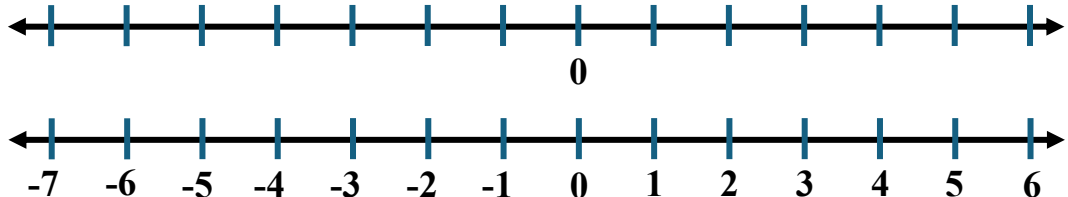
- 3.) **Making 10, Making 100 and eventually Making 1** – These three numeracy skills are important for several reasons. First, they promote numeracy and addition fact mastery of several math facts. Second, they are the basis for a Base 10 number system and metric system. Third, Making 10 can be used to quickly compute subtraction of 1-digit numbers from 2 digit (e.g. $14 - 8$). Reference: ***Math Facts Mastery – Easy To Do!*** white paper – free download located in the Reference Section of this document.

Begin with Making 10. (Video on this specific content located at the website address in the footer.) Teacher shows students 8 fingers. They make 10 by visually showing the teacher two fingers. Repeat until they are automatic at all combinations. Transition to Making 100. Begin with tens only. Example: Write $40 + \underline{\quad} = 100$ and $\underline{\quad} + 70 = 100$. Use Making 10 – add zero for tens. Once students master that skill, introduce "adding up" to 100 using a two-step method. For example, to find the difference between 73 and 100, move from 73 to 80 (7), then from 80 to 100 (20), totaling 27.

Teaching Tip Number 2

Apply this same logic to the "Making 1" exercise using decimals, which is a critical numeracy skill for 6th graders. All necessary resource sheets (i.e. practice and assessment) are in the Appendix, requiring zero prep time for the teacher. **Formative Loop** also has a extensive curricular resource library assessable for all grade levels – first through eighth grade.

- 4.) **Multiples (0-12)** This skill is vital for building basic numeracy and identifying the Least Common Denominators (LCD) for adding unlike fractions. Beyond computation, it provides students with a tangible understanding of multiplication fact automaticity. You can find practice sheets in the Appendix; assign these for homework until mastery is reached. Additionally, keep extra Xerox copies on hand as an effective "valuable filler activity" if your core lesson finishes ahead of schedule.
- 5.) **Subtraction – Check work by adding up.** It is recommended students complete one 3-to-5-digit subtraction problem daily. By checking their work with addition—just like the warm-up—students reinforce both operations simultaneously. This daily habit ensures the process becomes second nature, giving them a built-in strategy to verify their answers during high-stakes testing.
- 6.) **New 6th grade content from Tier 1 Daily Core Lessons.** Do not let students fall behind on the grade level content. *Remember there is a dual objective: Fill prior grade level academic gaps as well as ensure students remain at grade level with newly introduced Tier 1 6th grade content.* Each day, use the spaced repetition session to quickly review core Tier 1 lesson concepts. For instance, students quickly draw and partition a number line, labeling a point as zero and marking all positive and negative integers. To ensure students recognize the term visually rather than just auditorily, write "integers" on the whiteboard alongside other key vocabulary like place value, sum, difference, etc. If this process is not done, students understand math words like 'integers' auditorily, but they often do not recognize the word in print form.



- ❖ Then, the teacher can direct students to: Place a 'A' above -4. Place a 'B' above -1.
- ❖ Which integer is larger? -1 or 1? 0 or -5? -3 or 6?
- ❖ As integers proceed to the right, are they getting smaller or larger in value? To the left?
- ❖ At what point would sea level be on a vertical number line? Write a point on your paper that is above the surface water on that vertical number line? Would the point -3 be below or above the surface of the water on that vertical integer number line?
- ❖ What is the absolute value of point -5? -7? 6? 0? Note: Write 'absolute zero' in the corner of the whiteboard with the other defined math terms.
- ❖ Why is zero (0) larger than -3? *Answer:* Zero (0) is to the right of -3.
- ❖ Compare integers using $<$, $>$, or $=$. -6 $<$ -5; 0 $>$ 1; -4 $<$ $|-1|$, etc.

To close academic gaps and master 6th-grade Tier 1 content, teachers must implement **daily spaced repetition** through rapid, high-energy exercises. These 5-to-10-minute sessions should be fast paced with zero downtime to keep students fully engaged. The teacher should be checking visually to check student mastery. After mastery is achieved by all students, spiral the concept again in (about) 4 days. It is recommended to make a list of the skills with answers on a separate sheet of paper so that the teacher can use it as a quick reference to make the session dynamic and interesting for all students.

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Compute the sum of 207 and 135.

Rewrite equation vertically.

2.) Compute the difference of 207 and 135.

Rewrite equation vertically.

3.) Write the multiples of each number on the line provided.

2: 0, 2, 4, , , , , , , , , 20

4: 0, 4, , , , , , , , , , , 40

3: , , , , , , , , , , , , 30

4.) Circle the odd numbers below.

13 19 4 24 15
243 21 36 8 427

5.) Fill in the box for each number sentence that correctly completes the equation.

$3 + 11 = \square$

$15 - 3 = \square$

$6 \times 3 = \square$

$20 \div 2 = \square$

$\square + 30 = 100$

$\square - 9 = 8$

$5 \times \square = 25$

$16 \div \square = 4$

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

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Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Compute the sum of 207 and 135.

Rewrite equation vertically.
$$\begin{array}{r} 207 \\ + 135 \\ \hline 342 \end{array}$$
 Write sum in the corner of on the white board – define “answer in addition.”

2.) Compute the difference of 207 and 135.

Rewrite equation vertically.
$$\begin{array}{r} 207 \\ - 135 \\ \hline 72 \end{array}$$
 Write difference in the corner of on the white board – define “answer in subtraction.”

3.) Write the multiples of each number on the line provided.

2: 0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20

4: 0, 4, 8, 12, 16, 20, 24, 28, 32, 36, 40

3: 0, 3, 6, 9, 12, 15, 18, 21, 24, 27, 30

All multiples begin with zero. Practice until mastered by all stds.

4.) Circle the odd numbers below.

$\textcircled{13}$ $\textcircled{19}$ 4 24 $\textcircled{15}$
 $\textcircled{243}$ $\textcircled{21}$ 36 8 $\textcircled{427}$

Only one's digit matters: $243 = 200 + 40 + 3$ (3 not divisible by 2) – ALL else is. 115 is odd!

5.) Fill in the box for each number sentence that correctly completes the equation.

$3 + 11 = \boxed{14}$

$15 - 3 = \boxed{12}$

$6 \times 3 = \boxed{18}$

$20 \div 2 = \boxed{10}$

$\boxed{70} + 30 = 100$

$\boxed{17} - 9 = 8$

$5 \times \boxed{5} = 25$

$16 \div \boxed{4} = 4$

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

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$5 \times \boxed{5} = 25$

$16 \div \boxed{4} = 4$

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

- 1.) Subtract. Check your work by adding up. 2.) LaTrese bought 3 candy bars that cost 2 dollars each, and a soda that cost \$1.50. How much did she spend at the grocery store?

$$\begin{array}{r} 803 \\ - 259 \\ \hline \end{array}$$

- 3.) Write the multiples of each number on the line provided.

5: 0, , , , , , , , , , 50

4: , , , , , , , , , , 40

3: , , , , , , , , , , 30

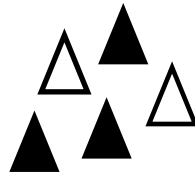
- 4.) Correctly complete each equation.

$$3 \times \square = 12 \quad \square - 9 = 2$$

$$50 + \square = 100 \quad 16 \div \square = 8$$

- 5.) Write the proper fraction (a proper fraction is always less than 1 whole) of the shaded figures.



$$\frac{\square}{\square}$$


$$\frac{\square}{\square}$$

The top number of the proper fraction is called the _____.

The bottom number is called the _____.

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

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4: , , , , , , , , , , 40

3: , , , , , , , , , , 30

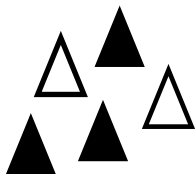
- 4.) Correctly complete each equation.

$$3 \times \square = 12 \quad \square - 9 = 2$$

$$50 + \square = 100 \quad 16 \div \square = 8$$

- 5.) Write the proper fraction (a proper fraction is always less than 1 whole) of the shaded figures.



$$\frac{\square}{\square}$$


$$\frac{\square}{\square}$$

The top number of the proper fraction is called the _____.

The bottom number is called the _____.

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

- 1.) Subtract. Check your work by adding up. 2.) LaTrese bought 3 candy bars that cost 2 dollars each, and a soda that cost \$1.50. How much did she spend at the grocery store?

$$\begin{array}{r} 803 \\ - 259 \\ \hline 544 \end{array} \quad \begin{array}{r} 544 \\ + 259 \\ \hline 803 \end{array}$$

Show solution using parenthesis and an equation form.

$$(3 \times \$2) + \$1.50 = \$6 + \$1.50 = \underline{\$7.50} \blacktriangleleft$$

- 3.) Write the multiples of each number on the line provided. 4.) Correctly complete each equation.

5: 0, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50

4: 0, 4, 8, 12, 16, 20, 24, 28, 32, 36, 40

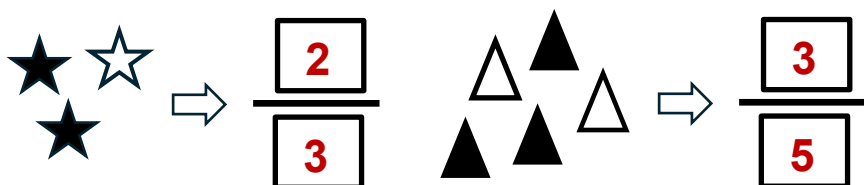
3: 0, 3, 6, 9, 12, 15, 18, 21, 24, 27, 30

$$3 \times \boxed{4} = 12 \quad \boxed{11} - 9 = 2$$

$$50 + \boxed{50} = 100 \quad 16 \div \boxed{2} = 8$$

All multiples begin with zero. Practice until mastered by all stds.

- 5.) Write the proper fraction (a proper fraction is always less than 1 whole) of the shaded figures.



The top number of the proper fraction is called the numerator.

The bottom number is called the denominator.

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

- 1.) Subtract. Check your work by adding up. 2.) LaTrese bought 3 candy bars that cost 2 dollars each, and a soda that cost \$1.50. How much did she spend at the grocery store?

$$\begin{array}{r} 803 \\ - 259 \\ \hline 544 \end{array} \quad \begin{array}{r} 544 \\ + 259 \\ \hline 803 \end{array}$$

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5: 0, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50

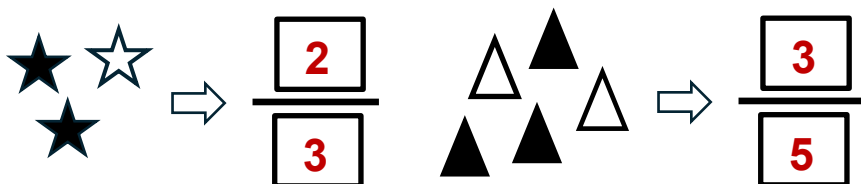
4: 0, 4, 8, 12, 16, 20, 24, 28, 32, 36, 40

3: 0, 3, 6, 9, 12, 15, 18, 21, 24, 27, 30

$$3 \times \boxed{4} = 12 \quad \boxed{11} - 9 = 2$$

$$50 + \boxed{50} = 100 \quad 16 \div \boxed{2} = 8$$

- 5.) Write the proper fraction (a proper fraction is always less than 1 whole) of the shaded figures.



The top number of the proper fraction is called the numerator.

The bottom number is called the denominator.

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Subtract. Check your work by adding up.

$$\begin{array}{r} 470 \\ - 193 \\ \hline \end{array}$$

2.) Betty and Jesus pooled their money. They had 3 dimes and 5 quarters. How much money did Betty and Jesus have together?

3.) Write the multiples of each number on the line provided.

6: _____, 60

4: _____, 40

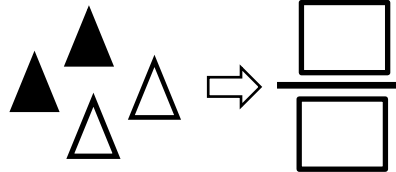
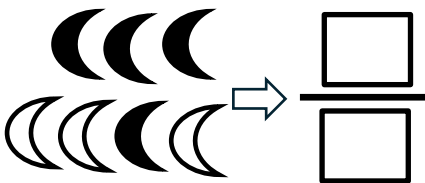
3: _____, 30

4.) Correctly complete each equation.

$4 \times \square = 12 \quad \square = 8 + 2$

$\square + 20 = 100 \quad 16 \div \square = 4$

5.) Write the proper fraction (a proper fraction is always less than 1 whole) of the shaded figures.



The parts we are interested in is called the _____.

The total number of parts is called the _____.

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Subtract. Check your work by adding up.

$$\begin{array}{r} 470 \\ - 193 \\ \hline \end{array}$$

2.) Betty and Jesus pooled their money. They had 3 dimes and 5 quarters. How much money did Betty and Jesus have together?

3.) Write the multiples of each number on the line provided.

6: _____, 60

4: _____, 40

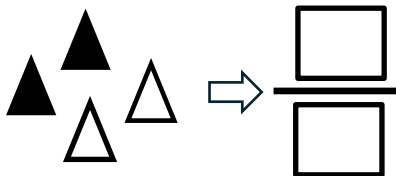
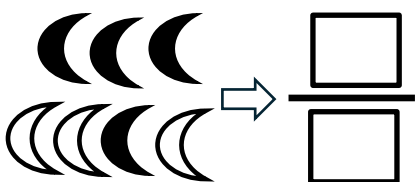
3: _____, 30

4.) Correctly complete each equation.

$4 \times \square = 12 \quad \square = 8 + 2$

$\square + 20 = 100 \quad 16 \div \square = 4$

5.) Write the proper fraction (a proper fraction is always less than 1 whole) of the shaded figures.



The parts we are interested in is called the _____.

The total number of parts is called the _____.

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

- 1.) Subtract. Check your work by adding up. 2.) Betty and Jesus pooled their money. They had 3 dimes and 5 quarters. How much money did Betty and Jesus have together? **Review Money as decimals, as needed.**
Show solution using parenthesis and an equation form.
 $(3 \times 10) + (5 \times 25) = 30 + 125 = 155 = \underline{\$1.55}$ ◀

$$\begin{array}{r} 470 \\ - 193 \\ \hline 277 \end{array} \quad \begin{array}{r} 277 \\ + 193 \\ \hline 470 \end{array} \checkmark$$

- 3.) Write the multiples of each number on the line provided. 4.) **Correctly** complete each equation.

6: 0, 6, 12, 18, 24, 30, 36, 42, 48, 54, 60

4: 0, 4, 8, 12, 16, 20, 24, 28, 32, 36, 40

3: 0, 3, 6, 9, 12, 15, 18, 21, 24, 27, 30

All multiples begin with zero!

$$4 \times \boxed{3} = 12 \quad \boxed{10} = 8 + 2$$

$$\boxed{80} + 20 = 100 \quad 16 \div \boxed{4} = 4$$

stress ↗

- 5.) **Write** the proper fraction (a proper fraction is always less than 1 whole) of the shaded figures.

Emphasize PART to WHOLE. Fraction is always parts to whole.



The parts we are interested in is called the numerator.

The total number of parts is called the denominator.

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

- 1.) Subtract. Check your work by adding up. 2.) Betty and Jesus pooled their money. They had 3 dimes and 5 quarters. How much money did Betty and Jesus have together? **Review Money as decimals, as needed.**
Show solution using parenthesis and an equation form.
 $(3 \times 10) + (5 \times 25) = 30 + 125 = 155 = \underline{\$1.55}$ ◀

$$\begin{array}{r} 470 \\ - 193 \\ \hline 277 \end{array} \quad \begin{array}{r} 277 \\ + 193 \\ \hline 470 \end{array} \checkmark$$

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6: 0, 6, 12, 18, 24, 30, 36, 42, 48, 54, 60

4: 0, 4, 8, 12, 16, 20, 24, 28, 32, 36, 40

3: 0, 3, 6, 9, 12, 15, 18, 21, 24, 27, 30

All multiples begin with zero!

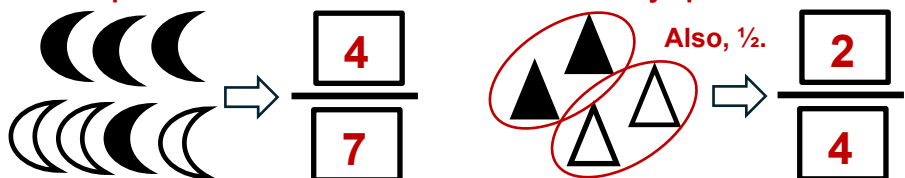
$$4 \times \boxed{3} = 12 \quad \boxed{10} = 8 + 2$$

$$\boxed{80} + 20 = 100 \quad 16 \div \boxed{4} = 4$$

stress ↗

- 5.) **Write** the proper fraction (a proper fraction is always less than 1 whole) of the shaded figures.

Emphasize PART to WHOLE. Fraction is always parts to whole.



The parts we are interested in is called the numerator.

The total number of parts is called the denominator.

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Write all positive and negative integers on the number line below.



2.) John has 319 baseball cards. William has 520 cards. How many more cards does William have than Bill?

3.) Write the multiples of each number on the line provided.

6: _____, 60

4: _____, 40

7: _____, 70

4.) Correctly complete each equation.

$5 \times \square = 15$ $\square = 12 - 3$

$\square + 40 = 100$ $20 \div \square = 4$

5.) Compare using $<$, $>$ or $=$.

$-4 \square -5$ $-2 \square -2$ $0 \square -1$

$3 \square 0$ $-3 \square 0$ $2 \square -5$

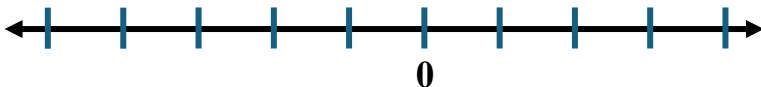
6.) Circle the even numbers below.

13 18 7 6 199

250 25 76 84 137

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Write all positive and negative integers on the number line below.



2.) John has 319 baseball cards. William has 520 cards. How many more cards does William have than Bill?

3.) Write the multiples of each number on the line provided.

6: _____, 60

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7: _____, 70

4.) Correctly complete each equation.

$5 \times \square = 15$ $\square = 12 - 3$

$\square + 40 = 100$ $20 \div \square = 4$

5.) Compare using $<$, $>$ or $=$.

$-4 \square -5$ $-2 \square -2$ $0 \square -1$

$3 \square 0$ $-3 \square 0$ $2 \square -5$

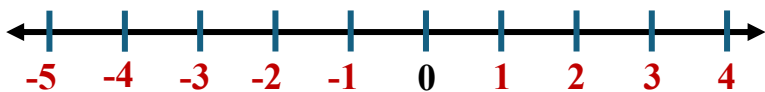
6.) Circle the even numbers below.

13 18 7 6 199

250 25 76 84 137

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Write all positive and negative integers on the number line below.



2.) John has 319 baseball cards. William has 520 cards. How many more cards does William have than Bill?

$$\begin{array}{r} 520 \\ - 319 \\ \hline 201 \end{array}$$

Students should check difference by adding up.

3.) Write the multiples of each number on the line provided.

6: 0, 6, 12, 18, 24, 30, 36, 42, 48, 54, 60

4: 0, 4, 8, 12, 16, 20, 24, 28, 32, 36, 40

7: 0, 7, 14, 21, 28, 35, 42, 49, 56, 63, 70

4.) Correctly complete each equation.

$$5 \times \boxed{3} = 15 \quad \boxed{9} = 12 - 3$$

$$\boxed{60} + 40 = 100 \quad 20 \div \boxed{5} = 4$$

5.) Compare using $<$, $>$ or $=$.

$$-4 \boxed{>} -5 \quad -2 \boxed{=} -2 \quad 0 \boxed{>} -1$$

$$3 \boxed{>} 0 \quad -3 \boxed{<} 0 \quad 2 \boxed{>} -5$$

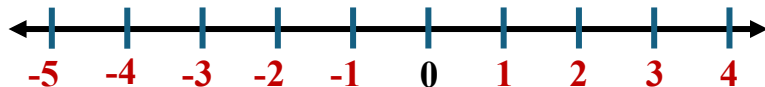
6.) Circle the even numbers below.

13 **18** 7 **6** 199

250 25 **76** **84** 137

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Write all positive and negative integers on the number line below.



2.) John has 319 baseball cards. William has 520 cards. How many more cards does William have than Bill?

$$\begin{array}{r} 520 \\ - 319 \\ \hline 201 \end{array}$$

Students should check difference by adding up.

3.) Write the multiples of each number on the line provided.

6: 0, 6, 12, 18, 24, 30, 36, 42, 48, 54, 60

4: 0, 4, 8, 12, 16, 20, 24, 28, 32, 36, 40

7: 0, 7, 14, 21, 28, 35, 42, 49, 56, 63, 70

4.) Correctly complete each equation.

$$5 \times \boxed{3} = 15 \quad \boxed{9} = 12 - 3$$

$$\boxed{60} + 40 = 100 \quad 20 \div \boxed{5} = 4$$

5.) Compare using $<$, $>$ or $=$.

$$-4 \boxed{>} -5 \quad -2 \boxed{=} -2 \quad 0 \boxed{>} -1$$

$$3 \boxed{>} 0 \quad -3 \boxed{<} 0 \quad 2 \boxed{>} -5$$

6.) Circle the even numbers below.

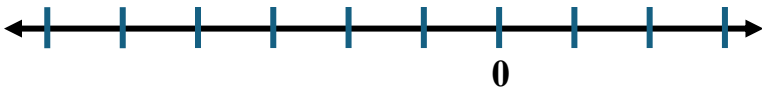
13 **18** 7 **6** 199

250 25 **76** **84** 137

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

- 1.) Write all positive and negative integers on the number line below.

- 2.) Mrs. Glass wrote 23,906 on the classroom white board. What is the place value and value of the 3?



The Place Value is the _____ place.

The Value of the 3 is _____.

- 3.) Write the multiples of each number on the line provided.

- 4.) Correctly complete each equation.

6: _____, _____, _____, _____, _____, _____, _____, _____, _____, _____, _____, 60

$2 \times \square = 18$ $\square = 15 - 6$

7: _____, _____, _____, _____, _____, _____, _____, _____, _____, _____, _____, 70

$\square + 90 = 100$ $30 \div \square = 5$

8: _____, _____, _____, _____, _____, _____, _____, _____, _____, _____, _____, 80

- 5.) Compare using $<$, $>$ or $=$.

- 6.) Answer the questions.

$-6 \square -6$ $-3 \square -2$ $-1 \square -6$

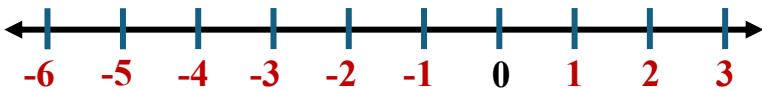
The opposite of 4 is _____. However, the opposite of -3 is _____. Now, zero has no opposite. True or False. When moving to the left on the number line, the integers are getting bigger. True or False.

$-4 \square 0$ $1 \square -3$ $5 \square -5$

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

- 1.) Write all positive and negative integers on the number line below.

- 2.) Mrs. Glass wrote 23,906 on the classroom white board. What is the place value and value of the 3?



The Place Value is the _____ place.

The Value of the 3 is _____.

- 3.) Write the multiples of each number on the line provided.

- 4.) Correctly complete each equation.

6: _____, _____, _____, _____, _____, _____, _____, _____, _____, _____, _____, 60

$2 \times \square = 18$ $\square = 15 - 6$

7: _____, _____, _____, _____, _____, _____, _____, _____, _____, _____, _____, 70

$\square + 90 = 100$ $30 \div \square = 5$

8: _____, _____, _____, _____, _____, _____, _____, _____, _____, _____, _____, 80

- 5.) Compare using $<$, $>$ or $=$.

- 6.) Answer the questions.

$-6 \square -6$ $-3 \square -2$ $-1 \square -6$

The opposite of 4 is _____. However, the opposite of -3 is _____. Now, zero has no opposite. True or False. When moving to the left on the number line, the integers are getting bigger. True or False.

$-4 \square 0$ $1 \square -3$ $5 \square -5$

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Write all positive and negative integers on the number line below.



2.) Mrs. Glass wrote 23,906 on the classroom white board. What is the place value and value of the 3?

The Place Value is the thousands place.

The Value of the 3 is 3,000.

3.) Write the multiples of each number on the line provided.

6: 0, 6, 12, 18, 24, 30, 36, 42, 48, 54, 60

7: 0, 7, 14, 21, 28, 35, 42, 49, 56, 63, 70

8: 0, 8, 16, 24, 32, 40, 48, 56, 64, 72, 80

Give HW on multiples to all students.

4.) Correctly complete each equation.

$$2 \times \boxed{9} = 18 \quad \boxed{9} = 15 - 6$$

$$\boxed{10} + 90 = 100 \quad 30 \div \boxed{6} = 5$$

5.) Compare using $<$, $>$ or $=$.

$$-6 \boxed{=} -6 \quad -3 \boxed{<} -2 \quad -1 \boxed{>} -6$$

$$-4 \boxed{<} 0 \quad 1 \boxed{>} -3 \quad 5 \boxed{>} -5$$

6.) Answer the questions.

The opposite of 4 is -4. However, the opposite of -3 is 3. Now, zero has no opposite. True or False. When moving to the left on the number line, the integers are getting bigger. True or False.

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Write all positive and negative integers on the number line below.



2.) Mrs. Glass wrote 23,906 on the classroom white board. What is the place value and value of the 3?

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The Value of the 3 is 3,000.

3.) Write the multiples of each number on the line provided.

6: 0, 6, 12, 18, 24, 30, 36, 42, 48, 54, 60

7: 0, 7, 14, 21, 28, 35, 42, 49, 56, 63, 70

8: 0, 8, 16, 24, 32, 40, 48, 56, 64, 72, 80

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$$2 \times \boxed{9} = 18 \quad \boxed{9} = 15 - 6$$

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$$-4 \boxed{<} 0 \quad 1 \boxed{>} -3 \quad 5 \boxed{>} -5$$

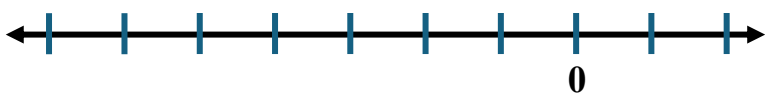
6.) Answer the questions.

The opposite of 4 is -4. However, the opposite of -3 is 3. Now, zero has no opposite. True or False. When moving to the left on the number line, the integers are getting bigger. True or False.

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Write all positive and negative integers on the number line below.

2.) Mr. Johns wrote 104,312 on the classroom white board. What is the place value and value of the 0?



The Place Value is the _____ place.

The Value is _____.

3.) Write the multiples of each number on the line provided.

4.) Write the absolute value of each number on the line provided below.

7: _____, 70

8: _____, 80

9: _____, 90

$|-1| \Rightarrow$ _____ $|7| \Rightarrow$ _____

$|1| \Rightarrow$ _____ $|-7| \Rightarrow$ _____

5.) Compare using $<$, $>$ or $=$.

6.) Answer the questions.

-1 -7 -3 -1 -2 1

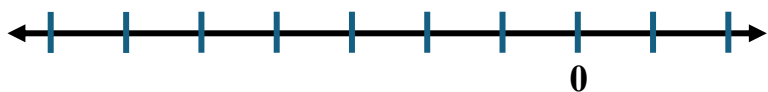
The opposite of -6 is _____. However, the opposite of 3 is _____. Now, zero has no opposite. True or False. When moving to the right on the number line, the integers are getting bigger. True or False.

0 -4 1 0 -2 2

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Write all positive and negative integers on the number line below.

2.) Mr. Johns wrote 104,312 on the classroom white board. What is the place value and value of the 0?



The Place Value is the _____ place.

The Value is _____.

3.) Write the multiples of each number on the line provided.

4.) Write the absolute value of each number on the line provided below.

7: _____, 70

8: _____, 80

9: _____, 90

$|-1| \Rightarrow$ _____ $|7| \Rightarrow$ _____

$|1| \Rightarrow$ _____ $|-7| \Rightarrow$ _____

5.) Compare using $<$, $>$ or $=$.

6.) Answer the questions.

-1 -7 -3 -1 -2 1

The opposite of -6 is _____. However, the opposite of 3 is _____. Now, zero has no opposite. True or False. When moving to the right on the number line, the integers are getting bigger. True or False.

0 -4 1 0 -2 2

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Write all positive and negative integers on the number line below.



2.) Mr. Johns wrote 104,312 on the classroom white board. What is the place value and value of the 0?

The Place Value is the ten-thousands place.

The Value is 0.

3.) Write the multiples of each number on the line provided.

7: 0, 7, 14, 21, 28, 35, 42, 49, 56, 63, 70

8: 0, 8, 16, 24, 32, 40, 48, 56, 64, 72, 80

9: 0, 9, 18, 27, 36, 45, 54, 63, 72, 81, 90

Give HW on multiples to all students.

4.) Write the absolute value of each number on the line provided below.

$|-1| \Rightarrow \underline{1}$ $|7| \Rightarrow \underline{7}$

$|1| \Rightarrow \underline{1}$ $|-7| \Rightarrow \underline{7}$

5.) Compare using $<$, $>$ or $=$.

$-1 \boxed{>} -7$ $-3 \boxed{<} -1$ $-2 \boxed{<} 1$

$0 \boxed{>} -4$ $1 \boxed{>} 0$ $-2 \boxed{<} 2$

6.) Answer the questions.

The opposite of -6 is 6. However, the opposite of 3 is -3. Now, zero has no opposite. True or False. When moving to the right on the number line, the integers are getting bigger. True or False.

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Write all positive and negative integers on the number line below.



2.) Mr. Johns wrote 104,312 on the classroom white board. What is the place value and value of the 0?

The Place Value is the ten-thousands place.

The Value is 0.

3.) Write the multiples of each number on the line provided.

7: 0, 7, 14, 21, 28, 35, 42, 49, 56, 63, 70

8: 0, 8, 16, 24, 32, 40, 48, 56, 64, 72, 80

9: 0, 9, 18, 27, 36, 45, 54, 63, 72, 81, 90

Give HW on multiples to all students.

4.) Write the absolute value of each number on the line provided below.

$|-1| \Rightarrow \underline{1}$ $|7| \Rightarrow \underline{7}$

$|1| \Rightarrow \underline{1}$ $|-7| \Rightarrow \underline{7}$

5.) Compare using $<$, $>$ or $=$.

$-1 \boxed{>} -7$ $-3 \boxed{<} -1$ $-2 \boxed{<} 1$

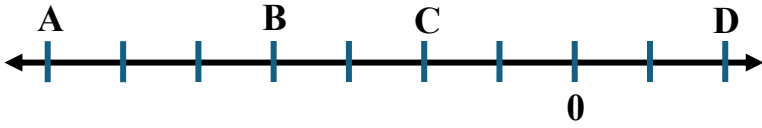
$0 \boxed{>} -4$ $1 \boxed{>} 0$ $-2 \boxed{<} 2$

6.) Answer the questions.

The opposite of -6 is 6. However, the opposite of 3 is -3. Now, zero has no opposite. True or False. When moving to the right on the number line, the integers are getting bigger. True or False.

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

- 1.) Write all positive and negative integers on the number line below. Write the integer defined by point A, B, and C.



Point A = _____ Point B = _____ Point C = _____

Compare using $<$, $>$ or $=$.

-5 Pt. A 0 Pt. D Pt. C Pt. B

- 4.) Write the multiples of each number on the line provided.

7: _____, 70

8: _____, 80

9: _____, 90

- 2.) Mr. Johns wrote 209,578 on the classroom white board. What is the place value and value of the 2?

The Place Value is the _____ place.

The Value is _____.

- 3.) Write the absolute value of each number on the line provided below.

$|-9| \Rightarrow$ _____ $|-15| \Rightarrow$ _____

$|12| \Rightarrow$ _____ $|0| \Rightarrow$ _____

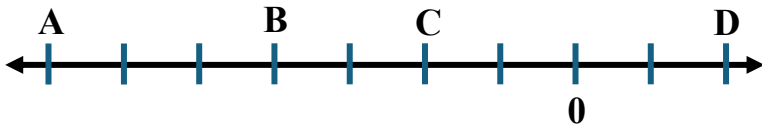
- 5.) Write the opposite integer.

$-11 \Rightarrow$ _____ $3 \Rightarrow$ _____

$11 \Rightarrow$ _____ $-5 \Rightarrow$ _____

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

- 1.) Write all positive and negative integers on the number line below. Write the integer defined by point A, B, and C.



Point A = _____ Point B = _____ Point C = _____

Compare using $<$, $>$ or $=$.

-5 Pt. A 0 Pt. D Pt. C Pt. B

- 4.) Write the multiples of each number on the line provided.

7: _____, 70

8: _____, 80

9: _____, 90

- 2.) Mr. Johns wrote 209,578 on the classroom white board. What is the place value and value of the 2?

The Place Value is the _____ place.

The Value is _____.

- 3.) Write the absolute value of each number on the line provided below.

$|-9| \Rightarrow$ _____ $|-15| \Rightarrow$ _____

$|12| \Rightarrow$ _____ $|0| \Rightarrow$ _____

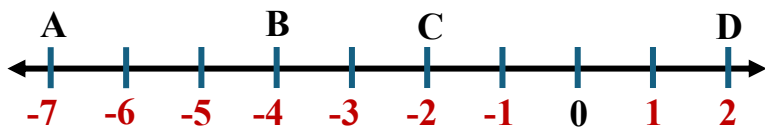
- 5.) Write the opposite integer.

$-11 \Rightarrow$ _____ $3 \Rightarrow$ _____

$11 \Rightarrow$ _____ $-5 \Rightarrow$ _____

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

- 1.) Write all positive and negative integers on the number line below. Write the integer defined by point A, B, and C.



Point A = -7 Point B = -4 Point C = -2

Compare using $<$, $>$ or $=$.

-5 $\boxed{>}$ Pt. A 0 $\boxed{<}$ Pt. D Pt. C $\boxed{>}$ Pt. B

- 4.) Write the multiples of each number on the line provided.

7: 0, 7, 14, 21, 28, 35, 42, 49, 56, 63, 70

8: 0, 8, 16, 24, 32, 40, 48, 56, 64, 72, 80

9: 0, 9, 18, 27, 36, 45, 54, 63, 72, 81, 90

- 2.) Mr. Johns wrote 209,578 on the classroom white board. What is the place value and value of the 2?

The Place Value is the hundred thousand place.

The Value is 200,000.

- 3.) Write the absolute value of each number on the line provided below.

$|-9| \Rightarrow \underline{9}$ $|-15| \Rightarrow \underline{15}$

$|12| \Rightarrow \underline{12}$ $|0| \Rightarrow \underline{0}$

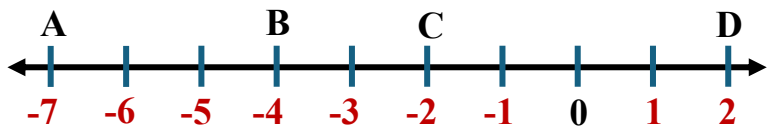
- 5.) Write the opposite integer.

-11 \Rightarrow 11 3 \Rightarrow -3

11 \Rightarrow -11 -5 \Rightarrow 5

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

- 1.) Write all positive and negative integers on the number line below. Write the integer defined by point A, B, and C.



Point A = -7 Point B = -4 Point C = -2

Compare using $<$, $>$ or $=$.

-5 $\boxed{>}$ Pt. A 0 $\boxed{<}$ Pt. D Pt. C $\boxed{>}$ Pt. B

- 4.) Write the multiples of each number on the line provided.

7: 0, 7, 14, 21, 28, 35, 42, 49, 56, 63, 70

8: 0, 8, 16, 24, 32, 40, 48, 56, 64, 72, 80

9: 0, 9, 18, 27, 36, 45, 54, 63, 72, 81, 90

- 2.) Mr. Johns wrote 209,578 on the classroom white board. What is the place value and value of the 2?

The Place Value is the hundred thousand place.

The Value is 200,000.

- 3.) Write the absolute value of each number on the line provided below.

$|-9| \Rightarrow \underline{9}$ $|-15| \Rightarrow \underline{15}$

$|12| \Rightarrow \underline{12}$ $|0| \Rightarrow \underline{0}$

- 5.) Write the opposite integer.

-11 \Rightarrow 11 3 \Rightarrow -3

11 \Rightarrow -11 -5 \Rightarrow 5

Teaching Tip Number 3

Decimal Place Value and Value – Pedagogy

Just like whole numbers, decimal place value positions—such as Tenths, Hundredths, and Thousandths - remain constant. While the position name is fixed, the actual value is determined by the specific digit (0–9) occupying that spot. Mastering this distinction between a "place" and its "value" is a fundamental pillar of mathematical fluency for students.

The "*Imaginary One*" technique is a specialized pedagogical strategy designed to help students rapidly master decimal place values by *visually* converting decimals into their fraction equivalents. It involves placing an 'imaginary one' **directly under the decimal point** and adding a zero under every digit to the right of the decimal point, **including zeros**. This method allows each digit's place value and value to be immediately visual. The examples below expatiate this process.

Example 1: Given the following decimal: **3.9** ~ Find the place value and value of each decimal digit.

$$3.9 = 3.\underset{1}{\overline{9}}$$

Place a '1' directly under the decimal point. Then, add zeroes

Therefore, the nine (9) is in the **tenths place** and the **value** is nine-tenths ($\frac{9}{10}$).

The **overall decimal quantity** can be read as well. Three *and* nine-tenths ~ $3 \frac{9}{10}$

Example 2: Given the following decimal: **5.08** ~ Find the place value and value of each decimal digit.

$$5.08 = 5.\underset{1}{\overline{08}}$$

Therefore, the zero (0) is in the **tenths place** and the **value** is zero-tenths ($\frac{0}{10}$). Whereas the eight (8) is in the **hundredths place** and its **value** is eight-hundredths ($\frac{8}{100}$).

The **overall decimal quantity** is read: Five *and* eight-hundredths ~ $5 \frac{8}{100}$

Example 3: Given the following decimal: **0.702** ~ Find the place value and value of each decimal digit.

$$0.702 = 0.\underset{1}{\overline{702}}$$

Therefore, the seven (7) is in the **tenths place** and the **value** is seven-tenths ($\frac{7}{10}$). Whereas the zero (0) is in the **hundredths place** and its **value** is zero-hundredths ($\frac{0}{100}$), and the two (2) is in the **thousandths place** with a **value** of $\frac{2}{1,000}$.

The **overall decimal quantity** is read: Zero *and* seven hundred two thousandths. ~ $0 \frac{702}{1,000}$

Note: The imaginary 1 method is viable for ANY size decimal. Also, the decimal point means "AND." A decimal is the only number read with an *AND*. For instance: 3.45 is read 'three and forty-five hundredths.'

Teaching Tip Number 3

'Using' Imaginary '1' Decimal Place Value and Value – Pedagogy

Using the “Imaginary 1” method for expanded place value, money and decimal magnitudes.

Example 1: Expand the decimal 24.803 into its fractional and decimal value components.

Since the ‘imaginary 1’ technique separates the decimal digits into a visible fractional form, it is relatively easy for the place value expansion form in either discrete fraction or decimal form.

$$24.803 = 24.\frac{803}{1000} = 20 + 4 + \frac{8}{10} + \frac{0}{100} + \frac{3}{1000}$$

$$24.803 = 24.\frac{803}{1000} = 20 + 4 + 0.8 + 0 + 0.003$$

For 6th graders, during spaced repetition, it's advantageous to teach expanded forms side-by-side. This pedagogy helps students become comfortable mentally switching between equivalent decimals and fractions.

Example 2: Reviewing MONEY (COINS) with regard to decimal and fractional equivalencies.

While it might seem basic arithmetic to review money for six graders, I've found that many students at this age often struggle to bridge the gap between decimal and fractional representations of money. This exercise is designed to close that gap using a familiar medium while reinforcing their understanding of decimal magnitude, as demonstrated in Example 3 below. (Repeat daily during spaced repetition until the process is ingrained into long term memory.

$$1 \text{ penny} = 1 \text{ cent} = 0.01 = \frac{1}{100}$$

Use the ‘imaginary 1’ technique, if necessary. Also, it is recommended to write decimals with no whole numbers in the 0.01 form.

$$1 \text{ nickel} = 5 \text{ cents} = 0.05 = \frac{5}{100}$$

Recommend starting with a penny and a nickel. Add dime, quarter and half-dollar as each coin value becomes automatic. Repetition over time is key.

$$1 \text{ dime} = 10 \text{ cents} = 0.10 = \frac{10}{100} = \frac{1}{10}$$

10 dimes in 100 pennies *or* 1 dime in 10 dimes. If students are prepared, dividing by $\frac{10}{10} = 1$ (Lowest Terms).

Teaching Tip Number 3

Example 2: Continued.

$$1 \text{ quarter} = 25 \text{ cents} = 0.25 = \frac{25}{100} = \frac{1}{4} \quad \begin{array}{l} 4 \text{ quarters in a dollar; thus,} \\ 1 \text{ quarter is } \frac{1}{4} \text{ of a dollar.} \end{array}$$

$$50 \text{ cents} = \text{half-dollar} = 0.50 = \frac{50}{100} = \frac{1}{2} \quad \begin{array}{l} 50 + 50 = 100. \text{ Therefore,} \\ 50 \text{ is half } (\frac{1}{2}) \text{ of a hundred.} \end{array}$$

Note: Mastering the halving and doubling of whole numbers is a vital numeracy skill for both elementary and secondary students. To ensure retention, it is recommended to include quick practice of these operations in daily spaced repetition sessions. Both practice and assessment sheets for this purpose in the appendix.

Example 3: Understanding decimal magnitudes – “*About how big is that decimal?*”

Students must grasp decimal magnitude both qualitatively and quantitatively. A common misconception involves viewing a value like 3.403458 as larger than 3.9 simply because it contains more digits. To accurately gauge size, students should practice rounding decimals to two places, treating them similarly to currency. For a detailed walkthrough, you can also watch the instructional video at the link provided in the footer.

Students must grasp that each subsequent digit added to a decimal represents a value smaller than the one before it. While the “imaginary 1” technique effectively illustrates this through fractions, learners should ultimately reconnect with the fundamental part-to-whole decimal concepts introduced in their elementary education.

Let’s demonstrate proof of this thinking using the ‘imaginary 1’ technique.

$$0.1239 = \frac{0.1239}{10000} = \frac{1}{10} + \frac{2}{100} + \frac{3}{1,000} + \frac{9}{10,000}$$

As decimals expand to the right, each new fractional digit is significantly smaller than the one before it. To help students grasp this, try comparing different scales: is $\frac{1}{10}$ (one shaded part of ten) larger than $\frac{2}{100}$ (two shaded parts of a hundred)? Using the U.S. Mint coin values as a guide, you can ask if 1 dime is worth more than 2 pennies. By the time you reach the ten-thousandths place – where 0.0009 represents just 9 tiny parts of 10,000—the value becomes incredibly small.

So, how large is **0.1239**? Think in terms of money! Since digits to the right of the hundredths place shrink so rapidly, you can focus on the first two digits in any decimal. In this case, 0.1239 is roughly **12 cents**, making $\frac{12}{100}$ an excellent approximation of its actual size.

Several more examples: **0.98**1067 is about 0.98 in size (0.02 from 1.00 and 0.98 from 0). Plot visually on a number line from 0 to 1. **16.07**19774 is about 16.07 (0.07 from 16 and 0.93 from 17.) It is recommended to have students circle the decimal to the hundredths and quickly plot the decimal between the two integers that bookend it (i.e., between 16 and 17 for 16.0719774).

Teaching Tip Number 3

Example 3: Continued.

To master decimal magnitude, students round or circle a decimal to the **nearest hundredth**, plot it on a number line (a visual), and calculate the distance to the surrounding whole numbers and half-points. **Note:** Mastering Making 1 is a prerequisite to this task. Resources are available in the Appendix.

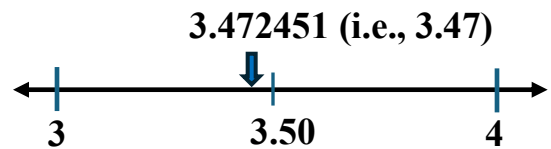
Here are three (3) exercises to practice this process during spaced repetition:

Exercise 1: Given the decimal: **3.472451**

1. **Round** the nearest hundredth is **3.47** or circle the decimal to its hundredth place: **3.472451**.
2. **Plot:** Place 3.472451 on a number line between the whole number boundaries **3** and **4**. Ask students, “*The decimal 3.472451 is between what two positive integers or whole numbers?*” (3 and 4)

3. **Distance Approximations:**

- Distance to the lower boundary (3): **0.47**
- Distance to the upper boundary (4): **0.53**
- Distance to the half-way point (3.5): **0.03**

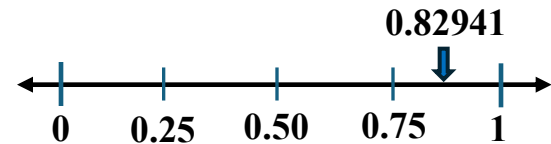


Exercise 2: Given the decimal: **0.82941**

1. **Round** the nearest hundredth is **0.83** or circle the decimal to its hundredth place: **0.82941**
2. **Plot:** Place **0.82941** on a number line between the whole number boundaries **0** and **1**. Ask students, “*The decimal 0.82941 is between what two positive integers or whole numbers?*” (0 and 1)

3. **Distance Approximations:**

- Distance to the lower boundary (0): **0.83**
- Distance to the upper boundary (1): **0.17**
- Distance to the half-way point (0.5): **0.33**

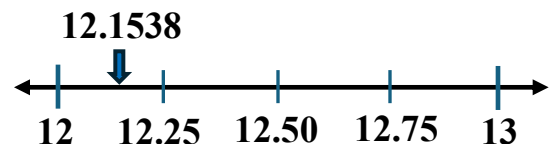


Exercise 3: Given the decimal: **12.1538**

1. **Round** the nearest hundredth is **12.15** or circle the decimal to its hundredth place: **12.1538**.
2. **Plot:** Place **12.1538** on a number line between the whole number boundaries **12** and **13**. Ask students, “*The decimal 12.1538 is between what two positive integers or whole numbers?*” (12 and 13)

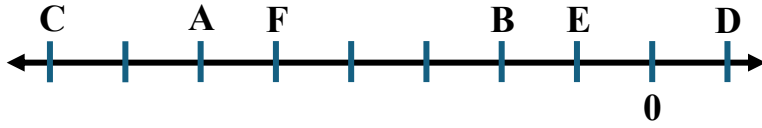
4. **Distance Approximations:**

- Distance to the lower boundary (12): **0.15**
- Distance to the upper boundary (13): **0.85**
- Distance to the half-way point (12.5): **0.35**



Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

- 1.) Write all positive and negative integers on the number line below. Write the integer defined by point A, F, and E.



Point F = _____ Point E = _____ Point A = _____

Compare using $<$, $>$ or $=$.

-2 Pt. E -2 Pt. B Pt. C Pt. B

- 4.) Write the multiples of each number on the line provided.

9: _____ 90

10: _____ 100

12: _____ 120

- 2.) Order the integers below from least to greatest. Write the integers on the line provided.

7 -9 0 -1 4 -3

- 3.) Write the absolute value of each integer.

$|32| \Rightarrow$ _____ $|-3| \Rightarrow$ _____

$|-19| \Rightarrow$ _____ $|-71| \Rightarrow$ _____

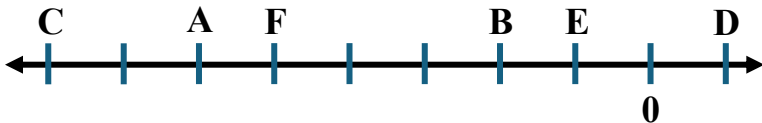
- 5.) Write the opposite integer.

-18 \Rightarrow _____ 21 \Rightarrow _____

132 \Rightarrow _____ -9 \Rightarrow _____

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

- 1.) Write all positive and negative integers on the number line below. Write the integer defined by point A, F, and E.



Point F = _____ Point E = _____ Point A = _____

Compare using $<$, $>$ or $=$.

-2 Pt. E -2 Pt. B Pt. C Pt. B

- 4.) Write the multiples of each number on the line provided.

9: _____ 90

10: _____ 100

12: _____ 120

- 2.) Order the integers below from least to greatest. Write the integers on the line provided.

7 -9 0 -1 4 -3

- 3.) Write the absolute value of each integer.

$|32| \Rightarrow$ _____ $|-3| \Rightarrow$ _____

$|-19| \Rightarrow$ _____ $|-71| \Rightarrow$ _____

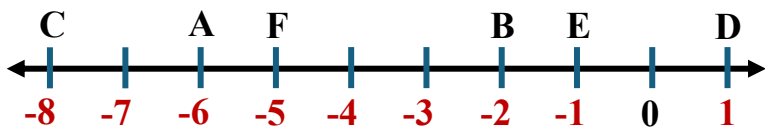
- 5.) Write the opposite integer.

-18 \Rightarrow _____ 21 \Rightarrow _____

132 \Rightarrow _____ -9 \Rightarrow _____

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

- 1.) Write all positive and negative integers on the number line below. Write the integer defined by point A, F, and E.



Point F = -5 Point E = -1 Point A = -6

Compare using $<$, $>$ or $=$.

-2 $<$ Pt. E -2 $=$ Pt. B Pt. C $<$ Pt. B

- 4.) Write the multiples of each number on the line provided.

9: 0, 9, 18, 27, 36, 45, 54, 63, 72, 81, 90

10: 0, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100

12: 0, 12, 24, 36, 48, 60, 72, 84, 96, 108, 120

- 2.) Order the integers below from least to greatest. Write the integers on the line provided.

7 -9 0 -1 4 -3
-9 -3 -1 0 4 7

- 3.) Write the absolute value of each integer.

$|32| \Rightarrow \underline{32}$ $|-3| \Rightarrow \underline{3}$

$|-19| \Rightarrow \underline{19}$ $|-71| \Rightarrow \underline{71}$

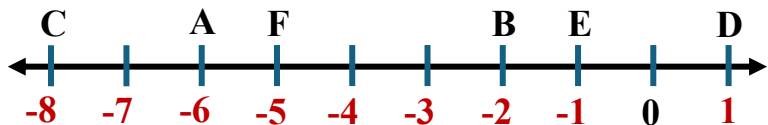
- 5.) Write the opposite integer.

-18 \Rightarrow 18 21 \Rightarrow -21

132 \Rightarrow -132 -9 \Rightarrow 9

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

- 1.) Write all positive and negative integers on the number line below. Write the integer defined by point A, F, and E.



Point F = -5 Point E = -1 Point A = -6

Compare using $<$, $>$ or $=$.

-2 $<$ Pt. E -2 $=$ Pt. B Pt. C $<$ Pt. B

- 4.) Write the multiples of each number on the line provided.

9: 0, 9, 18, 27, 36, 45, 54, 63, 72, 81, 90

10: 0, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100

12: 0, 12, 24, 36, 48, 60, 72, 84, 96, 108, 120

- 2.) Order the integers below from least to greatest. Write the integers on the line provided.

7 -9 0 -1 4 -3
-9 -3 -1 0 4 7

- 3.) Write the absolute value of each integer.

$|32| \Rightarrow \underline{32}$ $|-3| \Rightarrow \underline{3}$

$|-19| \Rightarrow \underline{19}$ $|-71| \Rightarrow \underline{71}$

- 5.) Write the opposite integer.

-18 \Rightarrow 18 21 \Rightarrow -21

132 \Rightarrow -132 -9 \Rightarrow 9

Teaching Tip Number 4

Multiples-2, Halves and Fraction (2 Things) – Pedagogy

Once students master Multiples-1 (0–12), advance to Multiples-2 (10, 12, 15, 20, 25, 75, and 30–100). Both sets are foundational to numeracy. While students often find 12, 15, and 75 more challenging, your early start on the arithmetic catch-up provides the necessary time for mastery.

To teach these effectively, use the spaced repetition session and auditory chants. For example, with the 12's:

- **Day 1:** The teacher chants, "0, 12, 24, 36." Students repeat and write these four multiples.
- **Day 2:** The teacher extends the chant to 60. Students repeat and write all six.

Within a school week, ALL students typically achieve "ownership" of the sequence with very little effort on the teacher's part. This numeracy mastery is practical: 12's are vital for measuring inches and feet, while 15's are the key to mastering quarter-hour increments.

Teachers should have copies of Multiples-1 and Multiples-2 on hand for formative assessments and daily homework. These resources are available for immediate download in the Appendix.

Halves

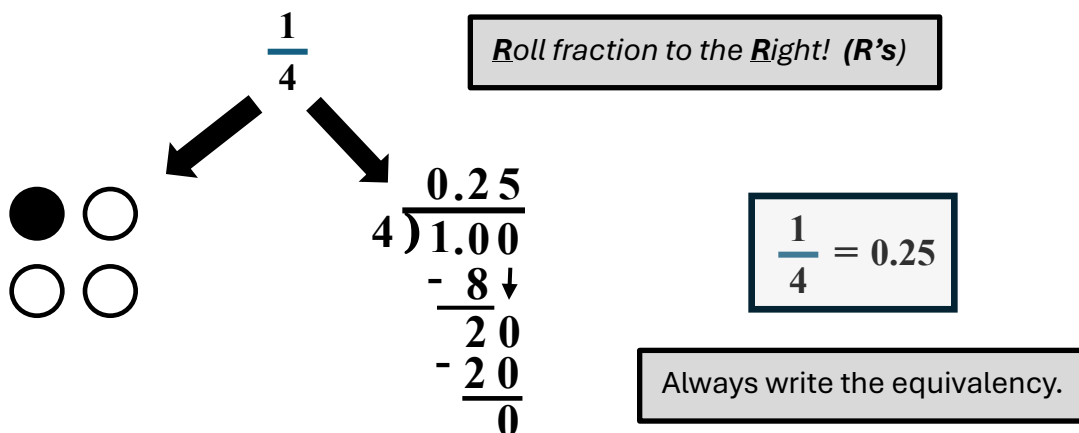
Halving whole numbers is a vital arithmetic skill that many 6th graders lack, yet it's a quick fix with the right approach. Start with small even numbers (2–20) and gradually increase the difficulty each day.

To build mastery, integrate larger benchmarks like multiples of 10 to 100, 150 and 200 to 1,000. Using spaced repetition and requiring students to physically write their answers ensures active engagement and cements the knowledge into long-term memory. Again, the Appendix has a supply of resources in this content area that will reduce teacher prep time.

A Fraction is Two-Things

Students must recognize a fraction as both a *part of a whole* and a *division expression*; this dual understanding of proper and improper fractions is key to numerical flexibility in decimals and mixed number equivalency. Practice the skill during spaced repetition. A classroom teacher can write a proper fraction on the white board (e.g., $\frac{1}{2}$ or $\frac{1}{4}$ or $\frac{3}{4}$). Then, ask students, "A fraction can represent how many things?" Students respond by showing two fingers (the peace sign or the Hook 'Em Horns, if the school is in Texas).

Example: Show the two representations of the proper fraction, $\frac{1}{4}$



$\frac{1}{4}$

Roll fraction to the **Right!** (R's)

● ○
○ ○

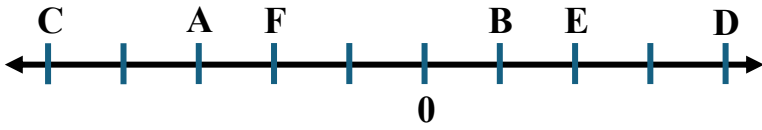
$$\begin{array}{r} 0.25 \\ 4 \overline{) 1.00} \\ \underline{- 8} \\ 20 \\ \underline{- 20} \\ 0 \end{array}$$

$\frac{1}{4} = 0.25$

Always write the equivalency.

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

- 1.) Write all positive and negative integers on the number line below. Write the integer defined by point A, C, and E.



Point A = _____ Point C = _____ Point E = _____

Compare using $<$, $>$ or $=$.

3 Pt. E -3 Pt. B Pt. F Pt. A

- 4.) Write the multiples of each number on the line provided.

10: _____, 100

12: _____, 120

15: _____, 150

- 2.) Order the integers below from greatest to least. Write the integers on the line provided.

2 -5 0 -1 3 -2

- 3.) Compute the product.

$$\begin{array}{r} 31 \\ \times 5 \\ \hline \end{array}$$

$$\begin{array}{r} 42 \\ \times 6 \\ \hline \end{array}$$

$$\begin{array}{r} 58 \\ \times 4 \\ \hline \end{array}$$

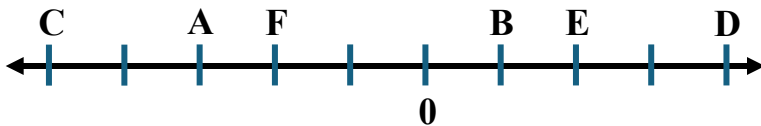
- 5.) Write the opposite integer.

-11 \Rightarrow _____ 92 \Rightarrow _____

-369 \Rightarrow _____ -1 \Rightarrow _____

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

- 1.) Write all positive and negative integers on the number line below. Write the integer defined by point A, C, and E.



Point A = _____ Point C = _____ Point E = _____

Compare using $<$, $>$ or $=$.

3 Pt. E -3 Pt. B Pt. F Pt. A

- 4.) Write the multiples of each number on the line provided.

10: _____, 100

12: _____, 120

15: _____, 150

- 2.) Order the integers below from greatest to least. Write the integers on the line provided.

2 -5 0 -1 3 -2

- 3.) Compute the product.

$$\begin{array}{r} 31 \\ \times 5 \\ \hline \end{array}$$

$$\begin{array}{r} 42 \\ \times 6 \\ \hline \end{array}$$

$$\begin{array}{r} 58 \\ \times 4 \\ \hline \end{array}$$

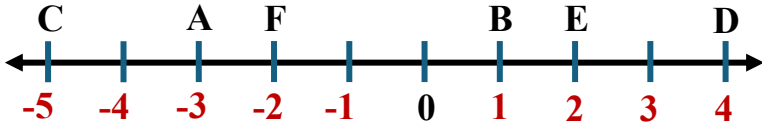
- 5.) Write the opposite integer.

-11 \Rightarrow _____ 92 \Rightarrow _____

-369 \Rightarrow _____ -1 \Rightarrow _____

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

- 1.) Write all positive and negative integers on the number line below. Write the integer defined by point A, C, and E.



Point A = -3 Point C = -5 Point E = 2

Compare using $<$, $>$ or $=$.

3 $>$ Pt. E -3 $<$ Pt. B Pt. F $>$ Pt. A

- 4.) Write the multiples of each number on the line provided.

10: 0, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100

12: 0, 12, 24, 36, 48, 60, 72, 84, 96, 108, 120

15: 0, 15, 30, 45, 60, 75, 90, 105, 120, 135, 150

- 2.) Order the integers below from greatest to least. Write the integers on the line provided.

2 -5 0 -1 3 -2
3 2 0 -1 -2 -5

- 3.) Compute the product.

31 x 5 <hr style="width: 100%;"/> 155	42 x 6 <hr style="width: 100%;"/> 252	58 x 4 <hr style="width: 100%;"/> 232
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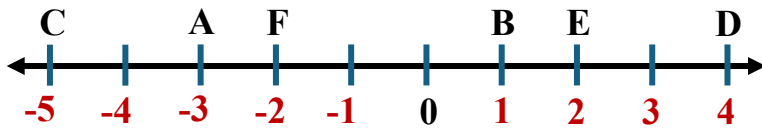
- 5.) Write the opposite integer.

-11 \Rightarrow 11 92 \Rightarrow -92

-369 \Rightarrow 369 -1 \Rightarrow 1

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

- 1.) Write all positive and negative integers on the number line below. Write the integer defined by point A, C, and E.



Point A = -3 Point C = -5 Point E = 2

Compare using $<$, $>$ or $=$.

3 $>$ Pt. E -3 $<$ Pt. B Pt. F $>$ Pt. A

- 4.) Write the multiples of each number on the line provided.

10: 0, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100

12: 0, 12, 24, 36, 48, 60, 72, 84, 96, 108, 120

15: 0, 15, 30, 45, 60, 75, 90, 105, 120, 135, 150

- 2.) Order the integers below from greatest to least. Write the integers on the line provided.

2 -5 0 -1 3 -2
3 2 0 -1 -2 -5

- 3.) Compute the product.

31 x 5 <hr style="width: 100%;"/> 155	42 x 6 <hr style="width: 100%;"/> 252	58 x 4 <hr style="width: 100%;"/> 232
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- 5.) Write the opposite integer.

-11 \Rightarrow 11 92 \Rightarrow -92

-369 \Rightarrow 369 -1 \Rightarrow 1

Teaching Tip Number 5

Fractional - Decimal Number Lines – Pedagogy – Stage 1

Students often struggle with proper fractions, improper fractions, decimals, and mixed numbers because they learn them as isolated concepts rather than a unified system. Without a clear connection between these forms, students lack a deep conceptual and practical grasp of their values. However, these misconceptions are effectively resolved when all numerical types are integrated and visualized on a single fractional-decimal number line.

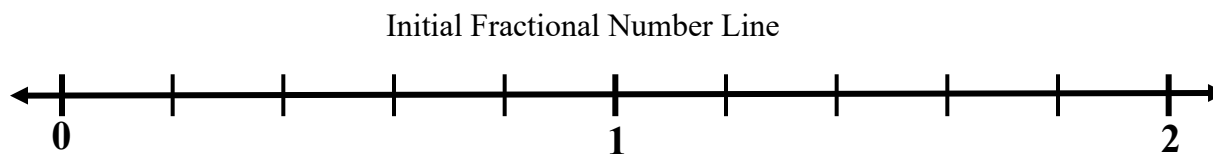
Many incoming sixth graders struggle with math fact automaticity, which can hinder their ability to convert fractions to equivalent decimals. This challenge is somewhat mitigated by the fact that these conversions typically involve small number multiplication and division rather than complex calculations.

Breaking this instruction via spaced repetition into discrete stages on a single number line can further support students. Moreover, by teaching these equivalencies in steps, students are provided the time needed to master each piece without being overwhelmed by the complex equivalency computations between mixed numbers, improper fractions, and decimals.

Stage 1: Converting and Plotting Proper and Improper Fractions in Conjunction to Equivalent Decimals

To maximize effectiveness, instructors should initiate daily spaced repetition using blank number lines that clearly mark 0, 1, and any necessary positive integers. This consistent practice grounds the students' spatial reasoning before they layer in more complex fractional or decimal values. To implement this, teachers should utilize direct instruction by "talking through" the logic of fractional number lines in real-time. This evolves into guided practice, where the educator and students collaborate on blank number lines (in lock step or students become confused that believe that they possess understanding.) until the class demonstrates a firm grasp of the fundamental placement of integers and intervals. Once the teacher confirms students' readiness, they can transition to independent practice. During Stage 1, students work autonomously to complete assigned fractional number lines while the teacher circulates to monitor progress and provide targeted feedback where needed.

Example:



Teacher questioning during direct teach and guided practice – Talking out loud to students:

First, “What is the denominator of the fractional number line above? Show me with your fingers.”

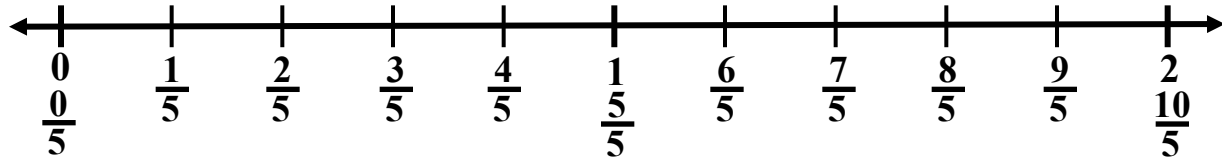
(**Note:** Students normally count the lines between any two adjacent whole numbers and extend 4 fingers. This answer is incorrect, of course. Students must **count the equal spaces** between any two adjacent integers.)

The teacher demonstrates that equal spaces must be counted to determine the fractional number line's denominator. Thus, there are five (5) equal spaces between 0 and 1 or 1 and 2. The teacher should stress that it does not matter which adjacent whole numbers are chosen. After a fractional number's denominator is identified, it does not change at any point on the number line. Consequently, **the fractional number line is in fifths** or the **fractional number line's denominator is five**.

Teaching Tip Number 5

Fractional - Decimal Number Lines – Pedagogy – Stage 1 (Continued)

Continued: Stage 1 – equating proper and improper fractions to equivalent decimals.



Second, “Let’s label the number line in fifths at every line.”

(Note: The teacher begins at zero (0). Label the zero-point (0/5). It is important to do this step, or when the number line does **not** begin with zero it is not easy for students to calculate equivalencies with mixed numbers.

Label the number line with proper and improper fractions – identifying the definition point (e.g., 1 on this number line) when proper fractions transition into improper fractions.

“Count the SPACES and Label the LINES” – Mantra.

Third, “How can I be sure my number line is correctly labeled?”

Students should know at this point that every fraction can represent two things: Part of a group and a division problem. Relative to the division expression, $5/5$ divides into 1 and $10/5$ divides into 2. Division of each improper fraction yields an integer (i.e., 1 or 2).

Fourth, “Convert a proper fraction (or improper fraction) to an equivalent decimal.”

Of course, any fraction can be selected. I choose the first one, usually, since it is the easiest to divide; however, it is important to point out that any fraction may be selected for the conversion.

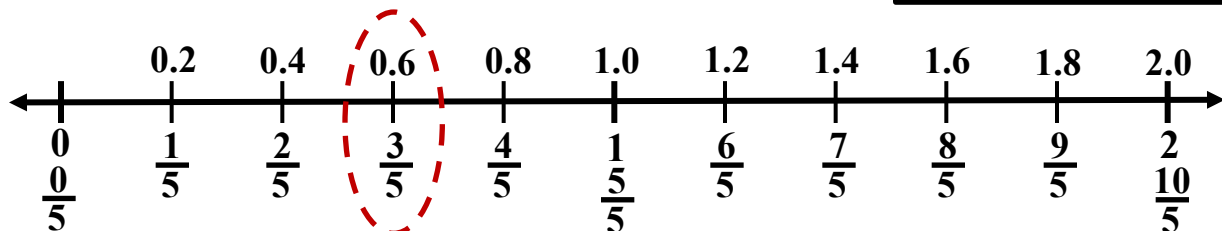
Roll $1/5$ to the right. Divide. $\frac{1}{5}$ $5 \overline{) 1.0}$

Add the equivalent decimals to the number line.

$$\begin{array}{r} 0.2 \\ 5 \overline{) 1.0} \\ - 1.0 \\ \hline 0 \end{array}$$

$\frac{1}{5} = 0.2$

Always write the equivalency.



Fifth, A teacher can pick any point on the number line. Choose a point on the fractional number line. Divide. Prove it is equivalent.

Let’s choose $3/5$.

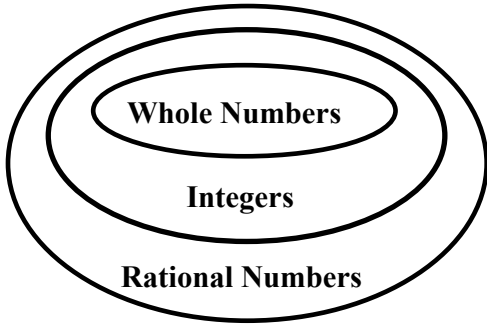
The number line is correct since $3/5 = 0.6$.

$$\begin{array}{r} 0.6 \\ 5 \overline{) 3.0} \\ - 3.0 \\ \hline 0 \end{array}$$

$\frac{3}{5} = 0.6$

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.)



Place a rectangle around the numbers that can only be Rational Numbers and circle numbers that can only be Whole Numbers.

-1 -5.5 2 -11 -1/2 -9

-6 5 0 110.5 3^{1/4} -2

4.) Write the multiples of each number on the line provided.

12: _____, 120

15: _____, 150

2.) Answer the questions.

- All whole numbers are integers. True False
- All integers are whole numbers. True False
- All even numbers are whole numbers. True False

3.) Order the integers below from *least to greatest*. Write the integers on the line provided.

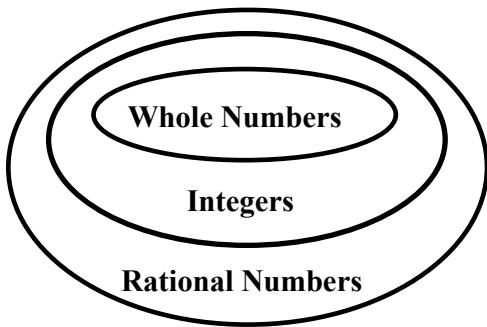
-1 -5 2 -11 3 -9

5.) Compute the product.

$\begin{array}{r} 43 \\ \times 2 \\ \hline \end{array}$	$\begin{array}{r} 76 \\ \times 4 \\ \hline \end{array}$	$\begin{array}{r} 93 \\ \times 5 \\ \hline \end{array}$
---	---	---

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.)



Place a rectangle around the numbers that can only be Rational Numbers and circle numbers that can only be Whole Numbers.

-1 -5.5 2 -11 -1/2 -9

-6 5 0 110.5 3^{1/4} -2

4.) Write the multiples of each number on the line provided.

12: _____, 120

15: _____, 150

2.) Answer the questions.

- All whole numbers are integers. True False
- All integers are whole numbers. True False
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3.) Order the integers below from *least to greatest*. Write the integers on the line provided.

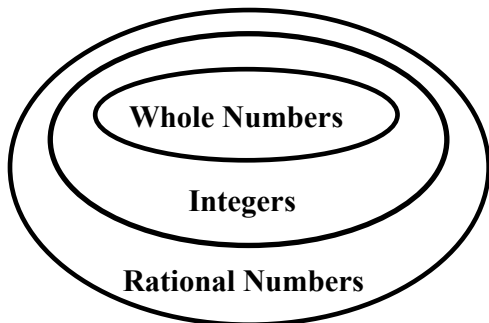
-1 -5 2 -11 3 -9

5.) Compute the product.

$\begin{array}{r} 43 \\ \times 2 \\ \hline \end{array}$	$\begin{array}{r} 76 \\ \times 4 \\ \hline \end{array}$	$\begin{array}{r} 93 \\ \times 5 \\ \hline \end{array}$
---	---	---

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.)



Place a rectangle around the numbers that can only be Rational Numbers and circle numbers that can only be Whole Numbers.

Int.-1 -5.5 2 -11 Int. $-\frac{1}{2}$ -9 Int.
 -6 Int. 5 0 110.5 $3\frac{1}{4}$ -2 Int.

4.) Write the multiples of each number on the line provided.

12: 0, 12, 24, 36, 48, 60, 72, 84, 96, 108, 120

15: 0, 15, 30, 45, 60, 75, 90, 105, 120, 135, 150

2.) Answer the questions.

- All whole numbers are integers. True False
0, 1, 2, 3, 4, Etc.
- All integers are whole numbers. True False
-1, -2, -3, -4, Etc.
- All even numbers are whole numbers. True False
0, 2, 4, 6, 8, Etc.

3.) Order the integers below from *least to greatest*. Write the integers on the line provided.

-1 -5 2 -11 3 -9

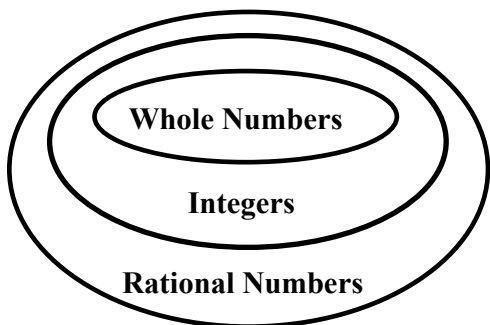
-11 -9 -5 -1 2 3

5.) Compute the product.

$\begin{array}{r} 43 \\ \times 2 \\ \hline 86 \end{array}$	$\begin{array}{r} 76 \\ \times 4 \\ \hline 304 \end{array}$	$\begin{array}{r} 93 \\ \times 5 \\ \hline 465 \end{array}$
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Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.)



Place a rectangle around the numbers that can only be Rational Numbers and circle numbers that can only be Whole Numbers.

Int.-1 -5.5 2 -11 Int. $-\frac{1}{2}$ -9 Int.
 -6 Int. 5 0 110.5 $3\frac{1}{4}$ -2 Int.

4.) Write the multiples of each number on the line provided.

12: 0, 12, 24, 36, 48, 60, 72, 84, 96, 108, 120

15: 0, 15, 30, 45, 60, 75, 90, 105, 120, 135, 150

2.) Answer the questions.

- All whole numbers are integers. True False
0, 1, 2, 3, 4, Etc.
- All integers are whole numbers. True False
-1, -2, -3, -4, Etc.
- All even numbers are whole numbers. True False
0, 2, 4, 6, 8, Etc.

3.) Order the integers below from *least to greatest*. Write the integers on the line provided.

-1 -5 2 -11 3 -9

-11 -9 -5 -1 2 3

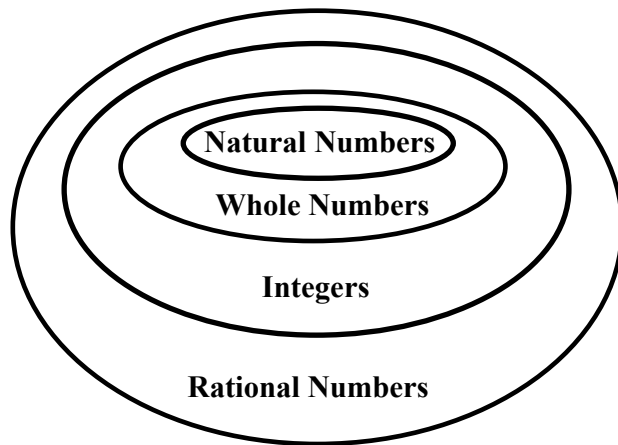
5.) Compute the product.

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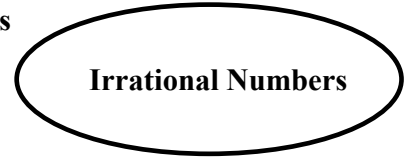
Teaching Tip Number 6

Number Types, Rounding, Improper to Mixed Number

Students should be able to draw the following Venn Diagram and write the numbers that separate each category.



Real Numbers



Rational Numbers – can be put in the p/q form. All numbers that repeat or terminate in decimal form (e.g., $\frac{1}{5}$, 3.2, $\frac{1}{7}$, -4.1, $\frac{2}{3}$, etc.)

Irrational Numbers – non-terminating and non-repeating (e.g., pi, e, etc.) ~ very special numbers.

Real Numbers – Every type of number...or Rational and Irrational Numbers since they include all the other number types.

Definitions:

Natural Numbers = 1; 2, 3, 4, etc.

Whole Numbers – 0, Natural Numbers

Integers – (... -4, -3, -2, -1, Whole Numbers)

Note: Within this Venn diagram, Rational Numbers present the primary challenge for students, as they must accurately convert fractions into decimals. This often requires calculating to multiple decimal places to identify repeating patterns, such as in the case of $\frac{1}{7}$. Irrational Numbers represent a more advanced concept for the sixth grade; using π (3.14159...) serves as an ideal example of a non-terminating, non-repeating value that students will soon apply to area and circumference calculations.

Rounding Whole Numbers and Decimal Numbers ~ Elementary Grades Review

Utilize spaced repetition to provide rapid reviews of whole-number place value. Since students should already be proficient up to the millions place, these reviews are designed to be quick and reinforcing. Once place value positions are mastered, bridge into rounding using the familiar elementary chant: *“Find the place, look next door; five or bigger, add one more!”* As students demonstrate fluency with whole numbers, extend the practice to include rounding decimals up to the thousandths place.

Converting Improper Fractions to Mixed Numbers

Begin this skill pedagogy with a visual – a pictorial – so students understand the physical meaning of the mathematical operations shown in the second method.

Method 1:

$$\frac{15}{4} \rightarrow \begin{array}{c} 1 + 1 + 1 + \frac{3}{4} = 3\frac{3}{4} \\ \begin{array}{cccc} \begin{array}{|c|c|} \hline \blacksquare & \blacksquare \\ \hline \end{array} & \begin{array}{|c|c|} \hline \blacksquare & \blacksquare \\ \hline \end{array} & \begin{array}{|c|c|} \hline \blacksquare & \blacksquare \\ \hline \end{array} & \begin{array}{|c|c|} \hline \blacksquare & \blacksquare \\ \hline \end{array} \\ \hline \end{array} \\ \frac{4}{4} + \frac{4}{4} + \frac{4}{4} + \frac{3}{4} = \frac{15}{4} = 3\frac{3}{4} \end{array}$$

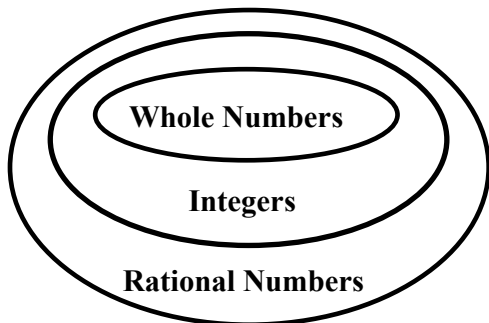
Method 2: Roll I.F. to the right! Right!

$$\frac{15}{4} \rightarrow 4 \overline{)15} \begin{array}{r} 3 \\ -12 \\ \hline 3 \end{array} \frac{3}{4} \quad \boxed{\frac{15}{4} = 3\frac{3}{4}}$$

Draw a picture like Method 1.

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.)



Place a rectangle around the numbers that are only Integers and circle numbers that can only be a Whole Number.

- 6 -0.5 2 -77 $-3/7$ -3
-1 0 8 1.25 $3\frac{1}{4}$ -2

2.) Answer the questions.

Rational Numbers ARE Integers and Whole Numbers.

- Rational Numbers can be whole numbers and integers. True False
5.5 can be expressed $55/10$ or $11/2$ or $5\frac{1}{2}$.
- Rational Numbers are non-terminating numbers. True False *Terminating ($1/2$) and repeating ($2/3$).*

3.) Find the least common multiple (LCM) of 4 and 5. Circle the LCM.

4: 0, 4, 8, 12, 16, 20, 24, 28, 32

5: 0, 5, 10, 15, 20, 25, 30, 35, 40

5.) Compute the product.

$\begin{array}{r} 78 \\ \times 4 \\ \hline 312 \end{array}$	$\begin{array}{r} 90 \\ \times 8 \\ \hline 720 \end{array}$	$\begin{array}{r} 91 \\ \times 9 \\ \hline 819 \end{array}$
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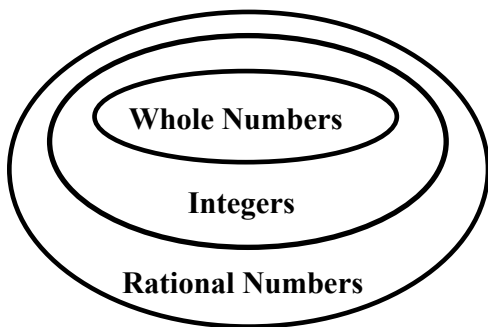
4.) Write the multiples of each number on the line provided.

12: 0, 12, 24, 36, 48, 60, 72, 84, 96, 108, 120

15: 0, 15, 30, 45, 60, 75, 90, 105, 120, 135, 150

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.)



Place a rectangle around the numbers that are only Rational Numbers and circle numbers that can only be a Whole Number.

- 6 -0.5 2 -77 $-3/7$ -3
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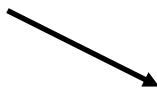
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12: 0, 12, 24, 36, 48, 60, 72, 84, 96, 108, 120

15: 0, 15, 30, 45, 60, 75, 90, 105, 120, 135, 150

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

- 1.) Match the correct term with the example using an arrow. 2.) Compute the product.

- A.) Whole Numbers ▪ ...-2, -1, 0, 1, 2, 3...
- B.) Natural Numbers ▪ 0, 1, 2, 3, 4... 
- C.) Integers ▪ 1, 2, 3, 4...
- D.) Rational Numbers ▪ 3.5, ²/₃, ³⁰/₆, 3, -5...

$$\begin{array}{r} 178 \\ \times 5 \\ \hline \end{array} \qquad \begin{array}{r} 20 \\ \times 8 \\ \hline \end{array} \qquad \begin{array}{r} 31 \\ \times 8 \\ \hline \end{array}$$

- 3.) Subtract. Check your work by adding up.

$$\begin{array}{r} 660 \\ - 193 \\ \hline \end{array}$$

- 4.) Find the least common multiple (LCM) of 7 and 3. Circle the LCM.

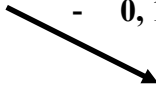
3: 0, 3, 6, 9, 12, 15, 18, 21, 24

7: 0, 7, 14, 21, 28, 35, 42, 49, 56

- 5.) Blaine and Jim pooled their money. They had 5 dimes and 3 quarters. How much money did Blaine and Jim have together?

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

- 1.) Match the correct term with the example using an arrow. 2.) Compute the product.

- 1.) Whole Numbers • ...-2, -1, 0, 1, 2, 3...
- 2.) Natural Numbers - 0, 1, 2, 3, 4... 
- 3.) Integers • 1, 2, 3, 4...
- 4.) Rational Numbers • 3.5, ²/₃, ³⁰/₆, 3, -5...

$$\begin{array}{r} 178 \\ \times 5 \\ \hline \end{array} \qquad \begin{array}{r} 20 \\ \times 8 \\ \hline \end{array} \qquad \begin{array}{r} 31 \\ \times 8 \\ \hline \end{array}$$

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3: 0, 3, 6, 9, 12, 15, 18, 21, 24

7: 0, 7, 14, 21, 28, 35, 42, 49, 56

- 5.) Blaine and Jim pooled their money. They had 5 dimes and 3 quarters. How much money did Blaine and Jim have together?

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

- 1.) Match the correct term with the example using an arrow. 2.) Compute the product.

- A.) Whole Numbers  • ...-2, -1, 0, 1, 2, 3...
- B.) Natural Numbers  • 0, 1, 2, 3, 4...
- C.) Integers  • 1, 2, 3, 4...
- D.) Rational Numbers  • 3.5, ²/₃, ³⁰/₆, 3, -5...

$$\begin{array}{r} 178 \\ \times 5 \\ \hline 890 \end{array} \quad \begin{array}{r} 20 \\ \times 8 \\ \hline 160 \end{array} \quad \begin{array}{r} 31 \\ \times 8 \\ \hline 248 \end{array}$$

- 3.) Subtract. Check your work by adding up.

$$\begin{array}{r} 660 \\ - 193 \\ \hline 467 \end{array} \quad \begin{array}{r} 467 \\ + 193 \\ \hline 660 \end{array} \checkmark$$

- 4.) Find the least common multiple (LCM) of 7 and 3. Circle the LCM.

3: 0, 3, 6, 9, 12, 15, 18, 21, 24

7: 0, 7, 14, 21, 28, 35, 42, 49, 56





- 5.) Blaine and Jim pooled their money. They had 5 dimes and 3 quarters. How much money did Blaine and Jim have together?

Show solution using parenthesis and an equation form.

$$(5 \times 10) + (3 \times 25) = 50 + 75 = 125 = \underline{\$1.25}$$

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

- 1.) Match the correct term with the example using an arrow. 2.) Compute the product.

- 1.) Whole Numbers  • ...-2, -1, 0, 1, 2, 3...
- 2.) Natural Numbers  • 0, 1, 2, 3, 4...
- 3.) Integers  • 1, 2, 3, 4...
- 4.) Rational Numbers  • 3.5, ²/₃, ³⁰/₆, 3, -5...

$$\begin{array}{r} 178 \\ \times 5 \\ \hline 890 \end{array} \quad \begin{array}{r} 20 \\ \times 8 \\ \hline 160 \end{array} \quad \begin{array}{r} 31 \\ \times 8 \\ \hline 248 \end{array}$$

- 3.) Subtract. Check your work by adding up.

$$\begin{array}{r} 660 \\ - 193 \\ \hline 467 \end{array} \quad \begin{array}{r} 467 \\ + 193 \\ \hline 660 \end{array} \checkmark$$

- 4.) Find the least common multiple (LCM) of 7 and 3. Circle the LCM.

3: 0, 3, 6, 9, 12, 15, 18, 21, 24

7: 0, 7, 14, 21, 28, 35, 42, 49, 56

- 5.) Blaine and Jim pooled their money. They had 5 dimes and 3 quarters. How much money did Blaine and Jim have together?

Show solution using parenthesis and an equation form.

$$(5 \times 10) + (3 \times 25) = 50 + 75 = 125 = \underline{\$1.25}$$

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

- 1.) Match the correct term with the example using an arrow. 2.) Compute the quotient.

- A.) Whole Numbers ▪ $\frac{2}{5}, -\frac{2}{5}, 3.7, 0, -4$
- B.) Natural Numbers ▪ $0, 1, 2, 3, 4...$
- C.) Integers ▪ $1, 2, 3, 4...$
- D.) Rational Numbers ▪ $0, -8, 7, 4$

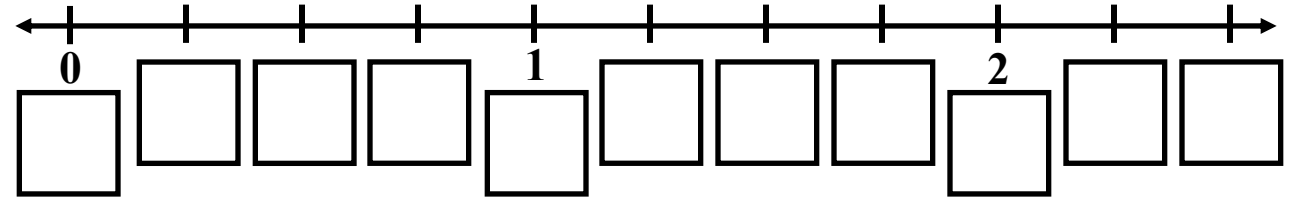
$$\begin{array}{r} 3 \overline{)9} \\ 7 \overline{)14} \\ 2 \overline{)4} \\ 4 \overline{)8} \\ 7 \overline{)21} \\ 3 \overline{)15} \end{array}$$

- 3.) Rewrite each Improper Fraction as an equivalent Mixed Number. 4.) Order using $<, >$ or $=$
(Mentally Roll fraction to the Right)

$$\frac{9}{4} = \boxed{} \quad \frac{3}{2} = \boxed{} \quad \frac{4}{4} = \boxed{}$$

$$\begin{array}{l} 2 \bigcirc -5 \quad -2 \bigcirc -1 \\ 12 \bigcirc 13 \quad -2 \bigcirc 0 \end{array}$$

- 5.) Complete the fractional number line for proper and improper fractions.



Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

- 1.) Match the correct term with the example using an arrow. 2.) Compute the quotient.

- A.) Whole Numbers • $\frac{2}{5}, -\frac{2}{5}, 3.7, 0, -4$
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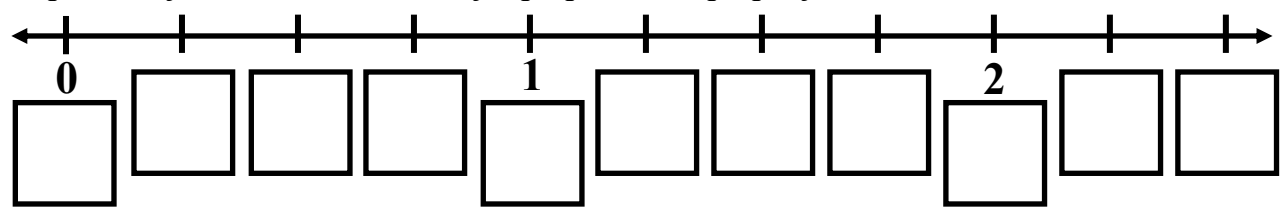
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- B.) Natural Numbers ▪ $0, 1, 2, 3, 4, \dots$
- C.) Integers ▪ $1, 2, 3, 4, \dots$
- D.) Rational Numbers ▪ $0, -8, 7, 4$

2.) Compute the quotient.

$$\begin{array}{r} 3 \\ 3 \overline{)9} \end{array} \quad \begin{array}{r} 2 \\ 7 \overline{)14} \end{array} \quad \begin{array}{r} 2 \\ 2 \overline{)4} \end{array}$$

$$\begin{array}{r} 2 \\ 4 \overline{)8} \end{array} \quad \begin{array}{r} 3 \\ 7 \overline{)21} \end{array} \quad \begin{array}{r} 5 \\ 3 \overline{)15} \end{array}$$

3.) Rewrite each Improper Fraction as an equivalent Mixed Number.
(Mentally Roll fraction to the Right)

$$\frac{9}{4} = \boxed{2 \frac{1}{4}} \quad \frac{3}{2} = \boxed{1 \frac{1}{2}} \quad \frac{4}{4} = \boxed{1}$$

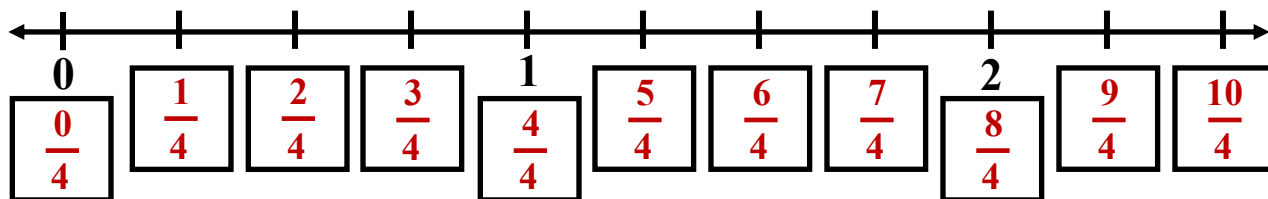
4.) Order using $<$, $>$ or $=$

$$2 \text{ (} > \text{)} -5 \quad -2 \text{ (} < \text{)} -1$$

$$12 \text{ (} < \text{)} 13 \quad -2 \text{ (} < \text{)} 0$$

Focus students' attention on proper and improper fractions' locations on Number Line.

5.) Complete the fractional number line for proper and improper fractions.



Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Match the correct term with the example using an arrow.

- A.) Whole Numbers • $\frac{2}{5}, -\frac{2}{5}, 3.7, 0, -4$
- B.) Natural Numbers • $0, 1, 2, 3, 4, \dots$
- C.) Integers • $1, 2, 3, 4, \dots$
- D.) Rational Numbers • $0, -8, 7, 4$

2.) Compute the quotient.

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3.) Rewrite each Improper Fraction as an equivalent Mixed Number.
(Mentally Roll fraction to the Right)

$$\frac{9}{4} = \boxed{2 \frac{1}{4}} \quad \frac{3}{2} = \boxed{1 \frac{1}{2}} \quad \frac{4}{4} = \boxed{1}$$

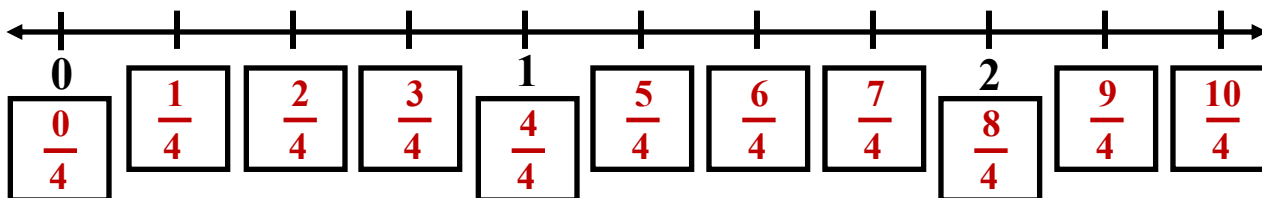
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$$2 \text{ (} > \text{)} -5 \quad -2 \text{ (} < \text{)} -1$$

$$12 \text{ (} < \text{)} 13 \quad -2 \text{ (} < \text{)} 0$$

Focus students' attention on proper and improper fractions' locations on Number Line.

5.) Complete the fractional number line for proper and improper fractions.



Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

- 1.) Match the correct term with the example using an arrow. 2.) Compute the quotient.

A.) Whole Numbers ▪ 0, 1, 2, 3, 4...

B.) Natural Numbers ▪ $\frac{1}{3}$, $-\frac{1}{2}$, 4.7, -1.2, 3

C.) Integers ▪ 0, -1, 7, 4

D.) Rational Numbers ▪ 1, 2, 3, 4...

$$7 \overline{)21} \quad 5 \overline{)25} \quad 2 \overline{)10}$$

$$4 \overline{)12} \quad 7 \overline{)28} \quad 3 \overline{)18}$$

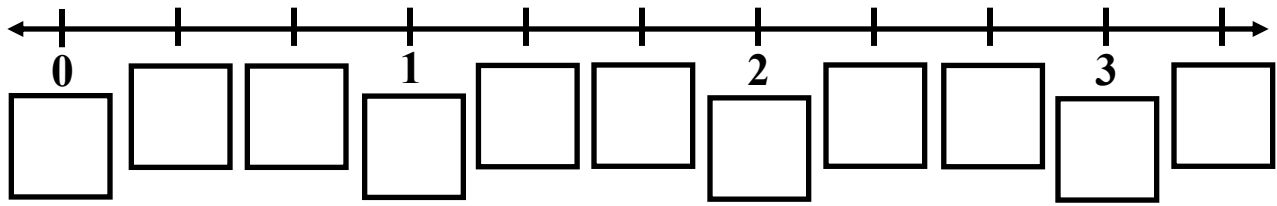
- 3.) Rewrite each Improper Fraction as an equivalent Mixed Number. 4.) Order using $<$, $>$ or $=$
(Mentally Roll fraction to the Right)

$$\frac{5}{4} = \boxed{} \quad \frac{5}{2} = \boxed{} \quad \frac{6}{3} = \boxed{}$$

$$-4 \bigcirc -3 \quad 2 \bigcirc -1$$

$$12 \bigcirc -13 \quad 2 \bigcirc 0$$

- 5.) Complete the fractional number line for proper and improper fractions.



Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

- 1.) Match the correct term with the example using an arrow. 2.) Compute the quotient.

A.) Whole Numbers • 0, 1, 2, 3, 4...

B.) Natural Numbers • $\frac{1}{3}$, $-\frac{1}{2}$, 4.7, -1.2, 3

C.) Integers • 0, -1, 7, 4

D.) Rational Numbers • 1, 2, 3, 4...

$$7 \overline{)21} \quad 5 \overline{)25} \quad 2 \overline{)10}$$

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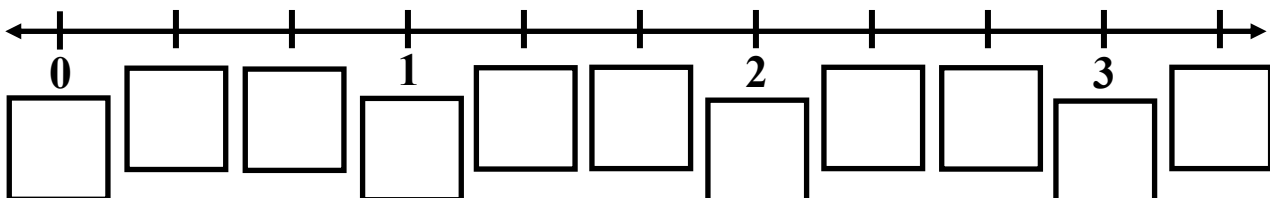
- 3.) Rewrite each Improper Fraction as an equivalent Mixed Number. 4.) Order using $<$, $>$ or $=$
(Mentally Roll fraction to the Right)

$$\frac{5}{4} = \boxed{} \quad \frac{5}{2} = \boxed{} \quad \frac{6}{3} = \boxed{}$$

$$-4 \bigcirc -3 \quad 2 \bigcirc -1$$

$$12 \bigcirc -13 \quad 2 \bigcirc 0$$

- 5.) Complete the fractional number line for proper and improper fractions.



Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

- 1.) Match the correct term with the example using an arrow. 2.) Compute the quotient.

A.) Whole Numbers \longrightarrow \blacksquare 0, 1, 2, 3, 4...

B.) Natural Numbers \nearrow \blacksquare $\frac{1}{3}$, $-\frac{1}{2}$, 4.7, -1.2, 3

C.) Integers \longrightarrow \blacksquare 0, -1, 7, 4

D.) Rational Numbers \searrow \blacksquare 1, 2, 3, 4...

$$7 \overline{)21}^3 \quad 5 \overline{)25}^5 \quad 2 \overline{)10}^5$$

$$4 \overline{)12}^3 \quad 7 \overline{)28}^4 \quad 3 \overline{)18}^6$$

- 3.) Rewrite each Improper Fraction as an equivalent Mixed Number. (Mentally Roll fraction to the Right) 4.) Order using $<$, $>$ or $=$

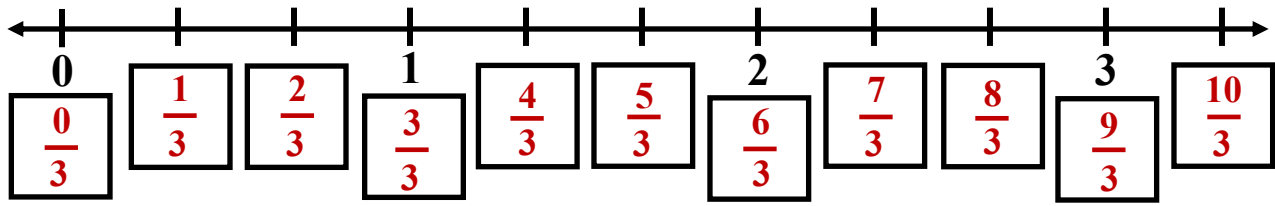
$$\frac{5}{4} = \boxed{1 \frac{1}{4}} \quad \frac{5}{2} = \boxed{2 \frac{1}{2}} \quad \frac{6}{3} = \boxed{2}$$

$$-4 \text{ (<) } -3 \quad 2 \text{ (>) } -1$$

$$12 \text{ (>) } -13 \quad 2 \text{ (>) } 0$$

Focus students' attention on proper and improper fractions' locations on Number Line.

- 5.) Complete the fractional number line for proper and improper fractions.



Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

- 1.) Match the correct term with the example using an arrow. 2.) Compute the quotient.

A.) Whole Numbers \longrightarrow \bullet 0, 1, 2, 3, 4...

B.) Natural Numbers \nearrow \bullet $\frac{1}{3}$, $-\frac{1}{2}$, 4.7, -1.2, 3

C.) Integers \longrightarrow \bullet 0, -1, 7, 4

D.) Rational Numbers \searrow \bullet 1, 2, 3, 4...

$$7 \overline{)21}^3 \quad 5 \overline{)25}^5 \quad 2 \overline{)10}^5$$

$$4 \overline{)12}^3 \quad 7 \overline{)28}^4 \quad 3 \overline{)18}^6$$

- 3.) Rewrite each Improper Fraction as an equivalent Mixed Number. (Mentally Roll fraction to the Right) 4.) Order using $<$, $>$ or $=$

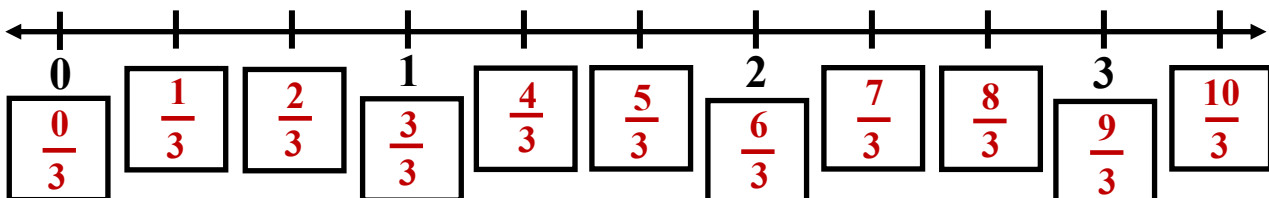
$$\frac{5}{4} = \boxed{1 \frac{1}{4}} \quad \frac{5}{2} = \boxed{2 \frac{1}{2}} \quad \frac{6}{3} = \boxed{2}$$

$$-4 \text{ (<) } -3 \quad 2 \text{ (>) } -1$$

$$12 \text{ (>) } -13 \quad 2 \text{ (>) } 0$$

Focus students' attention on proper and improper fractions' locations on Number Line.

- 5.) Complete the fractional number line for proper and improper fractions.



Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

- 1.) Rewrite each Mixed Number as an equivalent Improper Fraction. 2.) Compute the quotient.

$$x \left(3 \frac{1}{4} = (3 \times 4) + 1 = \frac{13}{4} \right)$$

$1 \frac{1}{4} = \boxed{}$

$2 \frac{1}{3} = \boxed{}$

$5 \frac{3}{4} = \boxed{}$

$7 \overline{)21}$

$5 \overline{)25}$

$2 \overline{)10}$

$4 \overline{)12}$

$7 \overline{)28}$

$3 \overline{)18}$

- 3.) Rewrite each Improper Fraction as an equivalent Mixed Number. 4.) Compute the product.
(Mentally Roll fraction to the Right)

$\frac{5}{4} = \boxed{}$

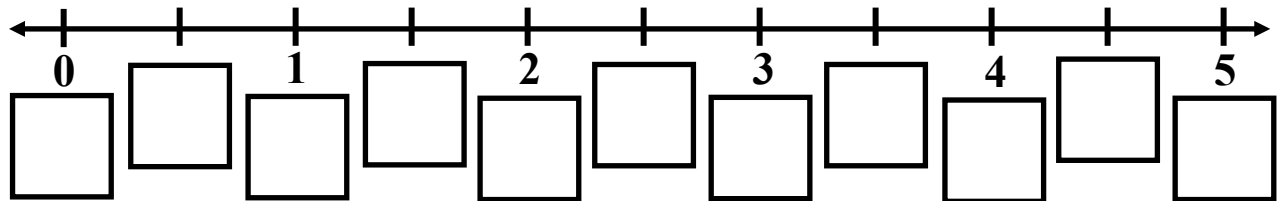
$\frac{7}{3} = \boxed{}$

$\frac{3}{3} = \boxed{}$

$$\begin{array}{r} 43 \\ \times 21 \\ \hline \end{array}$$

$$\begin{array}{r} 60 \\ \times 21 \\ \hline \end{array}$$

- 5.) Complete the fractional number line for proper and improper fractions.



Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

- 1.) Rewrite each Mixed Number as an equivalent Improper Fraction. 2.) Compute the quotient.

$$x \left(3 \frac{1}{4} = (3 \times 4) + 1 = \frac{13}{4} \right)$$

$1 \frac{1}{4} = \boxed{}$

$2 \frac{1}{3} = \boxed{}$

$5 \frac{3}{4} = \boxed{}$

$7 \overline{)21}$

$5 \overline{)25}$

$2 \overline{)10}$

$4 \overline{)12}$

$7 \overline{)28}$

$3 \overline{)18}$

- 3.) Rewrite each Improper Fraction as an equivalent Mixed Number. 4.) Compute the product.
(Mentally Roll fraction to the Right)

$\frac{5}{4} = \boxed{}$

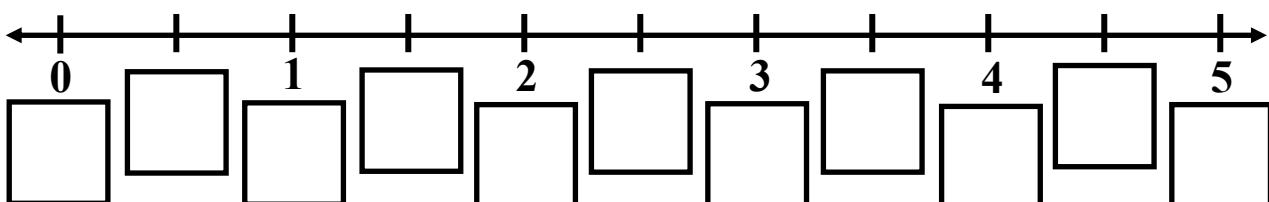
$\frac{7}{3} = \boxed{}$

$\frac{3}{3} = \boxed{}$

$$\begin{array}{r} 43 \\ \times 21 \\ \hline \end{array}$$

$$\begin{array}{r} 60 \\ \times 21 \\ \hline \end{array}$$

- 5.) Complete the fractional number line for proper and improper fractions.



Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

- 1.) Rewrite each Mixed Number as an equivalent Improper Fraction. 2.) Compute the quotient.

$$x \left(3\frac{1}{4} = (3 \times 4) + 1 = \frac{13}{4} \right)$$

$$7 \overline{)21} \quad 5 \overline{)25} \quad 2 \overline{)10}$$

$$1\frac{1}{4} = \boxed{\frac{5}{4}} \quad 2\frac{1}{3} = \boxed{\frac{7}{3}} \quad 5\frac{3}{4} = \boxed{\frac{23}{4}}$$

$$4 \overline{)12} \quad 7 \overline{)28} \quad 3 \overline{)18}$$

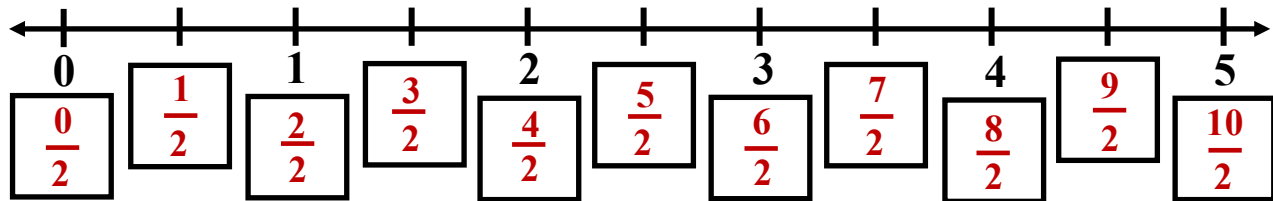
- 3.) Rewrite each Improper Fraction as an equivalent Mixed Number. 4.) Compute the product.
(Mentally Roll fraction to the Right)

$$\frac{5}{4} = \boxed{1\frac{1}{4}} \quad \frac{7}{3} = \boxed{2\frac{1}{3}} \quad \frac{3}{3} = \boxed{1}$$

$$\begin{array}{r} 43 \\ \times 21 \\ \hline 903 \end{array} \quad \begin{array}{r} 60 \\ \times 21 \\ \hline 1,260 \end{array}$$

- 5.) Complete the fractional number line for proper and improper fractions.

Focus students' attention on proper and improper fractions' locations on N.L.



Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

- 1.) Rewrite each Mixed Number as an equivalent Improper Fraction. 2.) Compute the quotient.

$$x \left(3\frac{1}{4} = (3 \times 4) + 1 = \frac{13}{4} \right)$$

$$7 \overline{)21} \quad 5 \overline{)25} \quad 2 \overline{)10}$$

$$1\frac{1}{4} = \boxed{\frac{5}{4}} \quad 2\frac{1}{3} = \boxed{\frac{7}{3}} \quad 5\frac{3}{4} = \boxed{\frac{23}{4}}$$

$$4 \overline{)12} \quad 7 \overline{)28} \quad 3 \overline{)18}$$

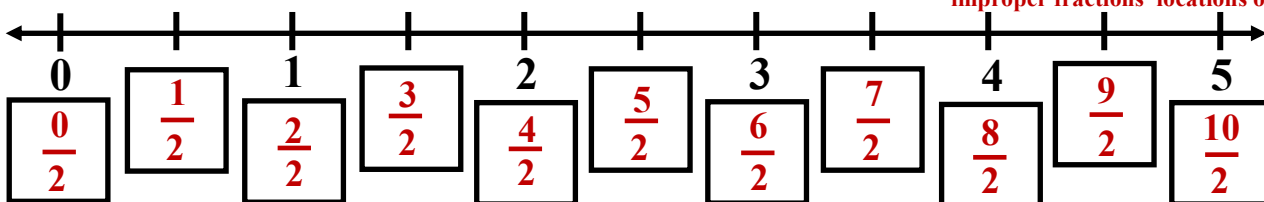
- 3.) Rewrite each Improper Fraction as an equivalent Mixed Number. 4.) Compute the product.
(Mentally Roll fraction to the Right)

$$\frac{5}{4} = \boxed{1\frac{1}{4}} \quad \frac{7}{3} = \boxed{2\frac{1}{3}} \quad \frac{3}{3} = \boxed{1}$$

$$\begin{array}{r} 43 \\ \times 21 \\ \hline 903 \end{array} \quad \begin{array}{r} 60 \\ \times 21 \\ \hline 1,260 \end{array}$$

- 5.) Complete the fractional number line for proper and improper fractions.

Focus students' attention on proper and improper fractions' locations on N.L.



Teaching Tip Number 7

Mixed Numbers to Improper Fraction and Fractional-Decimal Number Lines – Stage 2

Converting Mixed Numbers to Improper Fractions

Begin this skill pedagogy with a visual – a pictorial – so students understand the physical meaning of the mathematical operations shown in the second method.

Method 1:

$$3 \frac{1}{2} \rightarrow \begin{array}{cccc} 1 & + & 1 & + & 1 & + & \frac{1}{2} & = & 3 \frac{1}{2} \\ \hline \blacksquare & & \blacksquare & & \blacksquare & & \square & & \\ \frac{2}{2} & + & \frac{2}{2} & + & \frac{2}{2} & + & \frac{1}{2} & = & \frac{7}{2} \end{array}$$

Method 2: *Always have students draw a picture like Method 1.*

$$3 \frac{1}{2} = (3 \times 2) + 1 = \frac{7}{2}$$

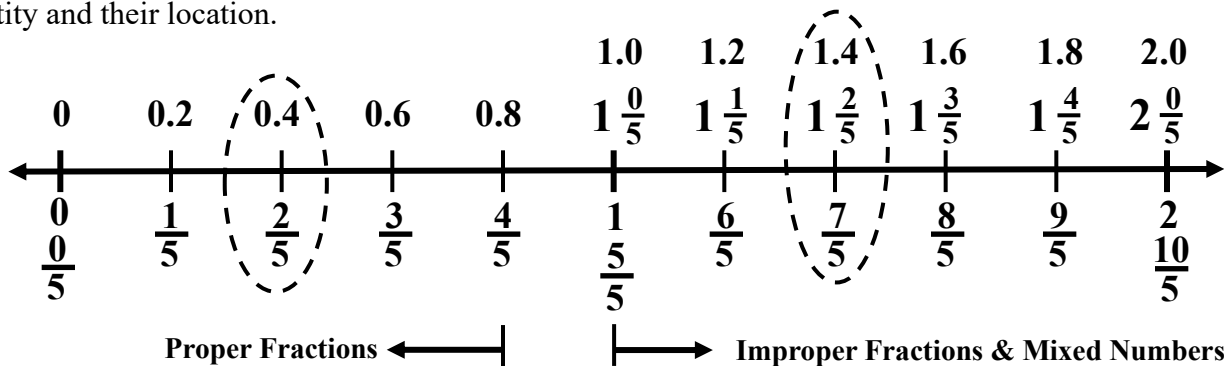
(3 groups of 2)

Note: Students need to understand that the same picture of the improper fraction or mixed number is the SAME fractional picture; hence, they are equivalent. With practice, they will! Finally, always require students to write the equivalency of the mixed number and improper fraction, so it is crystal clear to them that the two entities are equivalent.

$\frac{7}{2} = 3 \frac{1}{2}$

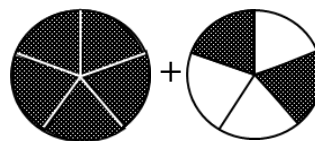
Fractional - Decimal Number Lines – Pedagogy – Stage 2

Add mixed numbers to the decimal, proper and improper fractional number line (Stage 1). Students should know on the number line the specific names – mixed numbers, proper fraction and improper fraction of each entity and their location.



Given an improper fraction or mixed number, students should convert to its equivalent entity. This qualitative approach to fractional number lines to connect all the fractional and decimal pieces **MUST be practiced** with blank number lines – given only zero and whole numbers labeled. Every day, during the spaced repetition pedagogy, students master this next step: *proper fractions, improper fractions and mixed numbers*. Finally after labeling all points on the number line, always pick a point on the number line and require students to **DRAW** a pictorial of the equivalency to visually illustrate that the improper fraction and mixed number represent the same thing. For example, let's choose $\frac{7}{5}$, $1 \frac{2}{5}$ and 1.4 from the above number line. Students should **also** write the equivalency.

From Stage 1, convert $\frac{2}{5}$ to an equivalent decimal of 0.4.



$\frac{7}{5} = 1 \frac{2}{5} = 1.4$

$$\frac{5}{5} \text{ or } 1 \frac{0}{5} + \frac{2}{5} = \frac{7}{5} \text{ or } 1 \frac{2}{5}$$

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Rewrite each Mixed Number as an equivalent Improper Fraction.

$$x \left(3 \frac{1}{4} = (3 \times 4) + 1 = \frac{13}{4} \right)$$

$$2 \frac{1}{5} = \boxed{}$$

$$4 \frac{3}{4} = \boxed{}$$

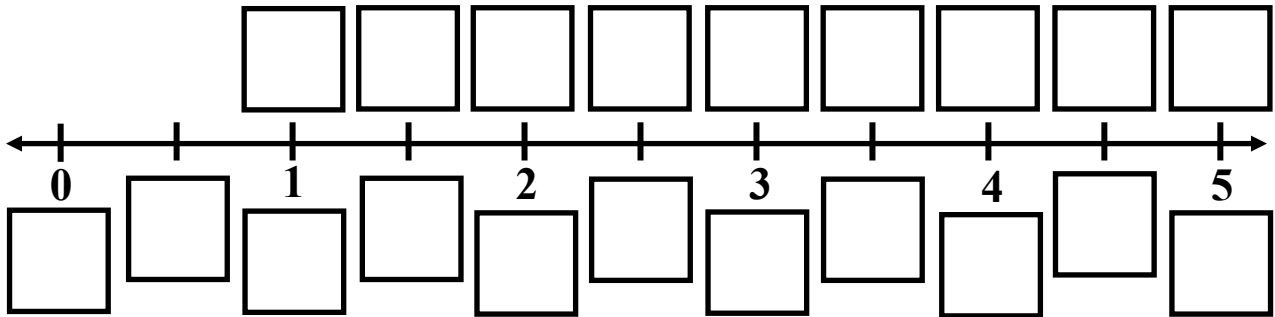
2.) Rewrite each Improper Fraction as an equivalent Mixed Number.

$$\frac{7}{4} = \boxed{} \quad \frac{7}{2} = \boxed{} \quad \frac{6}{2} = \boxed{}$$

3.) All whole numbers and integers are rational numbers. True or False (circle answer)

$$413 \times 6 =$$

5.) Complete the fractional number line for proper, improper fractions and mixed numbers.



Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Rewrite each Mixed Number as an equivalent Improper Fraction.

$$x \left(3 \frac{1}{4} = (3 \times 4) + 1 = \frac{13}{4} \right)$$

$$2 \frac{1}{5} = \boxed{}$$

$$4 \frac{3}{4} = \boxed{}$$

2.) Rewrite each Improper Fraction as an equivalent Mixed Number.

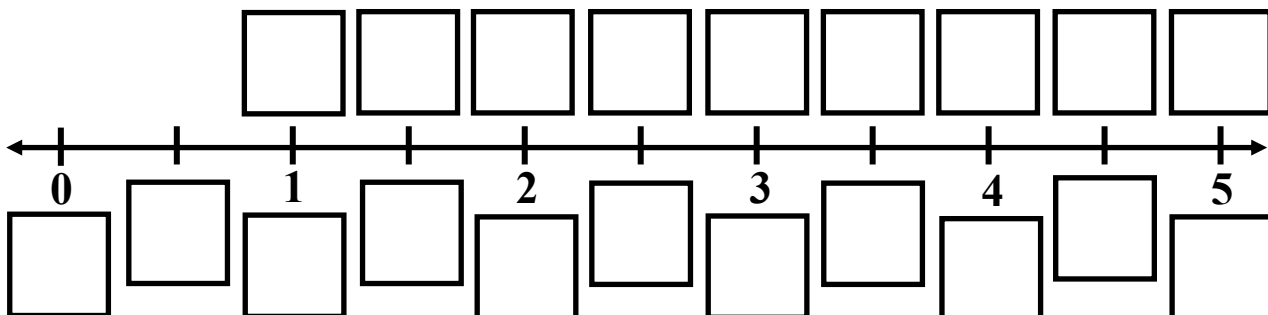
$$\frac{7}{4} = \boxed{} \quad \frac{7}{2} = \boxed{} \quad \frac{6}{2} = \boxed{}$$

4.) Compute the product. Rewrite Vertically.

$$413 \times 6 =$$

3.) All whole numbers and integers are rational numbers. True or False (circle answer)

5.) Complete the fractional number line for proper, improper fractions and mixed numbers.



Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Rewrite each Mixed Number as an equivalent Improper Fraction.

$$3\frac{1}{4} = (3 \times 4) + 1 = \frac{13}{4}$$

$$2\frac{1}{5} = \boxed{\frac{11}{5}}$$

$$4\frac{3}{4} = \boxed{\frac{19}{4}}$$

2.) Rewrite each Improper Fraction as an equivalent Mixed Number.

$$\frac{7}{4} = \boxed{1\frac{3}{4}}$$

$$\frac{7}{2} = \boxed{3\frac{1}{2}}$$

$$\frac{6}{2} = \boxed{2}$$

3.) All whole numbers and integers are rational numbers. (True or False) (circle answer)

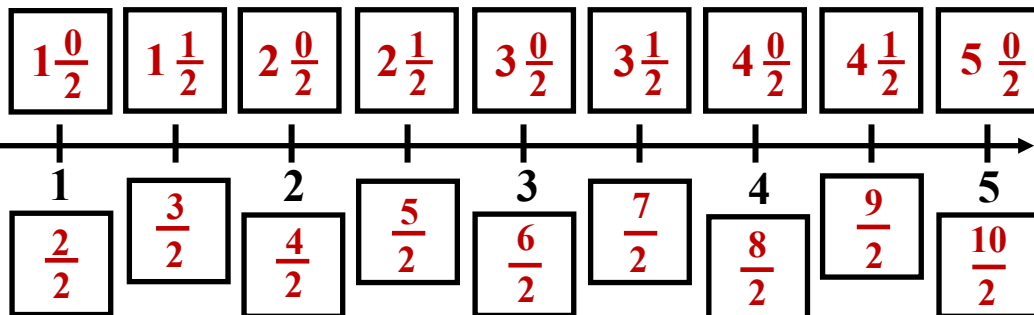
Draw Venn Diagram to illustrate.

$$413 \times 6 = 2,478$$

Note: There is a reason to write $1\frac{1}{2}$ instead of 1. Conversions between forms, if number line begins at a whole number other than zero (0).

5.) Complete the fractional number line for proper, improper fractions and mixed numbers.

Stress that $\frac{1}{2} = 2 = 2\frac{0}{2}$.
Number Line is correct!
Quick mental calculation.



Students can draw a pictorial of an equivalency on back of paper.

Example: $2\frac{1}{2} = \frac{5}{2}$

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Rewrite each Mixed Number as an equivalent Improper Fraction.

$$3\frac{1}{4} = (3 \times 4) + 1 = \frac{13}{4}$$

$$2\frac{1}{5} = \boxed{\frac{11}{5}}$$

$$4\frac{3}{4} = \boxed{\frac{19}{4}}$$

2.) Rewrite each Improper Fraction as an equivalent Mixed Number.

$$\frac{7}{4} = \boxed{1\frac{3}{4}}$$

$$\frac{7}{2} = \boxed{3\frac{1}{2}}$$

$$\frac{6}{2} = \boxed{2}$$

4.) Compute the product. Rewrite Vertically.

$$413 \times 6 = 2,478$$

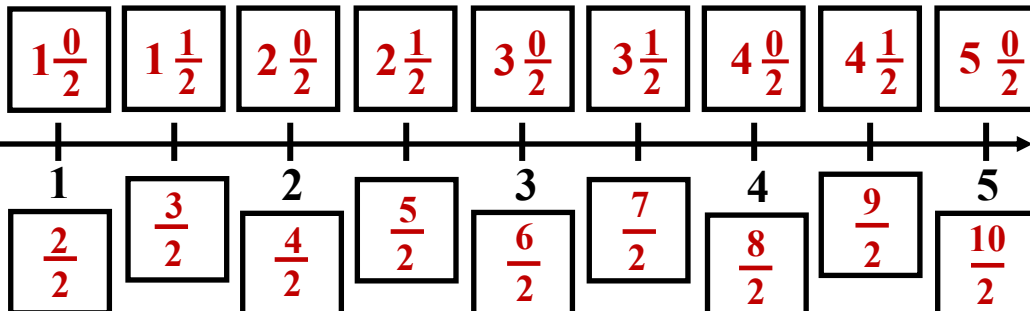
3.) All whole numbers and integers are rational numbers. (True or False) (circle answer)

Draw Venn Diagram to illustrate.

Note: There is a reason to write $1\frac{1}{2}$ instead of 1. Conversions between forms, if number line begins at a whole number other than zero (0).

5.) Complete the fractional number line for proper, improper fractions and mixed numbers.

Stress that $\frac{1}{2} = 2 = 2\frac{0}{2}$.
Number Line is correct!
Quick mental calculation.



Students can draw a pictorial of an equivalency on back of paper.

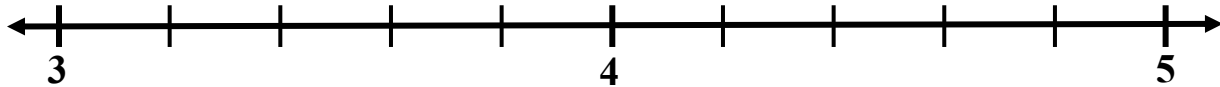
Example: $2\frac{1}{2} = \frac{5}{2}$

Teaching Tip Number 8

Fractional - Decimal Number Lines – Pedagogy – Stage 3

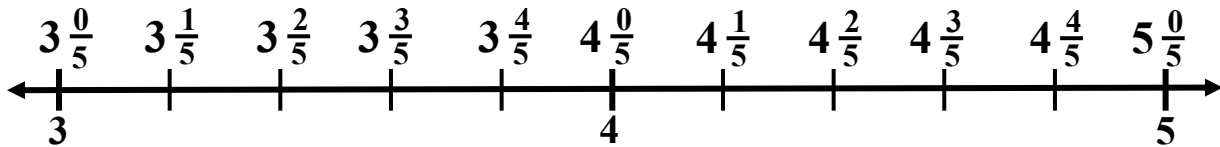
The situation when the fractional-decimal number line does not begin at zero (0), but a whole number greater than 1 whole. This situation involves students using the whole numbers with $\frac{0}{2}$ to quickly convert to a and improper fraction since mixed numbers are easily known. Additionally, since there are not proper fractions, it can be an easier situation for the students to grasp.

Example fractional number line: (Label all improper fractions, mixed numbers and decimals)

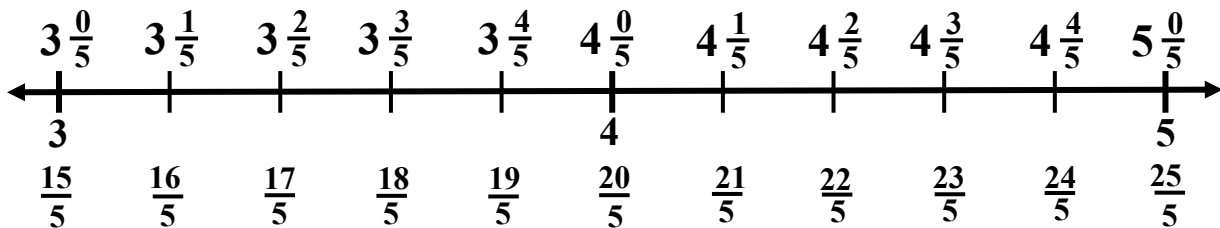


The number line is in fifths: *Five equal SPACES between each whole number or integer.*

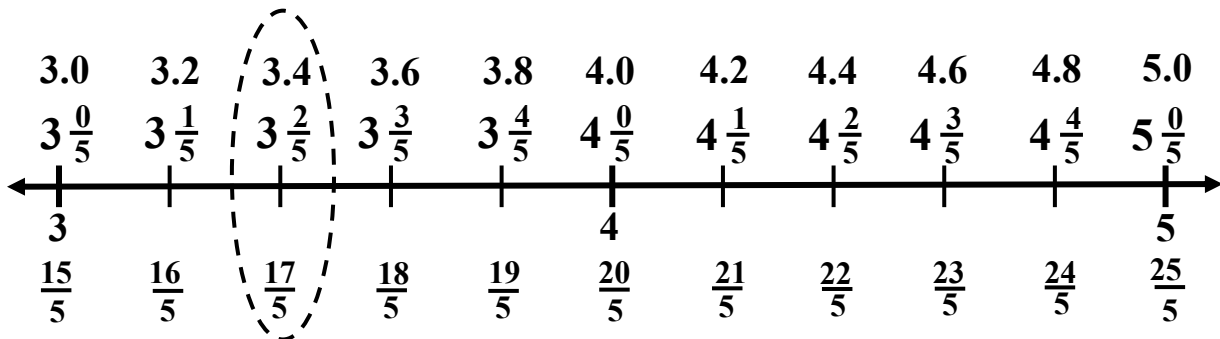
Label the mixed numbers, first, since it is the easiest form to begin with.



Convert $3 \frac{0}{5}$ to an equivalent mixed number: $(3 \times 5) + 0 = 15$; thus, $\frac{15}{5}$. Add the improper fractions.

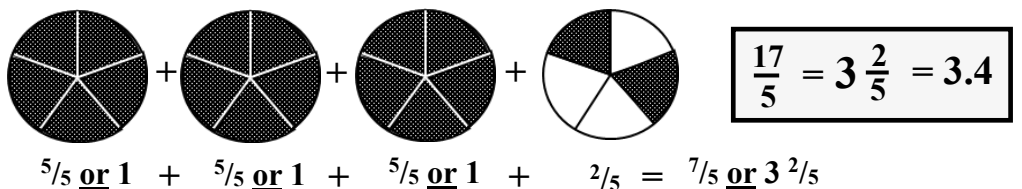


Convert the proper fraction of a mixed number ($\frac{1}{5}$) to a decimal and add in decimal numbers. ($\frac{1}{5} = 0.2$)



Pick a point on the number line and **show** the equivalency in pictorial form AND **write** it as well.

This learning process affords students to possess both a qualitative and quantitative understanding of fractions and decimals.



Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Rewrite each Mixed Number as an equivalent Improper Fraction.

2.) Rewrite each Improper Fraction as an equivalent Mixed Number.

$2 \frac{0}{3} = \boxed{}$

$2 \frac{1}{2} = \boxed{}$

$\frac{10}{3} = \boxed{}$

$\frac{5}{2} = \boxed{}$

$\frac{6}{2} = \boxed{}$

3.) • All whole numbers are integers. True - False

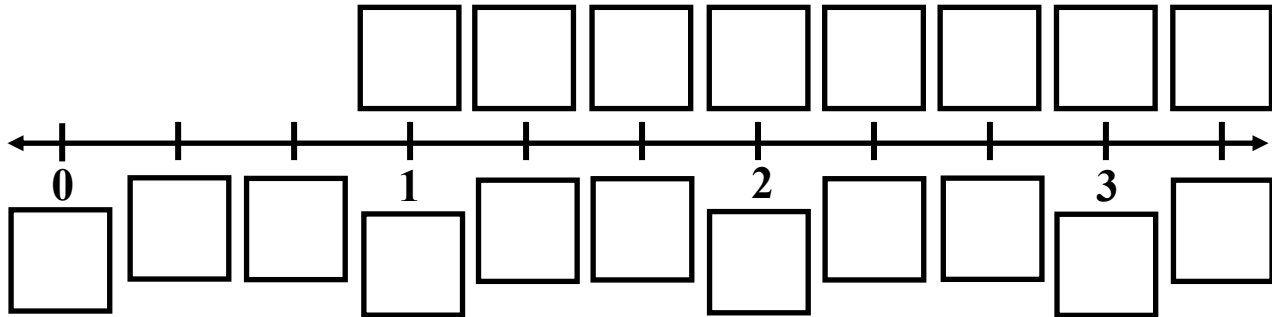
4.) Compute the product. Rewrite Vertically.

• What is the Lowest Common Multiple (LCM) of 2 and 3?

$950 \times 4 =$

LCM = ____

5.) Complete the fractional number line for proper, improper fractions and mixed numbers.



Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Rewrite each Mixed Number as an equivalent Improper Fraction.

2.) Rewrite each Improper Fraction as an equivalent Mixed Number.

$2 \frac{0}{3} = \boxed{}$

$2 \frac{1}{2} = \boxed{}$

$\frac{10}{3} = \boxed{}$

$\frac{5}{2} = \boxed{}$

$\frac{6}{2} = \boxed{}$

3.) • All whole numbers are integers. True - False

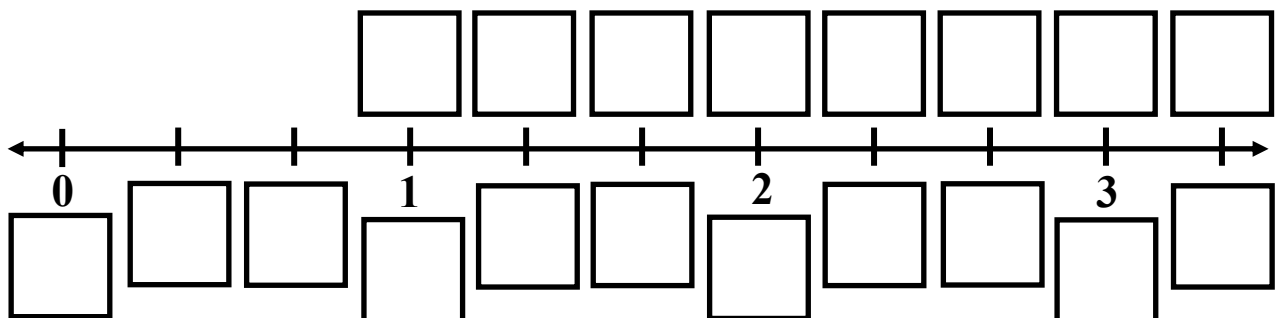
4.) Compute the product. Rewrite Vertically.

• What is the Lowest Common Multiple (LCM) of 2 and 3?

$950 \times 4 =$

LCM = ____

5.) Complete the fractional number line for proper, improper fractions and mixed numbers.



Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

- 1.) Rewrite each Mixed Number as an equivalent Improper Fraction. 2.) Rewrite each Improper Fraction as an equivalent Mixed Number.

$$2 \frac{0}{3} = \boxed{\frac{6}{3}} \quad 2 \frac{1}{2} = \boxed{\frac{5}{2}} \quad \frac{10}{3} = \boxed{3 \frac{1}{3}} \quad \frac{5}{2} = \boxed{2 \frac{1}{2}} \quad \frac{6}{2} = \boxed{3}$$

- 3.) • All whole numbers are integers **True** - False 4.) Compute the product. Rewrite Vertically.

Draw Venn Diagram to illustrate. Ask Students, "Are ALL integers whole numbers?" No. They are not!

- What is the Lowest Common Multiple (LCM) of 2 and 3? List multiples of 2 and 3.

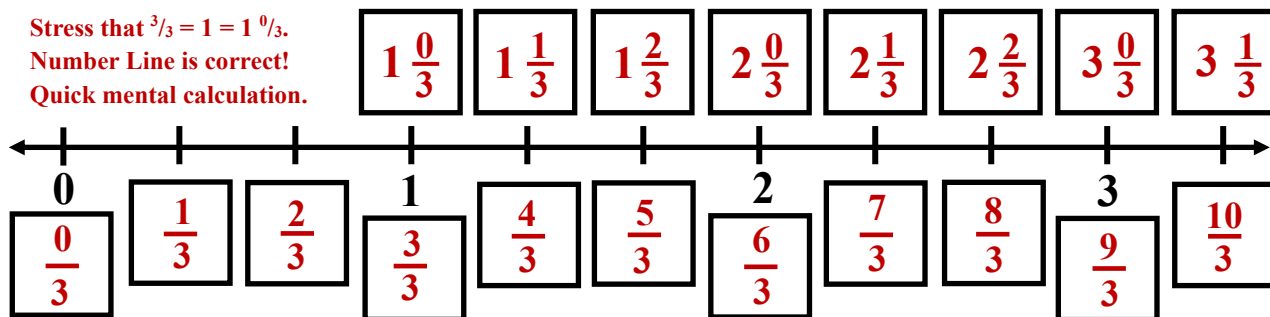
$$950 \times 4 = 3,800$$

LCM = 6
They intersect at 6.

Note: There is a reason to write $1 \frac{0}{3}$ instead of 1. Conversions between forms, if number line begins at a whole number other than zero (0).

- 5.) Complete the fractional number line for proper, improper fractions and mixed numbers.

Stress that $\frac{3}{3} = 1 = 1 \frac{0}{3}$.
Number Line is correct!
Quick mental calculation.



Students can draw a pictorial of an equivalency on back of paper.

Example: $1 \frac{0}{3} = \frac{3}{3}$

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

- 1.) Rewrite each Mixed Number as an equivalent Improper Fraction. 2.) Rewrite each Improper Fraction as an equivalent Mixed Number.

$$2 \frac{0}{3} = \boxed{\frac{6}{3}} \quad 2 \frac{1}{2} = \boxed{\frac{5}{2}} \quad \frac{10}{3} = \boxed{3 \frac{1}{3}} \quad \frac{5}{2} = \boxed{2 \frac{1}{2}} \quad \frac{6}{2} = \boxed{3}$$

- 3.) • All whole numbers are integers **True** - False 4.) Compute the product. Rewrite Vertically.

Draw Venn Diagram to illustrate. Ask Students, "Are ALL integers whole numbers?" No. They are not!

- What is the Lowest Common Multiple (LCM) of 2 and 3? List multiples of 2 and 3.

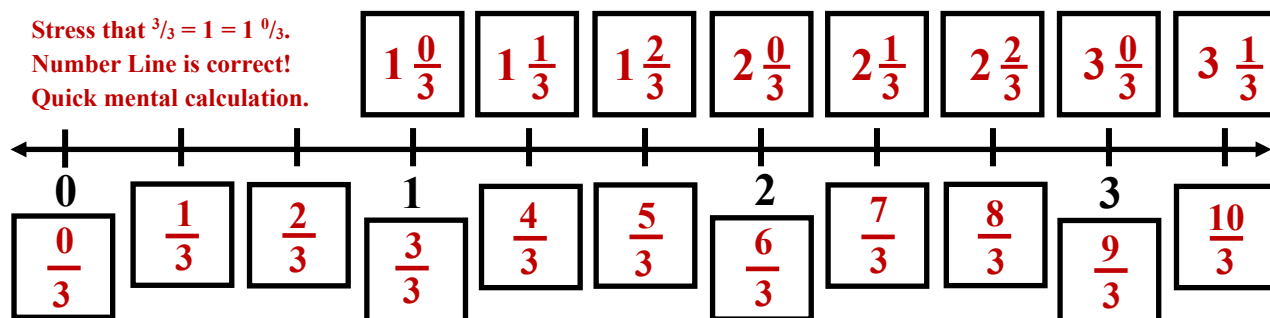
$$950 \times 4 = 3,800$$

LCM = 6
They intersect at 6.

Note: There is a reason to write $1 \frac{0}{3}$ instead of 1. Conversions between forms, if number line begins at a whole number other than zero (0).

- 5.) Complete the fractional number line for proper, improper fractions and mixed numbers.

Stress that $\frac{3}{3} = 1 = 1 \frac{0}{3}$.
Number Line is correct!
Quick mental calculation.



Students can draw a pictorial of an equivalency on back of paper.

Example: $1 \frac{0}{3} = \frac{3}{3}$


Teaching Tip Number 9

Daily Spaced Repetition Practice Converting Decimals and Mixed Numbers to Equivalent Proper and Improper Fractions.

Integrating incoming sixth graders presents a two-fold challenge. **First**, because previous elementary educators did not ensure math fact mastery, middle school educators must now prioritize accountability and daily practice until students are proficient in all four operations. To support this transition, a math fact white paper is available in the literature section to facilitate the implementation process. **Second**, students must master the computational mechanics and conceptual meaning of converting decimals and mixed numbers into fractions. To ensure they can fluently multiply and divide these values, this skill should be reinforced through daily spaced repetition until proficiency is reached.

To build fluency and mastery, provide students with repetitive, targeted examples focusing on one conversion type at a time until they reach mastery. Initially, use smaller numbers (e.g., 1, 2, 3, and 4) to ensure that a lack of multiplication or division fact recall doesn't stall their progress with the new concept.

A.) Whole Number Conversion to an Improper Number:

Example: Convert 3 to an improper fraction. $3 = \frac{3}{1}$ Why? $1 \overline{)3}$ *Pictorial meaning:* 

*Every fraction is a division problem, and in this case, there are how many items in each equal group? 3.
Or, 3 items placed in equal group(s)...there are 3 items in that one equal group.*

B.) Mixed Number Conversion to an Improper Number:

Students have been practicing this skill in recent warm-ups. Review each day until mastered.

C.) Decimal to an equivalent Proper or Improper Fraction:

1.) Proper Fraction Example: **0.5 or 0.34** (Use Imaginary ‘1’ method) Refer to Teaching Tip Number 3.

2.) Improper Fraction Example: **2.3**

It is easiest to multiply by $10/10$ or $100/100$ or $1,000/1,000$ depending on the decimal place.

2.3 is in the tenths place. Use $10/10$ as a multiplier. $2.3/1 \times 10/10 = 23/10$ is an equiv. Imp. Fraction.

D.) Practice Reciprocals of Fractions.

Example: The reciprocal of 4 is rewritten to $4/1$ then, the **reciprocal** of 4 equals $1/4$. The reciprocal of $2/3$ is $3/2$.

E.) Lowest Terms or Simplest Form.

Students not knowing their math facts to automaticity will (obviously) be problematic. There is a method (i.e., Compression Method) to do this more easily by listing factors of a given number; however, students must know their multiplication and division facts with mental recall. This method and form will be covered in a future teaching tip. On the bright side, if there is a consistent and global math numeracy plan using Formative Loop and the accelerated math fact methods presented in “*Math Fact Mastery: Easy to Do!*” -- sixth grade students can rectify math fact numeracy skill deficiencies with quickly.

Note: *Mastery of all content known to human beings – both students and adults – require consistent practice and repetition. The learning process will not magically happen by any other means.*

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

- 1.) Find the reciprocal of each fraction or whole number. 2.) Convert each whole number or decimal number to an equivalent proper or improper fraction.

$\frac{1}{2} = \square$ $\frac{4}{3} = \square$ $6 = \square$ $3 = \square$ $0.2 = \square$ $1.3 = \square$ $9 = \square$

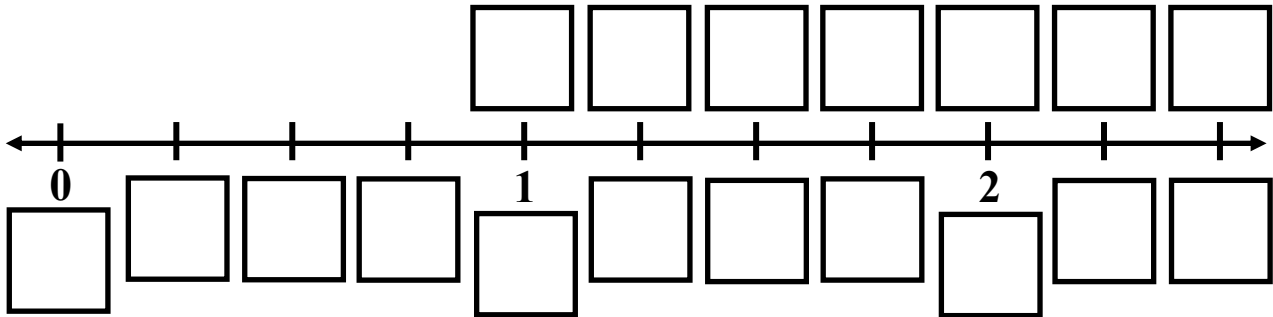
- 3.) • All rational numbers are integers. True - False 4.) Compute the product. Rewrite Vertically.

- What is the Lowest Common Multiple (LCM) of 3 and 4?

$111 \times 5 =$

LCM = _____

- 5.) Complete the fractional number line for proper, improper fractions and mixed numbers.



Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

- 1.) Find the reciprocal of each fraction or whole number. 2.) Convert each whole number or decimal number to an equivalent proper or improper fraction.

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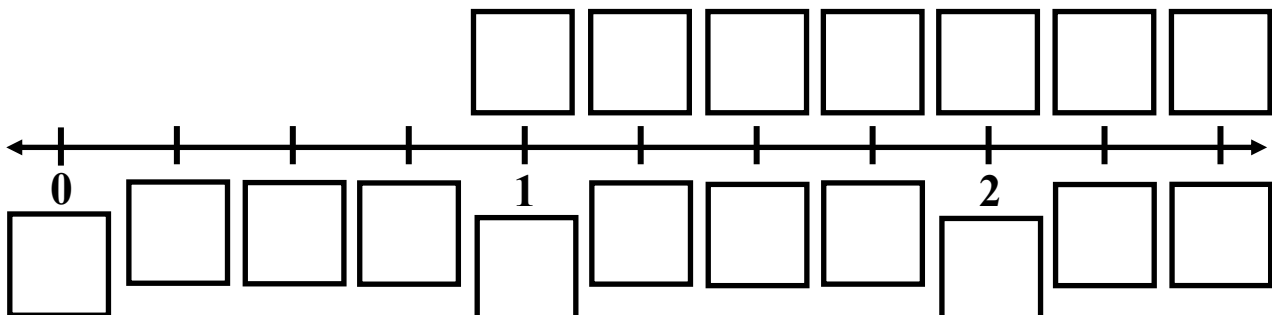
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- 3.) • All rational numbers are integers. True **(False)** 4.) Compute the product. Rewrite Vertically.

Draw Venn Diagram to illustrate.

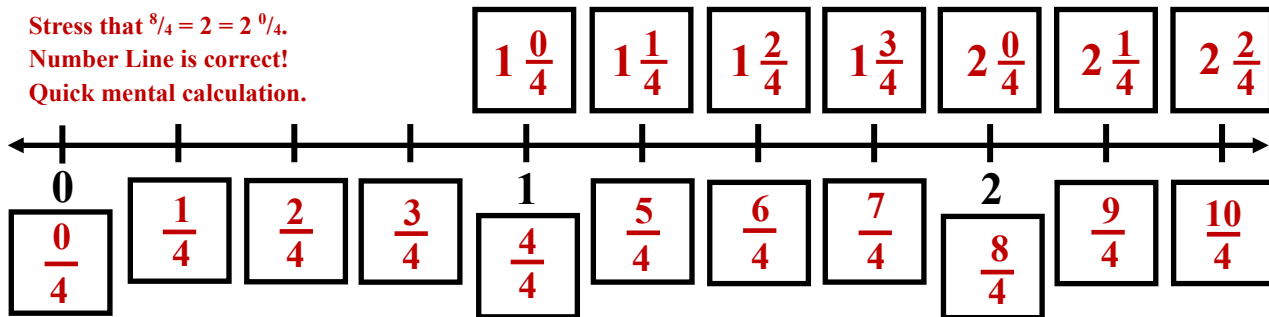
- What is the Lowest Common Multiple (LCM) of 3 and 4? List multiples of 3 and 4. They intersect at 12.

$$111 \times 5 = 555$$

LCM = 12

- 5.) Complete the fractional number line for proper, improper fractions and mixed numbers.

Stress that $\frac{8}{4} = 2 = 2 \frac{0}{4}$.
Number Line is correct!
Quick mental calculation.



Students can draw a pictorial of an equivalency on back of paper.

Example: $1 \frac{3}{4} = \frac{7}{4}$

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

- 1.) Find the reciprocal of each fraction or whole number. 2.) Convert each whole number or decimal number to an equivalent proper or improper fraction.

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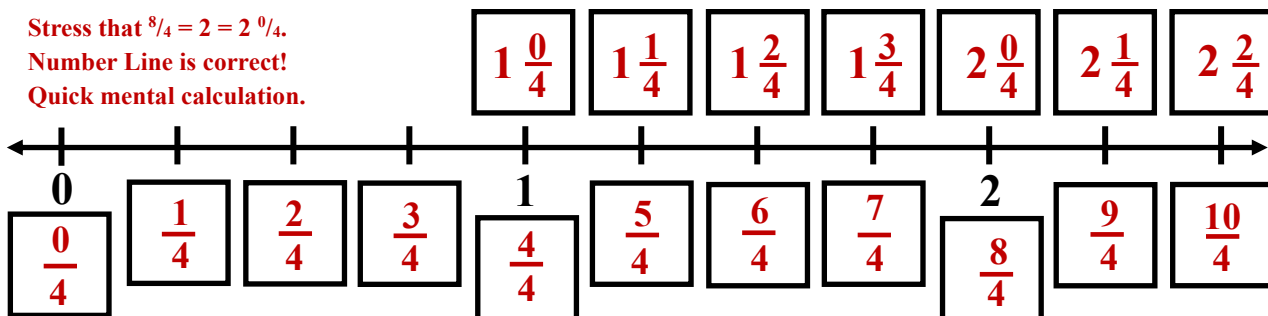
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Example: $1 \frac{3}{4} = \frac{7}{4}$

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Find the reciprocal of each fraction or whole number.

$$\frac{8}{3} = \boxed{} \quad \frac{1}{5} = \boxed{} \quad 9 = \boxed{}$$

2.) Convert each whole number or decimal number to an equivalent proper or improper fraction.

$$2 = \boxed{} \quad 0.9 = \boxed{} \quad 5.3 = \boxed{} \quad 2.31 = \boxed{}$$

3.) • - 3 is larger than - 2. True - False

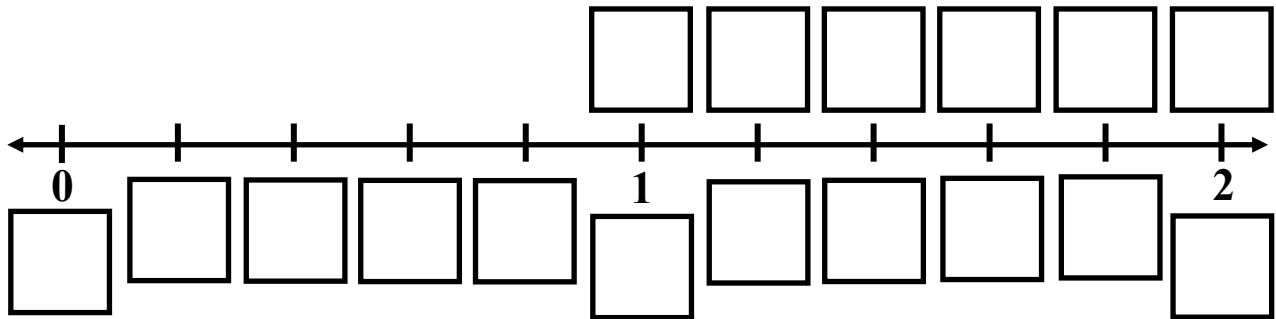
• What is the Lowest Common Multiple (LCM) of 3 and 5?

LCM = _____

4.) Write the decimal equivalent of the fraction.

$$\frac{1}{2} = \boxed{} \quad \frac{1}{4} = \boxed{} \quad \frac{1}{3} = \boxed{} \quad \frac{1}{5} = \boxed{}$$

5.) Complete the fractional number line for proper, improper fractions and mixed numbers.



Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

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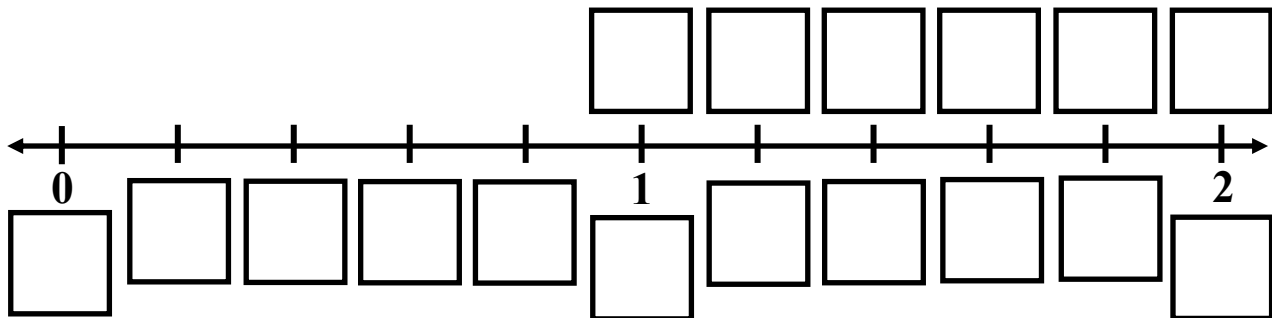
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4.) Write the decimal equivalent of the fraction.

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5.) Complete the fractional number line for proper, improper fractions and mixed numbers.



Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Find the reciprocal of each fraction or whole number.

$$\frac{8}{3} = \boxed{\frac{3}{8}} \quad \frac{1}{5} = \boxed{\frac{5}{1}} \quad 9 = \boxed{\frac{1}{9}}$$

2.) Convert each whole number or decimal number to an equivalent proper or improper fraction.

$$2 = \boxed{\frac{2}{1}} \quad 0.9 = \boxed{\frac{9}{10}} \quad 5.3 = \boxed{\frac{53}{10}} \quad 2.31 = \boxed{\frac{231}{100}}$$

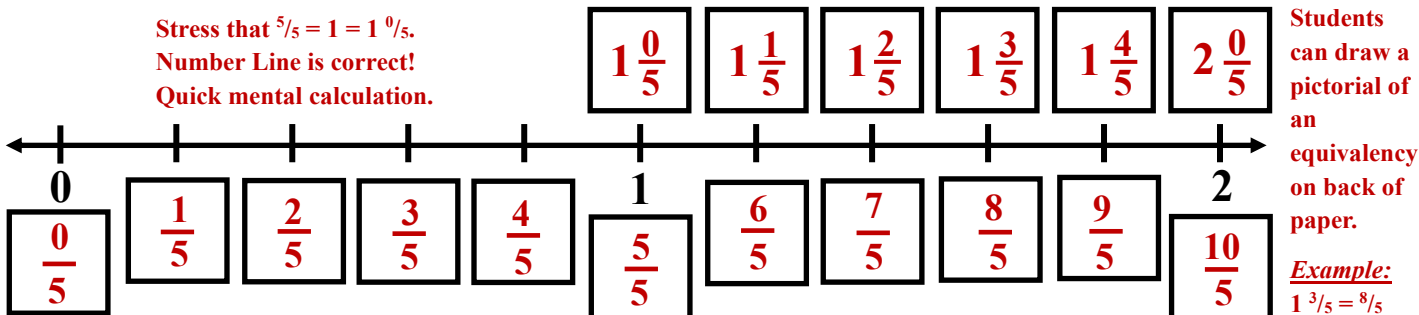
3.) • -3 is larger than -2. True ~~False~~
 Which integer is farther right on the number line?
 • What is the Lowest Common Multiple (LCM) of 3 and 5? List multiples of 3 and 5. They intersect at 15.
 LCM = 15

4.) Write the decimal equivalent of the fraction.

$$\frac{1}{2} = \boxed{0.5} \quad \frac{1}{4} = \boxed{0.25} \quad \frac{1}{3} = \boxed{0.\overline{33}} \quad \frac{1}{5} = \boxed{0.2}$$

Students CAN divide, but they should know the common fractions.

5.) Complete the fractional number line for proper, improper fractions and mixed numbers.



Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Find the reciprocal of each fraction or whole number.

$$\frac{8}{3} = \boxed{\frac{3}{8}} \quad \frac{1}{5} = \boxed{\frac{5}{1}} \quad 9 = \boxed{\frac{1}{9}}$$

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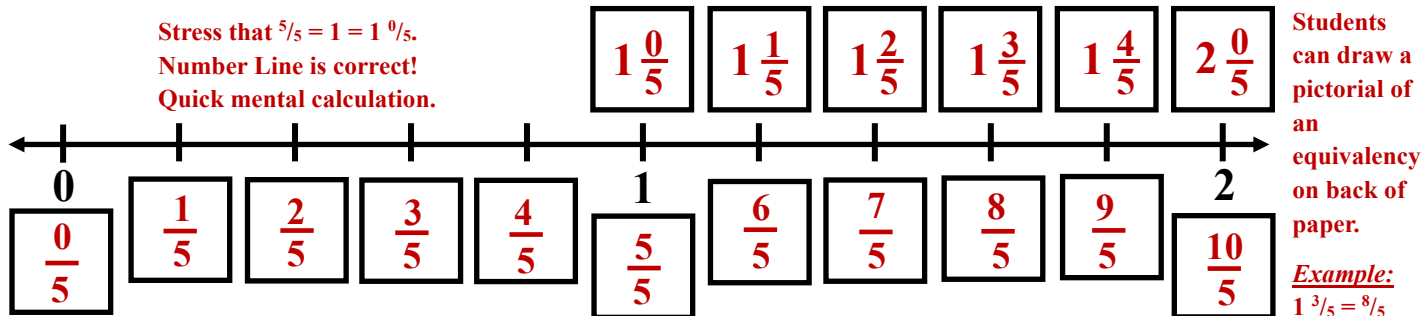
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Students CAN divide, but they should know the common fractions.

5.) Complete the fractional number line for proper, improper fractions and mixed numbers.




Teaching Tip Number 10

Mastering Factor Strings – “Compression Method” - Continued

Each instructional day, require students to vertically list the first ten whole numbers. For each number, students should identify all factors and classify the whole number as prime or composite. To help them remember that a *prime number* has exactly two factors, I use the 'Hook 'em' hand sign – a visual mnemonic.



List the first 10 whole numbers in sequential order on the white board.

1: {		1: {1}
2: {		2: {1, 2} - (P)
3: {		3: {1, 3} - (P)
4: {		4: {1, 2, 4} - (C)
5: {		5: {1, 5} - (P)
6: {		6: {1, 2, 3, 6} - (C)
7: {		7: {1, 7} - (P)
8: {		8: {1, 2, 4, 8} - (C)
9: {		9: {1, 3, 9} - (C)
10: {		10: {1, 2, 5, 10} - (C)


Students list all the factors for each number.

Add Prime (P) or Composite (C)

Repeat each day until all students can quickly list the factors for the first 10 numbers.

Note: 1 is neither prime or composite since it possesses only 1 factor, itself. *It is a special number.*

List the next 5 whole numbers in sequential order on the white board.

11: {		11: {1, 11} - (P)
12: {		12: {1, 2, 3, 4, 6, 12} - (C)
13: {		13: {1, 13} - (P)
14: {		14: {1, 2, 7, 14} - (C)
15: {		15: {1, 3, 5, 15} - (C)

Repeat as before. Only with these five numbers (11 through 15).

Rinse and repeat until students master these factor strings. Then, list the factors from 1 through 15, so they are refreshed on all factor strings to their mental schema.

Note: This process assists many kiddos to finally learn their multiplication math facts.

Continue the daily process, 5 factor strings at a time until students reach the whole number 25, consecutively. Then, write only the factor strings for most common whole numbers (i.e., 27, 28, 30, 32, 35, 36, 40, 42, 45, 48, 49, 50, 54, 56, 60, 63, 64, 72, 81, and 100). These last factor strings will all be composite numbers, obviously. Finally, this numeracy skill is also beneficial for prime factorization of large numbers.

This daily learning process is surprisingly fast – about 3 weeks (15 to 16 days, usually). I have frequently taught this technique to 4th and 5th graders with great success. The only students who encountered significant difficulties were those students receiving special education services and the task impacted their diagnosed learning disability. In those cases, it is essential to follow the student’s IEP exactly as written.

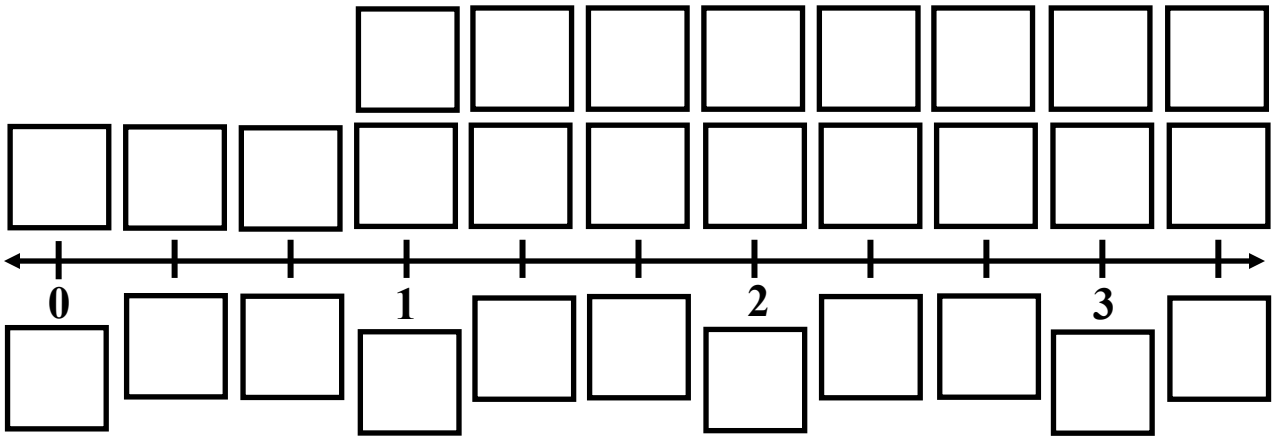
Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

- 1.) Write the decimal equivalent of the fraction. 2.) *Convert each whole number or decimal number to an equivalent proper or improper fraction.*

$$\frac{1}{2} = \boxed{} \quad \frac{1}{4} = \boxed{} \quad \frac{1}{3} = \boxed{} \quad 8 = \boxed{} \quad 0.5 = \boxed{} \quad 9.1 = \boxed{} \quad 8.99 = \boxed{}$$

- 3.) a.) What is the reciprocal of 8? _____ b.) Write an integer than is not a whole number? _____

4.) *Complete the fractional number line for proper, decimals, improper fractions and mixed numbers.*



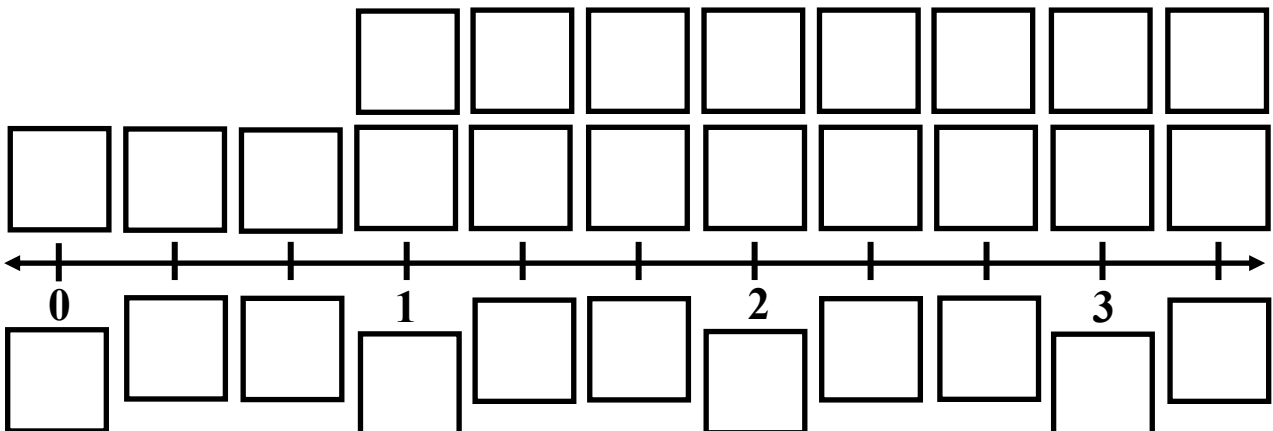
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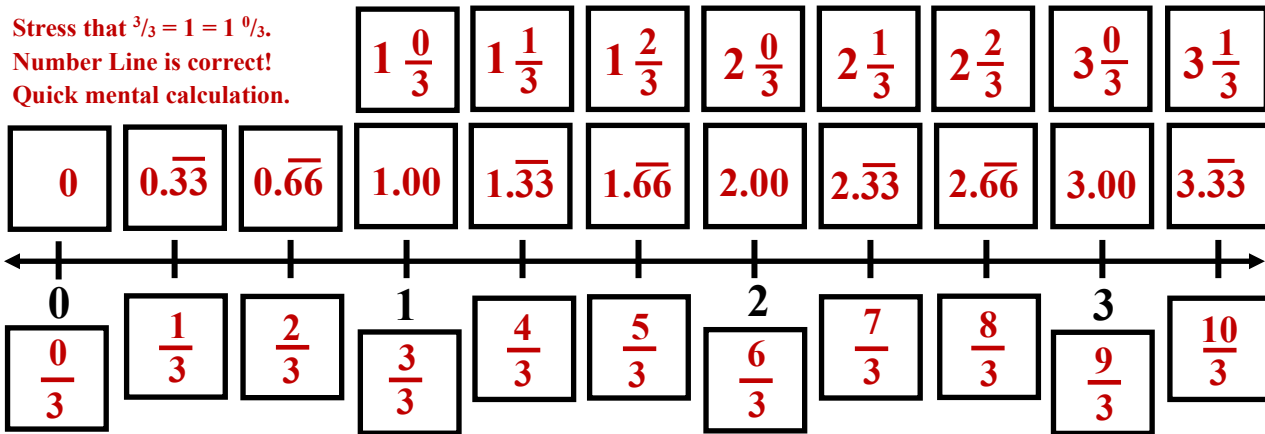
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- 3.) a.) What is the reciprocal of 8? $\frac{1}{8}$ b.) Write an integer than is not a whole number? -1, -2, ...

- 4.) Complete the fractional number line for proper, decimals, improper fractions and mixed numbers.

Stress that $\frac{3}{3} = 1 = 1 \frac{0}{3}$.
Number Line is correct!
Quick mental calculation.



Students can draw a pictorial of an equivalency on back of paper.

Example: $1 \frac{0}{3} = \frac{3}{3}$

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

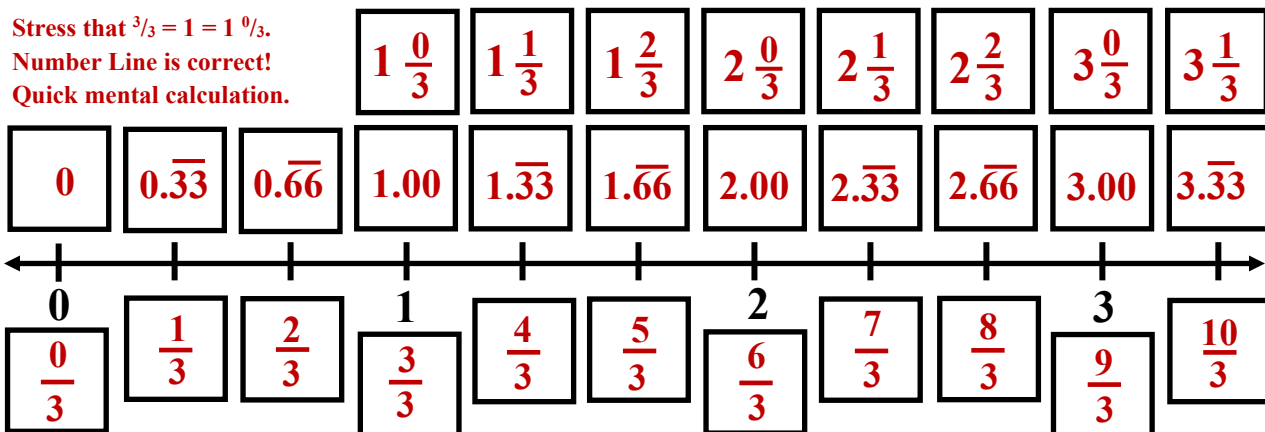
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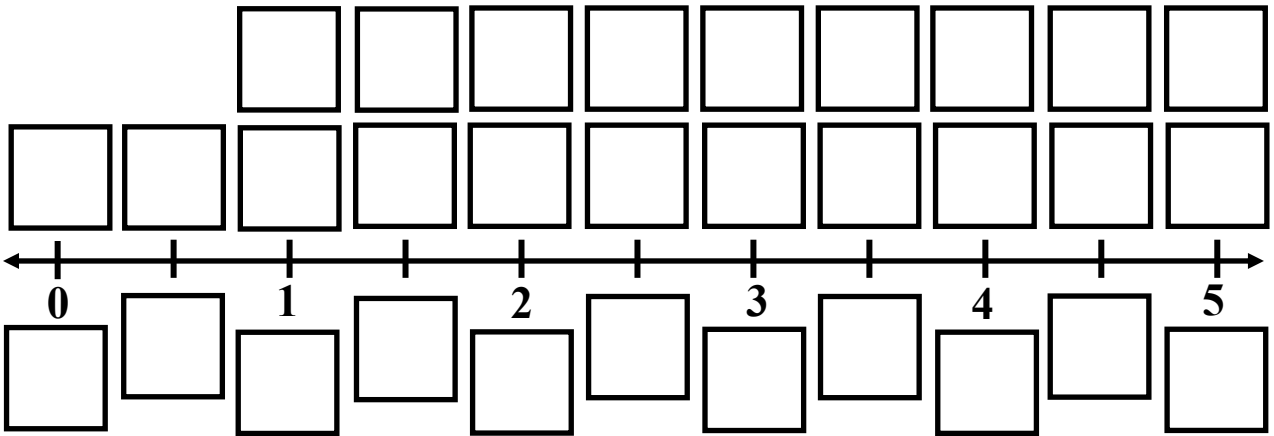
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- 3.) a.) What is the reciprocal of $\frac{2}{5}$? _____ b.) Compute the Lowest Common Multiple of 2 and 5. _____

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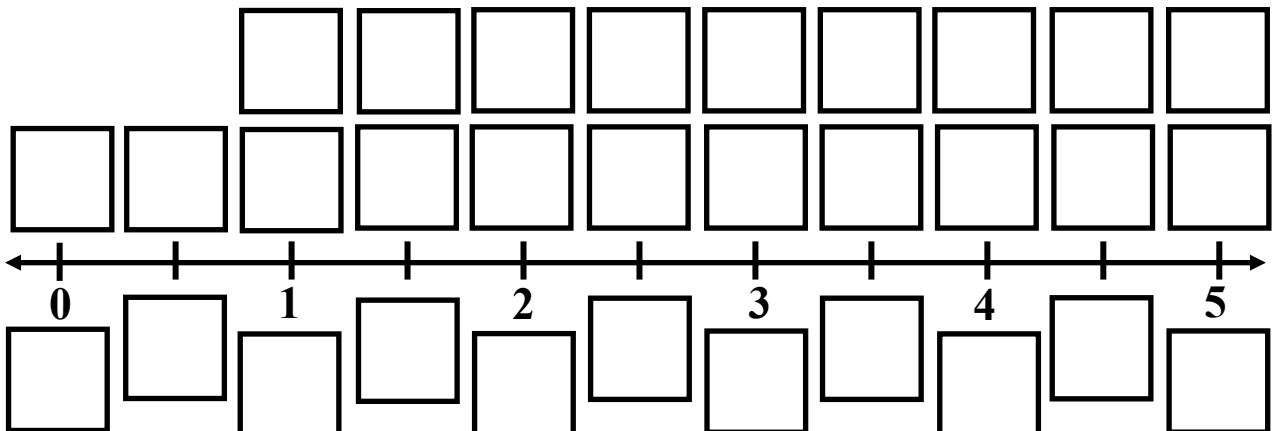
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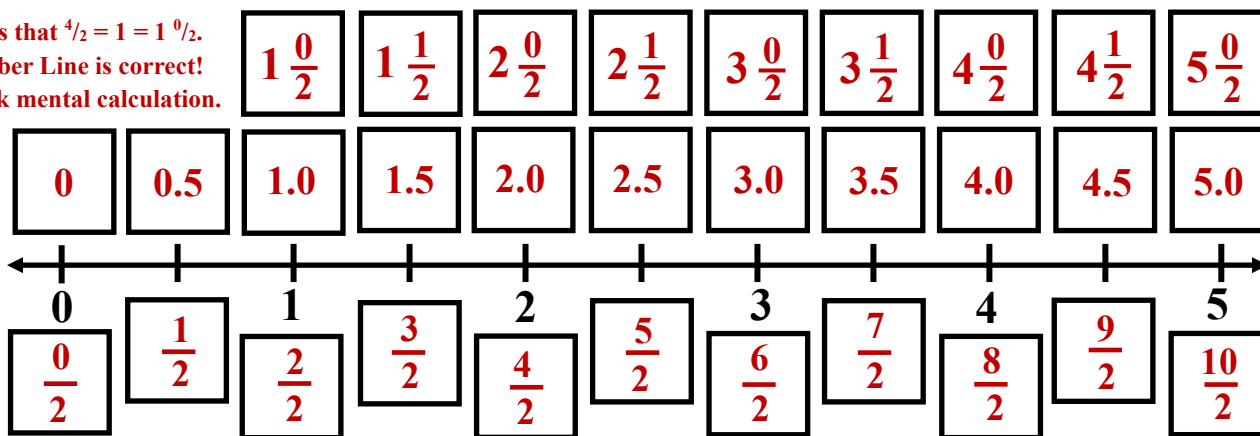
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- 3.) a.) What is the reciprocal of $\frac{2}{5}$? $\frac{5}{2}$ b.) Compute the Lowest Common Multiple of 2 and 5. 10

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Stress that $\frac{4}{2} = 1 = 1 \frac{0}{2}$.
Number Line is correct!
Quick mental calculation.



Students can draw a pictorial of an equivalency on back of paper.

Example:
 $1 \frac{1}{2} = \frac{3}{2}$

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

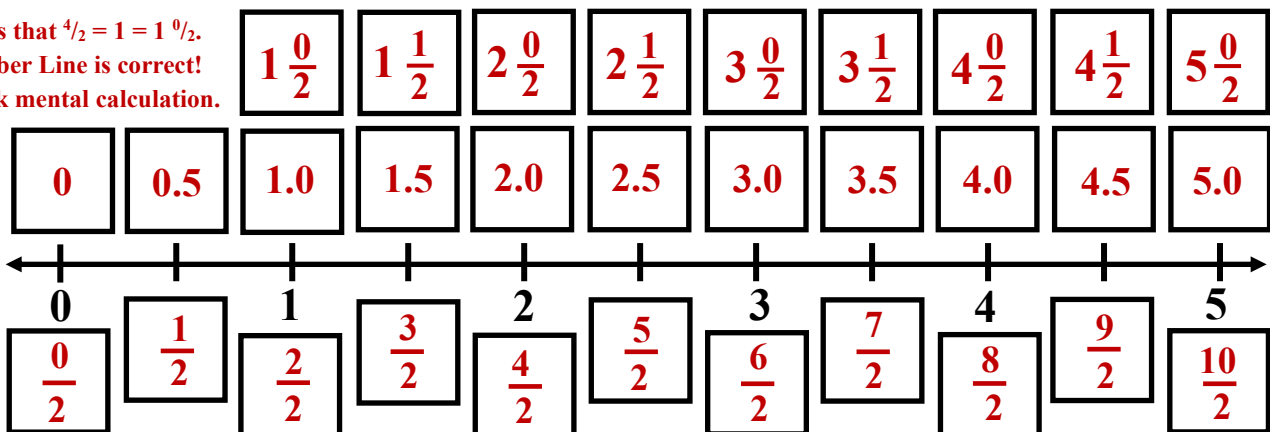
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Example:
 $1 \frac{1}{2} = \frac{3}{2}$

Teaching Tip Number 11

Lowest Terms – Fractions AND Equivalent Fractions

Simplifying fractions to lowest terms or computing equivalent fractions relies on the Identity Property. This rule states that multiplying or dividing any number by 1 doesn't change its value. To find an equivalent fraction, you simply use a version of 1 that is equivalent to an improper fraction (e.g., $\frac{2}{2}$ or $\frac{5}{5}$). For example, dividing both parts of a fraction by the same number of an improper fraction's numerator or denominator is essentially dividing by 1, which keeps the value the same while changing the form.

Many sixth graders fail to connect fractional operations to the identity property they already know from whole number arithmetic computations. They do not realize that multiplying or dividing a fraction by a "fractional one whole" (e.g., $\frac{6}{6}$ or $\frac{2}{2}$) is simply multiplying or dividing by 1 whole. Without consistent reinforcement of this link, students often view simplifying or expanding fractions as a new, mysterious process rather than a familiar rule in a different form.

To help sixth graders bridge the gap between whole numbers and fractions, the following pedagogical sequence may be used:

$$3 \times 1 = 3$$

$$1 = \frac{2}{2} = \frac{3}{3} = \frac{4}{4} = \frac{5}{5} = \frac{6}{6} \text{ to infinity}$$

Then, ask students, is this a valid mathematical statement: $3 \times \frac{2}{2} = 3$ True or False? **True**, of course.

Prove it... $\frac{3}{1} \times \frac{2}{2} = \frac{6}{2}$ Yes. $6 \div 2 = 3$ $3 \times \frac{2}{2} = 3$ Or, any improper fraction equal to 1.

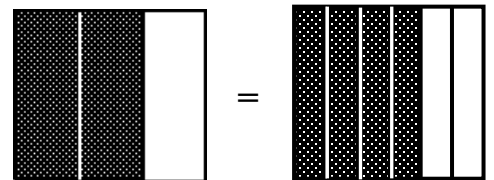
Note: Again, students do not recognize that they are multiplying or dividing fractions by 1 whole. That is why the fractions are equal. This concept must be reiterated to them until it is ingrained in long-term memory.

While 4th to 8th graders usually grasp this mathematical equivalency quickly, they still need frequent reminders. To reinforce the concept, I ask them, "What number are we actually multiplying or dividing by?" They usually respond by holding up an index finger to represent "1." I also have them draw an "imaginary 1" around the fraction to visually cement the idea that the identity principle is at work.

Equivalent Fraction Example: Find the equivalent fraction of $\frac{2}{3}$ with 9 as the new denominator (i.e., for use in computing like fractions to add or subtract ~ LCD = 9).

$$\frac{2}{3} \times \frac{3}{3} = \frac{6}{9} \quad \text{or} \quad \frac{2}{3} \times \frac{3}{3} = \frac{6}{9}$$

Also, show the **equal area** approach: $\frac{2}{3} = \frac{6}{9}$ →



Note: While the area approach works well for elementary students, the substitution method shown above is a more developmentally appropriate step for middle schoolers to grasp. However, equal areas are an excellent learning tool to visualize equivalent fractions at any age.

Teaching Tip Number 11

Lowest Terms – Fractions AND Equivalent Fractions

Simplifying fractions and computing equivalent fractions are essential numeracy processes that require students to have foundational math fact automaticity. Specifically, incoming 6th graders must prioritize mastery of multiplication, division (as well as addition, and subtraction facts). For more detail on this objective, please refer to the white paper located in the Literature Section of this document.

Let's continue the pedagogy discussion on simplifying fractions to their simplest form or lowest terms.

Simplifying Fraction Example: Compute the lowest terms for the fraction $\frac{6}{24}$.

A student who does not possess mental math fact strings must begin by writing the factor strings for the numerator and denominator of the fraction. Then, the GCF is used to reduce both the numerator and denominator. However, since the identity principle of division is used, the student is actually dividing the fraction by 1 whole in the form of an improper fraction (e.g., $\frac{6}{6}$ in the example below).

First, using the 'Compression Method' let's write the two factor strings:

6: {1, 2, 3, 6}

Common factors: 1, 2, 3, 6

24: {1, 2, 3, 4, 6, 8, 12, 24}

Greatest Common Factor (GCF): 6

$$\frac{6}{24} \div \frac{6}{6} = \boxed{\frac{1}{4}} \quad \text{or} \quad \frac{6}{24} \div \frac{6}{6} = \boxed{\frac{1}{4}}$$

(GCF) (GCF)

Let's check if $\frac{1}{4}$ is the simplest form for the original fraction $\frac{6}{24}$.

List the factors for both numerator and denominator for $\frac{1}{4}$.

1: {1}

Common factors: 1

4: {1, 2, 4}

Greatest Common Factor (GCF): 1

Since the only common and GCF is 1, the fraction cannot be simplified further.

Students should be taught, "**One and Done!**" when the fraction is in lowest terms because the only factor in common is 1 and the GCF is 1.

Note: Some teachers tell students to keep dividing by 2, and this method can work. However, it takes a lot of time, and students are not sure when the fraction is in lowest terms. Moreover, the method does not work when either the denominator or numerator is not an even number. Students must possess math numeracy at some point, or when they enter algebraic and geometry, they invariably struggle academically.

Teaching Tip Number 12

Understanding Multiplication of Fractions – Cross Cancelling

When multiplying two fractions, it is often much quicker to reduce the ‘size’ of the factors by cancelling the numerator and denominator by a common math fact.

For example: $\frac{24}{5} \times \frac{15}{2} = ?$ Multiplying 24 x 15 produces a large product. Thus, we can cancel the larger factors by cross cancellation.

$$\begin{array}{r} 12 \quad 3 \\ \cancel{24} \times \cancel{15} \\ \cancel{5} \times \cancel{2} \\ 1 \quad 1 \end{array} = \frac{36}{1} = \underline{36}$$

The issue here is that many students often struggle to understand the mechanics at play in the cancellation process.

There is a simple means to make this more apparent employing the commutative property of multiplication (e.g., 4 x 6 is equivalent to 6 x 4.)

$$\frac{24}{2} \times \frac{15}{5} =$$

Now, the division and cancellation mechanics are more apparent simply by transposing the 2 and 5 ---- since 2 x 5 is equivalent to 5 x 2.

$$\begin{array}{r} 12 \times 3 \\ \frac{24}{2} \times \frac{15}{5} = \underline{36} \end{array}$$

(24 divided by 2) is 12, and (15 divided by 5) is 3. Rewriting the multiplication of the fractions by transposing the denominators or numerators shows many students there is nothing ‘magical’ occurring with these types of cancellations. The math is basic and straightforward and above all, easy to understand.

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Write the decimal equivalent of the fraction.

$$\frac{1}{3} = \boxed{} \quad \frac{1}{4} = \boxed{} \quad \frac{1}{10} = \boxed{}$$

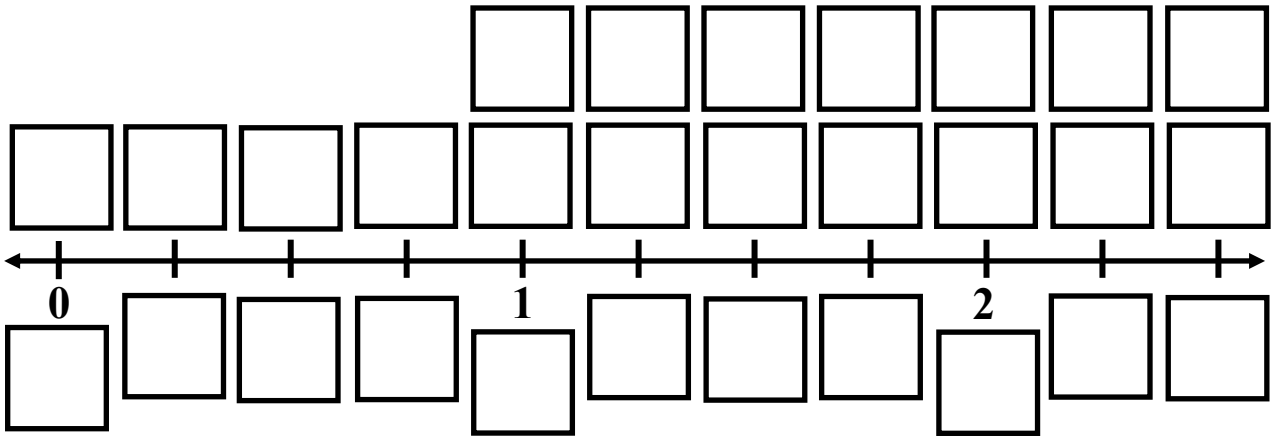
2.) Multiply.

$$8 \times \frac{1}{2} = \boxed{} \quad \frac{1}{2} \times \frac{1}{4} = \boxed{}$$

- 3.) a.) What are all the **factors** for 2? { }
 b.) What are all the **factors** for 4? { }

- c.) What is the GCF for 2 and 4? GCF =
 d.) What is $\frac{2}{4}$ in lowest terms?

4.) Complete the fractional number line for proper, decimals, improper fractions and mixed numbers.



Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Write the decimal equivalent of the fraction.

$$\frac{1}{3} = \boxed{} \quad \frac{1}{4} = \boxed{} \quad \frac{1}{10} = \boxed{}$$

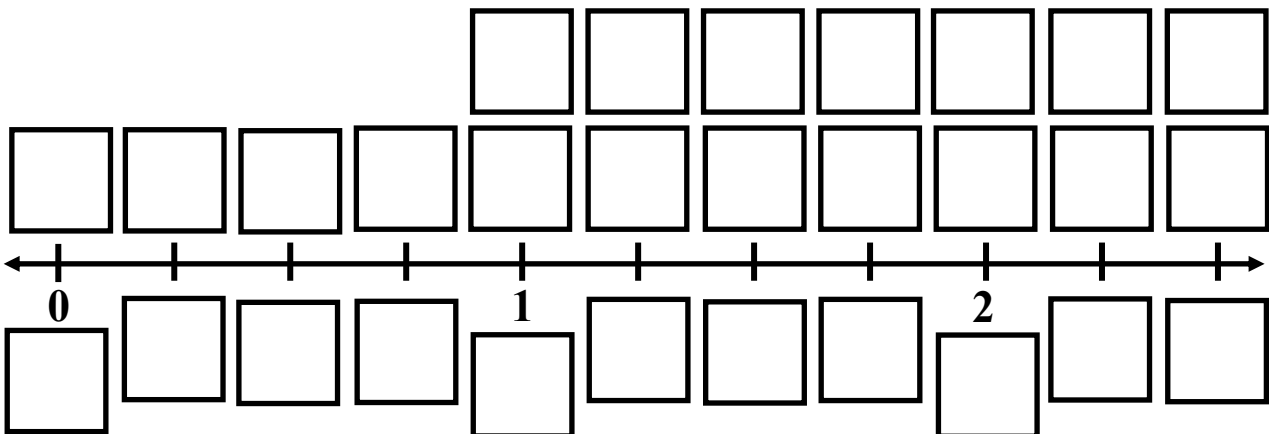
2.) Multiply.

$$8 \times \frac{1}{2} = \boxed{} \quad \frac{1}{2} \times \frac{1}{4} = \boxed{}$$

- 3.) a.) What are all the **factors** for 2? { }
 b.) What are all the **factors** for 4? { }

- c.) What is the GCF for 2 and 4? GCF =
 d.) What is $\frac{2}{4}$ in lowest terms?

4.) Complete the fractional number line for proper, decimals, improper fractions and mixed numbers.



Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

- 1.) Write the decimal equivalent of the fraction. 2.) Multiply.

$$\frac{1}{3} = \boxed{0.\overline{33}} \quad \frac{1}{4} = \boxed{0.25} \quad \frac{1}{10} = \boxed{0.1}$$

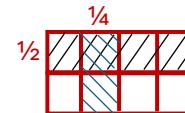


$$8 \times \frac{1}{2} = \boxed{4}$$

$$\frac{1}{2} \times \frac{1}{4} = \boxed{\frac{1}{8}}$$

8 objects. 2 groups (denominator) interested in 1 group = 4 in each group

$$\frac{8}{1} \times \frac{1}{2} = \boxed{\frac{8}{2}}$$

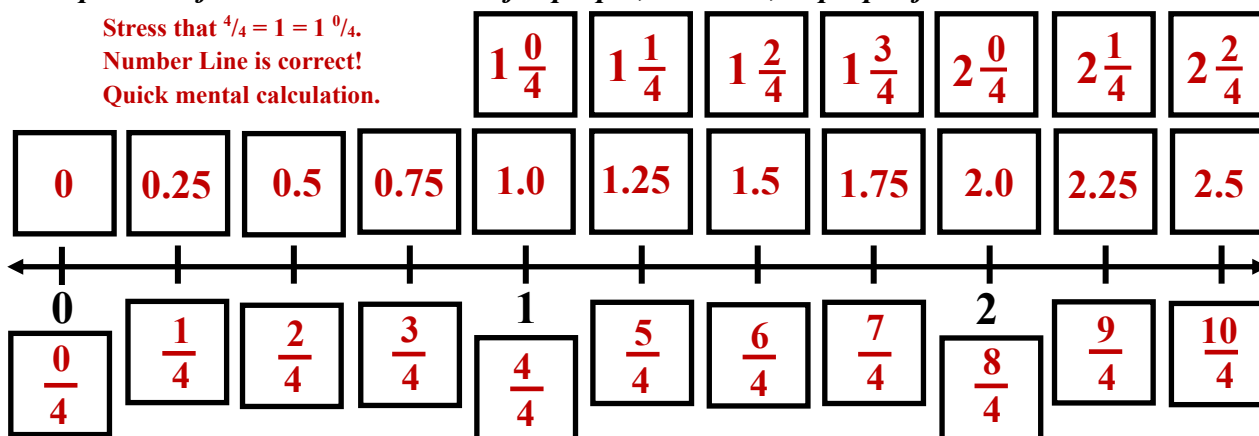


$\frac{1}{8}$ is double cross-hatched.

- 3.) a.) What are all the **factors** for 2? $\{1, 2\}$ c.) What is the GCF for 2 and 4? GCF = 2
 b.) What are all the **factors** for 4? $\{1, 2, 4\}$ d.) What is $\frac{2}{4}$ in lowest terms? $\frac{1}{2}$

- 4.) Complete the fractional number line for proper, decimals, improper fractions and mixed numbers.

Stress that $\frac{4}{4} = 1 = 1\frac{0}{4}$.
 Number Line is correct!
 Quick mental calculation.



Students can draw a pictorial of an equivalency on back of paper.

Example:
 $1\frac{1}{4} = \frac{5}{4}$

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

- 1.) Write the decimal equivalent of the fraction. 2.) Multiply.

$$\frac{1}{3} = \boxed{0.\overline{33}} \quad \frac{1}{4} = \boxed{0.25} \quad \frac{1}{10} = \boxed{0.1}$$

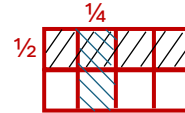


$$8 \times \frac{1}{2} = \boxed{4}$$

$$\frac{1}{2} \times \frac{1}{4} = \boxed{\frac{1}{8}}$$

8 objects. 2 groups (denominator) interested in 1 group = 4 in each group

$$\frac{8}{1} \times \frac{1}{2} = \boxed{\frac{8}{2}}$$

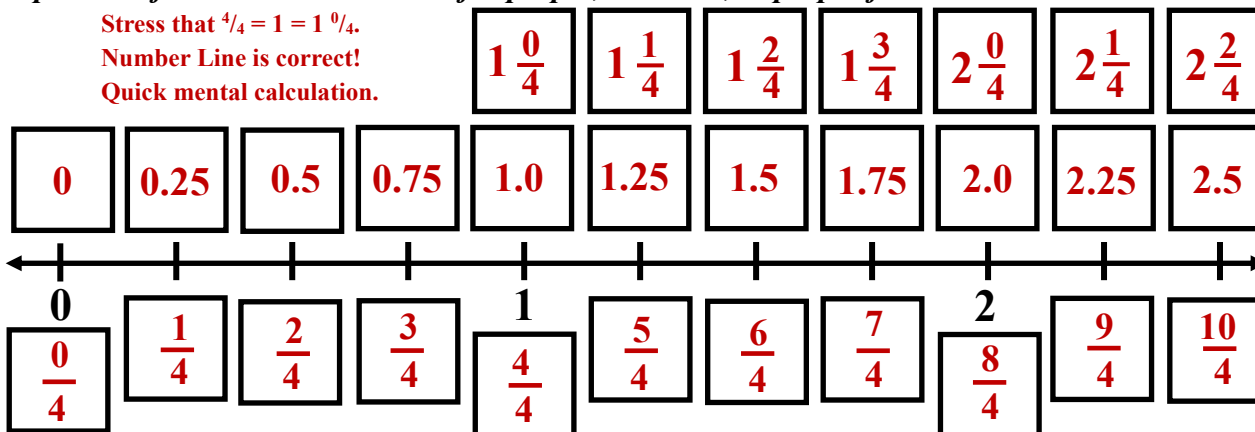


$\frac{1}{8}$ is double cross-hatched.

- 3.) a.) What are all the **factors** for 2? $\{1, 2\}$ c.) What is the GCF for 2 and 4? GCF = 2
 b.) What are all the **factors** for 4? $\{1, 2, 4\}$ d.) What is $\frac{2}{4}$ in lowest terms? $\frac{1}{2}$

- 4.) Complete the fractional number line for proper, decimals, improper fractions and mixed numbers.

Stress that $\frac{4}{4} = 1 = 1\frac{0}{4}$.
 Number Line is correct!
 Quick mental calculation.



Students can draw a pictorial of an equivalency on back of paper.

Example:
 $1\frac{1}{4} = \frac{5}{4}$

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Write the decimal equivalent of the fraction.

$$\frac{1}{3} = \boxed{} \quad \frac{1}{2} = \boxed{} \quad \frac{1}{10} = \boxed{}$$

2.) *Multiply.*

$$6 \times \frac{1}{3} = \boxed{} \quad \frac{1}{2} \times \frac{1}{2} = \boxed{}$$

- 3.) a.) What are all the factors for 4? { _____ }
 b.) What are all the factors for 8? { _____ }

- c.) What is the GCF for 4 and 8? GCF = _____
 d.) What is $\frac{4}{8}$ in lowest terms? _____

4.) *Write the following fractions in lowest terms.*

$$\frac{5}{10} = \boxed{} \quad \frac{6}{9} = \boxed{} \quad \frac{4}{10} = \boxed{}$$

5.) *Write the following fractions in lowest terms.*

$$\frac{12}{10} = \boxed{} \quad \frac{6}{4} = \boxed{} \quad \frac{5}{2} = \boxed{}$$

6.) *Complete by filling in the box with a whole number.*

$$\frac{5}{5} = \boxed{} \quad \frac{2}{2} = \boxed{} \quad \frac{10}{10} = \boxed{}$$

- 7.) *When dividing a proper fraction such as $\frac{2}{4}$ by $\frac{2}{2}$ to convert it into lowest terms, what whole number are you dividing by? _____ .*

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Write the decimal equivalent of the fraction.

$$\frac{1}{3} = \boxed{} \quad \frac{1}{2} = \boxed{} \quad \frac{1}{10} = \boxed{}$$

2.) *Multiply.*

$$6 \times \frac{1}{3} = \boxed{} \quad \frac{1}{2} \times \frac{1}{2} = \boxed{}$$

- 3.) a.) What are all the factors for 4? { _____ }
 b.) What are all the factors for 8? { _____ }

- c.) What is the GCF for 4 and 8? GCF = _____
 d.) What is $\frac{4}{8}$ in lowest terms? _____

4.) *Write the following fractions in lowest terms.*

$$\frac{5}{10} = \boxed{} \quad \frac{6}{9} = \boxed{} \quad \frac{4}{10} = \boxed{}$$

5.) *Write the following fractions in lowest terms.*

$$\frac{12}{10} = \boxed{} \quad \frac{6}{4} = \boxed{} \quad \frac{5}{2} = \boxed{}$$

6.) *Complete by filling in the box with a whole number.*

$$\frac{5}{5} = \boxed{} \quad \frac{2}{2} = \boxed{} \quad \frac{10}{10} = \boxed{}$$

- 7.) *When dividing a proper fraction such as $\frac{2}{4}$ by $\frac{2}{2}$ to convert it into lowest terms, what whole number are you dividing by? _____ .*

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Write the decimal equivalent of the fraction.

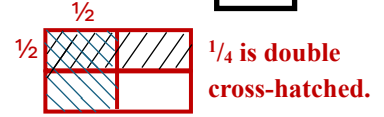
$$\frac{1}{3} = \boxed{0.\overline{33}} \quad \frac{1}{2} = \boxed{0.5} \quad \frac{1}{10} = \boxed{0.1}$$

6 objects. 3 groups (denominator) interested in 1 group = 2 in each group

2.) Multiply.

$$6 \times \frac{1}{3} = \boxed{2} \quad \frac{1}{2} \times \frac{1}{2} = \boxed{\frac{1}{4}}$$

$$\frac{6}{1} \times \frac{1}{3} = \boxed{\frac{6}{3}}$$



- 3.) a.) What are all the factors for 4? $\{1, 2, 4\}$
 b.) What are all the factors for 8? $\{1, 2, 4, 8\}$

- c.) What is the GCF for 4 and 8? GCF = 4
 d.) What is $\frac{4}{8}$ in lowest terms? $\frac{1}{2}$

4.) Write the following fractions in lowest terms.

$$\frac{5}{10} = \boxed{\frac{1}{2}} \quad \frac{6}{9} = \boxed{\frac{2}{3}} \quad \frac{4}{10} = \boxed{\frac{2}{5}}$$

Use and imaginary '1' as shown in Teaching Tip #11.

6.) Complete by filling in the box with a whole number.

$$\frac{5}{5} = \boxed{1} \quad \frac{2}{2} = \boxed{1} \quad \frac{10}{10} = \boxed{1}$$

5.) Write the following fractions in lowest terms.

$$\frac{12}{10} = \boxed{1\frac{1}{5}} \quad \frac{6}{4} = \boxed{1\frac{1}{2}} \quad \frac{5}{2} = \boxed{2\frac{1}{2}}$$

Use and imaginary '1' as shown in Teaching Tip #11. It is imperative that students realize they are using the identity principle when computing lowest terms.

- 7.) When dividing a proper fraction such as $\frac{2}{4}$ by $\frac{2}{2}$ to convert it into lowest terms, what whole number are you dividing by? 1.

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Write the decimal equivalent of the fraction.

$$\frac{1}{3} = \boxed{0.\overline{33}} \quad \frac{1}{2} = \boxed{0.5} \quad \frac{1}{10} = \boxed{0.1}$$

6 objects. 3 groups (denominator) interested in 1 group = 2 in each group

2.) Multiply.

$$6 \times \frac{1}{3} = \boxed{2} \quad \frac{1}{2} \times \frac{1}{2} = \boxed{\frac{1}{4}}$$

$$\frac{6}{1} \times \frac{1}{3} = \boxed{\frac{6}{3}}$$



- 3.) a.) What are all the factors for 4? $\{1, 2, 4\}$
 b.) What are all the factors for 8? $\{1, 2, 4, 8\}$

- c.) What is the GCF for 4 and 8? GCF = 4
 d.) What is $\frac{4}{8}$ in lowest terms? $\frac{1}{2}$

4.) Write the following fractions in lowest terms.

Use and imaginary '1' as shown in Teaching Tip #11.

$$\frac{5}{10} = \boxed{\frac{1}{2}} \quad \frac{6}{9} = \boxed{\frac{2}{3}} \quad \frac{4}{10} = \boxed{\frac{2}{5}}$$

Use and imaginary '1' as shown in Teaching Tip #11.

6.) Complete by filling in the box with a whole number.

$$\frac{5}{5} = \boxed{1} \quad \frac{2}{2} = \boxed{1} \quad \frac{10}{10} = \boxed{1}$$

5.) Write the following fractions in lowest terms.

$$\frac{12}{10} = \boxed{1\frac{1}{5}} \quad \frac{6}{4} = \boxed{1\frac{1}{2}} \quad \frac{5}{2} = \boxed{2\frac{1}{2}}$$

Use and imaginary '1' as shown in Teaching Tip #11. It is imperative that students realize they are using the identity principle when computing lowest terms.

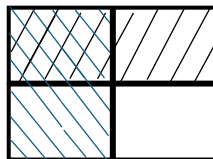
- 7.) When dividing a proper fraction such as $\frac{2}{4}$ by $\frac{2}{2}$ to convert it into lowest terms, what whole number are you dividing by? 1.

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) *Multiply.*

$$9 \times \frac{2}{3} = \boxed{} \quad \frac{2}{5} \times \frac{1}{2} = \boxed{}$$

2.) *Write the multiplication equation.*



$$\underline{} \times \underline{} = \underline{}$$

What fraction is double cross-hatched? _____

- 3.) a.) What are all the factors for 3? { _____ }
 b.) What are all the factors for 9? { _____ }

- c.) What is the GCF for 3 and 9? GCF = _____
 d.) What is $\frac{3}{9}$ in lowest terms? _____

4.) *Write the following fractions in lowest terms.*

$$\frac{5}{15} = \boxed{} \quad \frac{6}{12} = \boxed{} \quad \frac{8}{10} = \boxed{}$$

5.) *Write the following fractions in lowest terms.*

$$\frac{18}{10} = \boxed{} \quad \frac{8}{4} = \boxed{} \quad \frac{5}{3} = \boxed{}$$

6.) *Complete by filling in the box with a whole number.*

$$\frac{7}{7} = \boxed{} \quad \frac{3}{3} = \boxed{} \quad \frac{100}{100} = \boxed{}$$

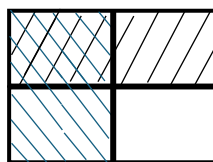
7.) *When dividing a proper fraction such as $\frac{5}{10}$ by $\frac{5}{5}$ to convert it into lowest terms, what whole number are you dividing by? _____ .*

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) *Multiply.*

$$9 \times \frac{2}{3} = \boxed{} \quad \frac{2}{5} \times \frac{1}{2} = \boxed{}$$

2.) *Write the multiplication equation.*



$$\underline{} \times \underline{} = \underline{}$$

What fraction is double cross-hatched? _____

- 3.) a.) What are all the factors for 3? { _____ }
 b.) What are all the factors for 9? { _____ }

- c.) What is the GCF for 3 and 9? GCF = _____
 d.) What is $\frac{3}{9}$ in lowest terms? _____

4.) *Write the following fractions in lowest terms.*

$$\frac{5}{15} = \boxed{} \quad \frac{6}{12} = \boxed{} \quad \frac{8}{10} = \boxed{}$$

5.) *Write the following fractions in lowest terms.*

$$\frac{18}{10} = \boxed{} \quad \frac{8}{4} = \boxed{} \quad \frac{5}{3} = \boxed{}$$

6.) *Complete by filling in the box with a whole number.*

$$\frac{7}{7} = \boxed{} \quad \frac{3}{3} = \boxed{} \quad \frac{100}{100} = \boxed{}$$

7.) *When dividing a proper fraction such as $\frac{5}{10}$ by $\frac{5}{5}$ to convert it into lowest terms, what whole number are you dividing by? _____ .*

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Multiply.

$$9 \times \frac{2}{3} = \boxed{6} \quad \frac{2}{5} \times \frac{1}{2} = \boxed{\frac{1}{5}}$$

$$\frac{9}{1} \times \frac{2}{3} = \boxed{\frac{18}{3}} \quad \frac{2}{10} = \frac{1}{5} \text{ (L.T.)}$$

- 3.) a.) What are all the **factors** for 3? { 1, 3 }
 b.) What are all the **factors** for 9? { 1, 3, 9 }

4.) Write the following fractions in lowest terms.

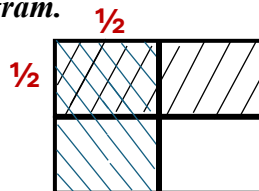
$$\frac{5}{15} = \boxed{\frac{1}{3}} \quad \frac{6}{12} = \boxed{\frac{1}{2}} \quad \frac{8}{10} = \boxed{\frac{4}{5}}$$

Use and imaginary '1' as shown in Teaching Tip #11.

6.) Complete by filling in the box with a whole number.

$$\frac{7}{7} = \boxed{1} \quad \frac{3}{3} = \boxed{1} \quad \frac{100}{100} = \boxed{1}$$

2.) Write the multiplication equation that matches the diagram.



$$\frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$$

What fraction is double cross-hatched? 1/4

- c.) What is the GCF for 3 and 9? GCF = 3
 d.) What is $\frac{3}{9}$ in lowest terms? 1/3

5.) Write the following fractions in lowest terms.

$$\frac{18}{10} = \boxed{1\frac{4}{5}} \quad \frac{8}{4} = \boxed{2} \quad \frac{5}{3} = \boxed{1\frac{2}{3}}$$

Use and imaginary '1' as shown in Teaching Tip #11.

It is imperative that students realize they are using the identity principle when computing lowest terms.

- 7.) When dividing a proper fraction such as $\frac{5}{10}$ by $\frac{5}{5}$ to convert it into lowest terms, what **whole number** are you dividing by? 1.

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Multiply.

$$9 \times \frac{2}{3} = \boxed{6} \quad \frac{2}{5} \times \frac{1}{2} = \boxed{\frac{1}{5}}$$

$$\frac{9}{1} \times \frac{2}{3} = \boxed{\frac{18}{3}} \quad \frac{2}{10} = \frac{1}{5} \text{ (L.T.)}$$

- 3.) a.) What are all the **factors** for 3? { 1, 3 }
 b.) What are all the **factors** for 9? { 1, 3, 9 }

4.) Write the following fractions in lowest terms.

Use and imaginary '1' as shown in Teaching Tip #11.

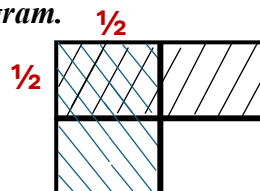
$$\frac{5}{15} = \boxed{\frac{1}{3}} \quad \frac{6}{12} = \boxed{\frac{1}{2}} \quad \frac{8}{10} = \boxed{\frac{4}{5}}$$

Use and imaginary '1' as shown in Teaching Tip #11.

6.) Complete by filling in the box with a whole number.

$$\frac{7}{7} = \boxed{1} \quad \frac{3}{3} = \boxed{1} \quad \frac{100}{100} = \boxed{1}$$

2.) Write the multiplication equation that matches the diagram.



$$\frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$$

What fraction is double cross-hatched? 1/4

- c.) What is the GCF for 3 and 9? GCF = 3
 d.) What is $\frac{3}{9}$ in lowest terms? 1/3

5.) Write the following fractions in lowest terms.

$$\frac{18}{10} = \boxed{1\frac{4}{5}} \quad \frac{8}{4} = \boxed{2} \quad \frac{5}{3} = \boxed{1\frac{2}{3}}$$

Use and imaginary '1' as shown in Teaching Tip #11.

It is imperative that students realize they are using the identity principle when computing lowest terms.

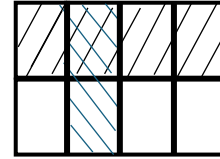
- 7.) When dividing a proper fraction such as $\frac{5}{10}$ by $\frac{5}{5}$ to convert it into lowest terms, what **whole number** are you dividing by? 1.

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) *Multiply.*

$$6 \times \frac{1}{3} = \boxed{} \quad \frac{4}{5} \times \frac{1}{2} = \boxed{}$$

2.) *Write the multiplication equation that matches the diagram.*



$$\underline{} \times \underline{} = \underline{}$$

What fraction is double cross-hatched? _____

- 3.) a.) What are all the factors for 4? { _____ }
 b.) What are all the factors for 10? { _____ }

- c.) What is the GCF for 4 and 10? GCF = _____
 d.) What is $\frac{4}{10}$ in lowest terms? _____

4.) *Write the following fractions in lowest terms.*

$$\frac{6}{9} = \boxed{} \quad \frac{10}{12} = \boxed{} \quad \frac{3}{15} = \boxed{}$$

5.) *Write the following fractions in lowest terms.*

$$\frac{14}{10} = \boxed{} \quad \frac{9}{4} = \boxed{} \quad \frac{9}{3} = \boxed{}$$

6.) *Complete by filling in the box with a whole number.*

$$\frac{9}{9} = \boxed{} \quad \frac{12}{3} = \boxed{} \quad \frac{1000}{1000} = \boxed{}$$

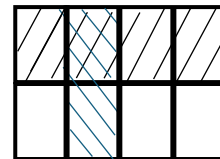
7.) *When dividing a proper fraction such as $\frac{8}{10}$ by $\frac{4}{4}$ to convert it into lowest terms, what whole number are you dividing by? _____ .*

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) *Multiply.*

$$6 \times \frac{1}{3} = \boxed{} \quad \frac{4}{5} \times \frac{1}{2} = \boxed{}$$

2.) *Write the multiplication equation that matches the diagram.*



$$\underline{} \times \underline{} = \underline{}$$

What fraction is double cross-hatched? _____

- 3.) a.) What are all the factors for 4? { _____ }
 b.) What are all the factors for 10? { _____ }

- c.) What is the GCF for 4 and 10? GCF = _____
 d.) What is $\frac{4}{10}$ in lowest terms? _____

4.) *Write the following fractions in lowest terms.*

$$\frac{6}{9} = \boxed{} \quad \frac{10}{12} = \boxed{} \quad \frac{3}{15} = \boxed{}$$

5.) *Write the following fractions in lowest terms.*

$$\frac{14}{10} = \boxed{} \quad \frac{9}{4} = \boxed{} \quad \frac{9}{3} = \boxed{}$$

6.) *Complete by filling in the box with a whole number.*

$$\frac{9}{9} = \boxed{} \quad \frac{12}{3} = \boxed{} \quad \frac{1000}{1000} = \boxed{}$$

7.) *When dividing a proper fraction such as $\frac{8}{10}$ by $\frac{4}{4}$ to convert it into lowest terms, what whole number are you dividing by? _____ .*

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) *Multiply.*

$$6 \times \frac{1}{3} = \boxed{2} \quad \frac{4}{5} \times \frac{1}{2} = \boxed{\frac{2}{5}}$$

$$\frac{6}{1} \times \frac{1}{3} = \boxed{\frac{6}{3}} \quad \frac{4}{10} = \frac{2}{5} \text{ (L.T.)}$$

- 3.) a.) What are all the **factors** for 4? { 1, 2, 4 }
 b.) What are all the **factors** for 10? { 1, 2, 5, 10 }

4.) *Write the following fractions in lowest terms.*

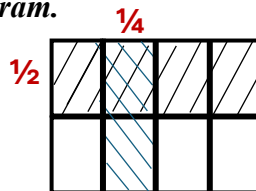
$$\frac{6}{9} = \boxed{\frac{2}{3}} \quad \frac{10}{12} = \boxed{\frac{5}{6}} \quad \frac{3}{15} = \boxed{\frac{1}{5}}$$

Use and imaginary '1' as shown in Teaching Tip #11.

6.) *Complete by filling in the box with a whole number.*

$$\frac{9}{9} = \boxed{1} \quad \frac{12}{3} = \boxed{4} \quad \frac{1000}{1000} = \boxed{1}$$

2.) *Write the multiplication equation that matches the diagram.*



$$\frac{1}{2} \times \frac{1}{4} = \frac{1}{8}$$

What fraction is double cross-hatched? $\frac{1}{8}$

- c.) What is the GCF for 4 and 10? GCF = 2
 d.) What is $\frac{4}{10}$ in lowest terms? $\frac{2}{5}$

5.) *Write the following fractions in lowest terms.*

$$\frac{14}{10} = \boxed{1\frac{2}{5}} \quad \frac{9}{4} = \boxed{2\frac{1}{4}} \quad \frac{9}{3} = \boxed{3}$$

Use and imaginary '1' as shown in Teaching Tip #11.

It is imperative that students realize they are using the identity principle when computing lowest terms.

- 7.) *When dividing a proper fraction such as $\frac{8}{10}$ by $\frac{4}{4}$ to convert it into lowest terms, what **whole number** are you dividing by? 1.*

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) *Multiply.*

$$6 \times \frac{1}{3} = \boxed{2} \quad \frac{4}{5} \times \frac{1}{2} = \boxed{\frac{2}{5}}$$

$$\frac{6}{1} \times \frac{1}{3} = \boxed{\frac{6}{3}} \quad \frac{4}{10} = \frac{2}{5} \text{ (L.T.)}$$

- 3.) a.) What are all the **factors** for 4? { 1, 2, 4 }
 b.) What are all the **factors** for 10? { 1, 2, 5, 10 }

4.) *Write the following fractions in lowest terms.*

Use and imaginary '1' as shown in Teaching Tip #11.

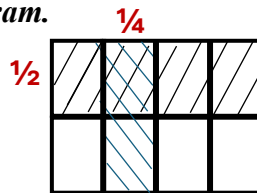
$$\frac{6}{9} = \boxed{\frac{2}{3}} \quad \frac{10}{12} = \boxed{\frac{5}{6}} \quad \frac{3}{15} = \boxed{\frac{1}{5}}$$

Use and imaginary '1' as shown in Teaching Tip #11.

6.) *Complete by filling in the box with a whole number.*

$$\frac{9}{9} = \boxed{1} \quad \frac{12}{3} = \boxed{4} \quad \frac{1000}{1000} = \boxed{1}$$

2.) *Write the multiplication equation that matches the diagram.*



$$\frac{1}{2} \times \frac{1}{4} = \frac{1}{8}$$

What fraction is double cross-hatched? $\frac{1}{8}$

- c.) What is the GCF for 4 and 10? GCF = 2
 d.) What is $\frac{4}{10}$ in lowest terms? $\frac{2}{5}$

5.) *Write the following fractions in lowest terms.*

$$\frac{14}{10} = \boxed{1\frac{2}{5}} \quad \frac{9}{4} = \boxed{2\frac{1}{4}} \quad \frac{9}{3} = \boxed{3}$$

Use and imaginary '1' as shown in Teaching Tip #11.

It is imperative that students realize they are using the identity principle when computing lowest terms.

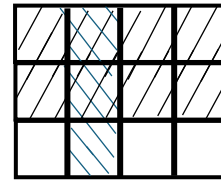
- 7.) *When dividing a proper fraction such as $\frac{8}{10}$ by $\frac{4}{4}$ to convert it into lowest terms, what **whole number** are you dividing by? 1.*

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) *Multiply.*

$$12 \times \frac{1}{4} = \boxed{} \quad \frac{3}{7} \times \frac{3}{3} = \boxed{}$$

2.) *Write the multiplication equation that matches the diagram.*



$$\underline{} \times \underline{} = \underline{}$$

What fraction is double cross-hatched? _____

- 3.) a.) What are all the factors for 2? { _____ }
 b.) What are all the factors for 10? { _____ }

- c.) What is the GCF for 2 and 10? GCF = _____
 d.) What is $\frac{2}{10}$ in lowest terms? _____

4.) *Write the following fractions in lowest terms.*

$$\frac{3}{9} = \boxed{} \quad \frac{10}{15} = \boxed{} \quad \frac{5}{15} = \boxed{}$$

5.) *Write the following fractions in lowest terms.*

$$\frac{12}{10} = \boxed{} \quad \frac{11}{4} = \boxed{} \quad \frac{6}{3} = \boxed{}$$

$$\frac{4}{8} = \boxed{} \quad \frac{10}{12} = \boxed{} \quad \frac{12}{15} = \boxed{}$$

7.) *Write the factor strings for each number.*

- | | | |
|----------|----------|-----------|
| 1: _____ | 5: _____ | 9: _____ |
| 2: _____ | 6: _____ | 10: _____ |
| 3: _____ | 7: _____ | 11: _____ |
| 4: _____ | 8: _____ | 12: _____ |

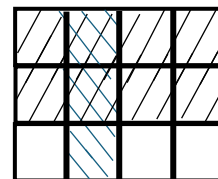
6.) *Circle the Prime Numbers in Problem 7.*

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) *Multiply.*

$$12 \times \frac{1}{4} = \boxed{} \quad \frac{3}{7} \times \frac{3}{3} = \boxed{}$$

2.) *Write the multiplication equation that matches the diagram.*



$$\underline{} \times \underline{} = \underline{}$$

What fraction is double cross-hatched? _____

- 3.) a.) What are all the factors for 2? { _____ }
 b.) What are all the factors for 10? { _____ }

- c.) What is the GCF for 2 and 10? GCF = _____
 d.) What is $\frac{2}{10}$ in lowest terms? _____

4.) *Write the following fractions in lowest terms.*

$$\frac{3}{9} = \boxed{} \quad \frac{10}{15} = \boxed{} \quad \frac{5}{15} = \boxed{}$$

5.) *Write the following fractions in lowest terms.*

$$\frac{12}{10} = \boxed{} \quad \frac{11}{4} = \boxed{} \quad \frac{6}{3} = \boxed{}$$

$$\frac{4}{8} = \boxed{} \quad \frac{10}{12} = \boxed{} \quad \frac{12}{15} = \boxed{}$$

7.) *Write the factor strings for each number.*

- | | | |
|----------|----------|-----------|
| 1: _____ | 5: _____ | 9: _____ |
| 2: _____ | 6: _____ | 10: _____ |
| 3: _____ | 7: _____ | 11: _____ |
| 4: _____ | 8: _____ | 12: _____ |

6.) *Circle the Prime Numbers in Problem 7.*

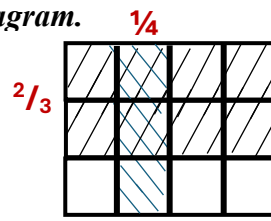
Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Multiply.

$$12 \times \frac{1}{4} = \boxed{3} \quad \frac{3}{7} \times \frac{3}{3} = \frac{3}{7} \quad (1)$$

$$\frac{12}{1} \times \frac{1}{4} = \boxed{\frac{12}{4}} \quad \frac{9}{21} = \frac{3}{7} \quad (\text{L.T.})$$

2.) Write the multiplication equation that matches the diagram.



$\frac{2}{3} \times \frac{1}{4} = \frac{2}{12}$ ($\frac{1}{6}$ in L.T.)

What fraction is double cross-hatched? $\frac{2}{12}$

- 3.) a.) What are all the **factors** for 2? { 1, 2 }
 b.) What are all the **factors** for 10? { 1, 2, 5, 10 }

- c.) What is the GCF for 2 and 10? GCF = 2
 d.) What is $\frac{2}{10}$ in lowest terms? $\frac{1}{5}$

4.) Write the following fractions in lowest terms.

$$\frac{3}{9} = \boxed{\frac{1}{3}} \quad \frac{10}{15} = \boxed{\frac{2}{3}} \quad \frac{5}{15} = \boxed{\frac{1}{3}}$$

The GCF is 1 when a fraction is in lowest terms!

$$\frac{4}{8} = \boxed{\frac{1}{2}} \quad \frac{10}{12} = \boxed{\frac{5}{6}} \quad \frac{12}{15} = \boxed{\frac{4}{5}}$$

The number 1 is NOT prime nor composite.

5.) Write the following fractions in lowest terms.

$$\frac{12}{10} = \boxed{1\frac{1}{5}} \quad \frac{11}{4} = \boxed{2\frac{3}{4}} \quad \frac{6}{3} = \boxed{2}$$

7.) Write the **factor strings** for each number.

- 1: {1} 5: {1, 5} 9: {1, 3, 9}
 2: {1, 2} 6: {1, 2, 3, 6} 10: {1, 2, 5, 10}
 3: {1, 3} 7: {1, 7} 11: {1, 11}
 4: {1, 2, 4} 8: {1, 2, 4, 8} 12: {1, 2, 3, 4, 6, 12}

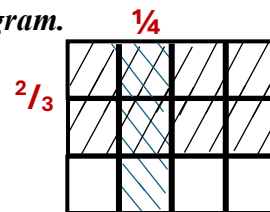
Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Multiply.

$$12 \times \frac{1}{4} = \boxed{3} \quad \frac{3}{7} \times \frac{3}{3} = \frac{3}{7} \quad (1)$$

$$\frac{12}{1} \times \frac{1}{4} = \boxed{\frac{12}{4}} \quad \frac{9}{21} = \frac{3}{7} \quad (\text{L.T.})$$

2.) Write the multiplication equation that matches the diagram.



$\frac{2}{3} \times \frac{1}{4} = \frac{2}{12}$ ($\frac{1}{6}$ in L.T.)

What fraction is double cross-hatched? $\frac{2}{12}$

- 3.) a.) What are all the **factors** for 2? { 1, 2 }
 b.) What are all the **factors** for 10? { 1, 2, 5, 10 }

- c.) What is the GCF for 2 and 10? GCF = 2
 d.) What is $\frac{2}{10}$ in lowest terms? $\frac{1}{5}$

4.) Write the following fractions in lowest terms.

$$\frac{3}{9} = \boxed{\frac{1}{3}} \quad \frac{10}{15} = \boxed{\frac{2}{3}} \quad \frac{5}{15} = \boxed{\frac{1}{3}}$$

The GCF is 1 when a fraction is in lowest terms!

$$\frac{4}{8} = \boxed{\frac{1}{2}} \quad \frac{10}{12} = \boxed{\frac{5}{6}} \quad \frac{12}{15} = \boxed{\frac{4}{5}}$$

The number 1 is NOT prime nor composite.

5.) Write the following fractions in lowest terms.

$$\frac{12}{10} = \boxed{1\frac{1}{5}} \quad \frac{11}{4} = \boxed{2\frac{3}{4}} \quad \frac{6}{3} = \boxed{2}$$

7.) Write the **factor strings** for each number.

- 1: {1} 5: {1, 5} 9: {1, 3, 9}
 2: {1, 2} 6: {1, 2, 3, 6} 10: {1, 2, 5, 10}
 3: {1, 3} 7: {1, 7} 11: {1, 11}
 4: {1, 2, 4} 8: {1, 2, 4, 8} 12: {1, 2, 3, 4, 6, 12}

6.) Circle the **Prime Numbers** in Problem 7.

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) *Multiply.*

$$16 \times \frac{2}{4} = \boxed{} \quad \frac{3}{7} \times \frac{1}{3} = \boxed{}$$

2.) *Multiply.*

$$1\frac{1}{4} \times 1\frac{1}{2} = \boxed{} \quad 1\frac{1}{4} \times 3 = \boxed{}$$

3.) a.) What is the GCF of $\frac{3}{5}$? _____

b.) Is the fraction $\frac{3}{5}$ in lowest terms? Yes No

4.) *Write the following fractions in lowest terms.*

$$\frac{6}{9} = \boxed{} \quad \frac{10}{20} = \boxed{} \quad \frac{5}{25} = \boxed{}$$

$$\frac{4}{10} = \boxed{} \quad \frac{10}{12} = \boxed{} \quad \frac{10}{30} = \boxed{}$$

5.) *Write the following fractions in lowest terms.*

$$\frac{19}{10} = \boxed{} \quad \frac{13}{4} = \boxed{} \quad \frac{10}{4} = \boxed{}$$

7.) *Write the factor strings for each number.*

1: _____ 5: _____ 9: _____
 2: _____ 6: _____ 10: _____
 3: _____ 7: _____ 11: _____
 4: _____ 8: _____ 12: _____

6.) *Circle the Prime Numbers in Problem 7.*

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) *Multiply.*

$$16 \times \frac{2}{4} = \boxed{} \quad \frac{3}{7} \times \frac{1}{3} = \boxed{}$$

2.) *Multiply.*

$$1\frac{1}{4} \times 1\frac{1}{2} = \boxed{} \quad 1\frac{1}{4} \times 3 = \boxed{}$$

3.) a.) What is the GCF of $\frac{3}{5}$? _____

b.) Is the fraction $\frac{3}{5}$ in lowest terms? Yes No

4.) *Write the following fractions in lowest terms.*

$$\frac{6}{9} = \boxed{} \quad \frac{10}{20} = \boxed{} \quad \frac{5}{25} = \boxed{}$$

$$\frac{4}{10} = \boxed{} \quad \frac{10}{12} = \boxed{} \quad \frac{10}{30} = \boxed{}$$

5.) *Write the following fractions in lowest terms.*

$$\frac{19}{10} = \boxed{} \quad \frac{13}{4} = \boxed{} \quad \frac{10}{4} = \boxed{}$$

7.) *Write the factor strings for each number.*

1: _____ 5: _____ 9: _____
 2: _____ 6: _____ 10: _____
 3: _____ 7: _____ 11: _____
 4: _____ 8: _____ 12: _____

6.) *Circle the Prime Numbers in Problem 7.*

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Multiply.

$$16 \times \frac{2}{4} = \boxed{8}$$

$$\frac{3}{7} \times \frac{1}{3} = \boxed{\frac{1}{7}}$$

2.) Multiply.

$$1\frac{1}{4} \times 1\frac{1}{2} = \boxed{1\frac{7}{8}}$$

$$1\frac{1}{4} \times 3 = \boxed{3\frac{3}{4}}$$

$$\frac{16}{1} \times \frac{2}{4} = \boxed{\frac{32}{4}}$$

$$\frac{3}{21} = \frac{1}{7} \text{ (L.T.)}$$

$$\frac{5}{4} \times \frac{3}{2} = \boxed{\frac{15}{8}}$$

$$\frac{5}{4} \times \frac{3}{1} = \boxed{\frac{15}{4}}$$

3.) a.) What is the GCF of $\frac{3}{5}$? 1

b.) Is the fraction $\frac{3}{5}$ in lowest terms? Yes No

Yes, the GCF between the numerator and denominator is 1. Cannot be reduced and further.

4.) Write the following fractions in lowest terms.

$$\frac{6}{9} = \boxed{\frac{2}{3}}$$

$$\frac{10}{20} = \boxed{\frac{1}{2}}$$

$$\frac{5}{25} = \boxed{\frac{1}{5}}$$

The number 2 the only prime AND even number.

$$\frac{19}{10} = \boxed{1\frac{9}{10}}$$

$$\frac{13}{4} = \boxed{3\frac{1}{4}}$$

$$\frac{10}{4} = \boxed{2\frac{1}{2}}$$

5.) Write the following fractions in lowest terms.

The GCF is 1 when a fraction is in lowest terms!

$$\frac{4}{10} = \boxed{\frac{2}{5}}$$

$$\frac{10}{12} = \boxed{\frac{5}{6}}$$

$$\frac{10}{30} = \boxed{\frac{1}{3}}$$

The number 1 is NOT prime nor composite.

7.) Write the factor strings for each number.

1: {1}

5: {1, 5}

9: {1, 3, 9}

2: {1, 2}

6: {1, 2, 3, 6}

10: {1, 2, 5, 10}

3: {1, 3}

7: {1, 7}

11: {1, 11}

4: {1, 2, 4}

8: {1, 2, 4, 8}

12: {1, 2, 3, 4, 6, 12}

6.) Circle the Prime Numbers in Problem 7.

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Multiply.

$$16 \times \frac{2}{4} = \boxed{8}$$

$$\frac{3}{7} \times \frac{1}{3} = \boxed{\frac{1}{7}}$$

2.) Multiply.

$$1\frac{1}{4} \times 1\frac{1}{2} = \boxed{1\frac{7}{8}}$$

$$1\frac{1}{4} \times 3 = \boxed{3\frac{3}{4}}$$

$$\frac{16}{1} \times \frac{2}{4} = \boxed{\frac{32}{4}}$$

$$\frac{3}{21} = \frac{1}{7} \text{ (L.T.)}$$

$$\frac{5}{4} \times \frac{3}{2} = \boxed{\frac{15}{8}}$$

$$\frac{5}{4} \times \frac{3}{1} = \boxed{\frac{15}{4}}$$

3.) a.) What is the GCF of $\frac{3}{5}$? 1

b.) Is the fraction $\frac{3}{5}$ in lowest terms? Yes No

Yes, the GCF between the numerator and denominator is 1. Cannot be reduced and further.

4.) Write the following fractions in lowest terms.

5.) Write the following fractions in lowest terms.

$$\frac{6}{9} = \boxed{\frac{2}{3}}$$

$$\frac{10}{20} = \boxed{\frac{1}{2}}$$

$$\frac{5}{25} = \boxed{\frac{1}{5}}$$

The number 2 the only prime AND even number.

$$\frac{19}{10} = \boxed{1\frac{9}{10}}$$

$$\frac{13}{4} = \boxed{3\frac{1}{4}}$$

$$\frac{10}{4} = \boxed{2\frac{1}{2}}$$

The GCF is 1 when a fraction is in lowest terms!

7.) Write the factor strings for each number.

1: {1}

5: {1, 5}

9: {1, 3, 9}

2: {1, 2}

6: {1, 2, 3, 6}

10: {1, 2, 5, 10}

3: {1, 3}

7: {1, 7}

11: {1, 11}

The number 1 is NOT prime nor composite.

4: {1, 2, 4}

8: {1, 2, 4, 8}

12: {1, 2, 3, 4, 6, 12}

6.) Circle the Prime Numbers in Problem 7.

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) *Divide.*

$$\frac{4}{4} \div \frac{1}{2} = \boxed{} \quad \frac{1}{3} \div \frac{1}{3} = \boxed{}$$

2.) *Multiply.*

$$2\frac{2}{3} \times 1\frac{1}{2} = \boxed{} \quad 2\frac{1}{2} \times 5 = \boxed{}$$

3.) a.) What is the GCF of $\frac{3}{9}$? _____

b.) Is the fraction $\frac{3}{9}$ in lowest terms? Yes No

4.) *Write the following fractions in lowest terms.*

$$\frac{5}{7} = \boxed{} \quad \frac{10}{25} = \boxed{} \quad \frac{5}{10} = \boxed{}$$

$$\frac{8}{10} = \boxed{} \quad \frac{10}{14} = \boxed{} \quad \frac{10}{40} = \boxed{}$$

5.) *Write the following fractions in lowest terms.*

$$\frac{25}{10} = \boxed{} \quad \frac{18}{4} = \boxed{} \quad \frac{50}{5} = \boxed{}$$

7.) *Write the factor strings for each number.*

1: _____ 5: _____ 9: _____
 2: _____ 6: _____ 10: _____
 3: _____ 7: _____ 11: _____
 4: _____ 8: _____ 12: _____

6.) *Circle the COMPOSITE Numbers in Problem 7.*

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) *Divide.*

$$\frac{4}{4} \div \frac{1}{2} = \boxed{} \quad \frac{1}{3} \div \frac{1}{3} = \boxed{}$$

2.) *Multiply.*

$$2\frac{2}{3} \times 1\frac{1}{2} = \boxed{} \quad 2\frac{1}{2} \times 5 = \boxed{}$$

3.) a.) What is the GCF of $\frac{3}{9}$? _____

b.) Is the fraction $\frac{3}{9}$ in lowest terms? Yes No

4.) *Write the following fractions in lowest terms.*

$$\frac{5}{7} = \boxed{} \quad \frac{10}{25} = \boxed{} \quad \frac{5}{10} = \boxed{}$$

$$\frac{8}{10} = \boxed{} \quad \frac{10}{14} = \boxed{} \quad \frac{10}{40} = \boxed{}$$

5.) *Write the following fractions in lowest terms.*

$$\frac{25}{10} = \boxed{} \quad \frac{18}{4} = \boxed{} \quad \frac{50}{5} = \boxed{}$$

7.) *Write the factor strings for each number.*

1: _____ 5: _____ 9: _____
 2: _____ 6: _____ 10: _____
 3: _____ 7: _____ 11: _____
 4: _____ 8: _____ 12: _____

6.) *Circle the COMPOSITE Numbers in Problem 7.*

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) **Divide.** *1 into 2 equal halves (1/2) Dividing by itself. 1 whole.*

$$\frac{4}{4} \div \frac{1}{2} = \boxed{2} \quad \frac{1}{3} \div \frac{1}{3} = \boxed{1}$$

$$\frac{4}{4} \times \frac{2}{1} = \boxed{\frac{8}{4}} \quad \frac{1}{3} \times \frac{3}{1} = \boxed{\frac{3}{3}}$$

Talk through the physical solutions with students.

2.) **Multiply.** *3 x 1 is about 3ish. 2 x 5 is about 10ish.*

$$2\frac{2}{3} \times 1\frac{1}{2} = \boxed{4} \quad 2\frac{1}{2} \times 5 = \boxed{12\frac{1}{2}}$$

$$\frac{8}{2} \times \frac{1}{3} = \boxed{\frac{8}{2}} \quad \frac{5}{2} \times \frac{5}{1} = \boxed{\frac{25}{2}}$$

Talk through the physical solutions with students.

3.) a.) What is the GCF of $\frac{3}{9}$? 3

b.) Is the fraction $\frac{3}{9}$ in lowest terms? Yes No $\frac{1}{3}$ LT

No, the GCF between the numerator and denominator is 3. Can be reduced further.

4.) Write the following fractions in lowest terms.

$$\frac{5}{7} = \boxed{\frac{5}{7}} \quad \frac{10}{25} = \boxed{\frac{2}{5}} \quad \frac{5}{10} = \boxed{\frac{1}{2}}$$

The number 2 the only prime AND even number.

The GCF is 1 when a fraction is in lowest terms!

$$\frac{8}{10} = \boxed{\frac{4}{5}} \quad \frac{10}{14} = \boxed{\frac{5}{7}} \quad \frac{10}{40} = \boxed{\frac{1}{4}}$$

5.) Write the following fractions in lowest terms.

$$\frac{25}{10} = \boxed{2\frac{1}{2}} \quad \frac{18}{4} = \boxed{4\frac{1}{2}} \quad \frac{50}{5} = \boxed{10}$$

7.) Write the factor strings for each number.

- 1: {1} 5: {1, 5} 9: {1, 3, 9}
 2: {1, 2} 6: {1, 2, 3, 6} 10: {1, 2, 5, 10}
 3: {1, 3} 7: {1, 7} 11: {1, 11}
 4: {1, 2, 4} 8: {1, 2, 4, 8} 12: {1, 2, 3, 4, 6, 12}

6.) Circle the COMPOSITE Numbers in Problem 7.

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) **Divide.** *1 into 2 equal halves (1/2) Dividing by itself - 1 whole.*

$$\frac{4}{4} \div \frac{1}{2} = \boxed{2} \quad \frac{1}{3} \div \frac{1}{3} = \boxed{1}$$

$$\frac{4}{4} \times \frac{2}{1} = \boxed{\frac{8}{4}} \quad \frac{1}{3} \times \frac{3}{1} = \boxed{\frac{3}{3}}$$

Talk through the physical solutions with students.

2.) **Multiply.** *3 x 1 is about 3ish. 2 x 5 is about 10ish.*

$$2\frac{2}{3} \times 1\frac{1}{2} = \boxed{4} \quad 2\frac{1}{2} \times 5 = \boxed{12\frac{1}{2}}$$

$$\frac{8}{2} \times \frac{1}{3} = \boxed{\frac{8}{2}} \quad \frac{5}{2} \times \frac{5}{1} = \boxed{\frac{25}{2}}$$

Talk through the physical solutions with students.

3.) a.) What is the GCF of $\frac{3}{9}$? 3

b.) Is the fraction $\frac{3}{9}$ in lowest terms? Yes No

No, the GCF between the numerator and denominator is 3. Can be reduced further.

4.) Write the following fractions in lowest terms.

$$\frac{5}{7} = \boxed{\frac{5}{7}} \quad \frac{10}{25} = \boxed{\frac{2}{5}} \quad \frac{5}{10} = \boxed{\frac{1}{2}}$$

The number 2 the only prime AND even number.

The GCF is 1 when a fraction is in lowest terms!

$$\frac{8}{10} = \boxed{\frac{4}{5}} \quad \frac{10}{14} = \boxed{\frac{5}{7}} \quad \frac{10}{40} = \boxed{\frac{1}{4}}$$

The number 1 is NOT prime nor composite.

5.) Write the following fractions in lowest terms.

$$\frac{25}{10} = \boxed{2\frac{1}{2}} \quad \frac{18}{4} = \boxed{4\frac{1}{2}} \quad \frac{50}{5} = \boxed{10}$$

7.) Write the factor strings for each number.

- 1: {1} 5: {1, 5} 9: {1, 3, 9}
 2: {1, 2} 6: {1, 2, 3, 6} 10: {1, 2, 5, 10}
 3: {1, 3} 7: {1, 7} 11: {1, 11}
 4: {1, 2, 4} 8: {1, 2, 4, 8} 12: {1, 2, 3, 4, 6, 12}

6.) Circle the COMPOSITE Numbers in Problem 7.

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) *Divide.*

$$\frac{7}{4} \div \frac{1}{3} = \boxed{} \quad \frac{2}{3} \div \frac{1}{3} = \boxed{}$$

2.) *Multiply.*

$$4\frac{1}{3} \times 1\frac{1}{5} = \boxed{} \quad 2\frac{1}{2} \times 6 = \boxed{}$$

3.) a.) What is the GCF of $\frac{5}{15}$? _____

b.) Is the fraction $\frac{5}{15}$ in lowest terms? Yes No

4.) *Write the following fractions in lowest terms.*

$$\frac{3}{6} = \boxed{} \quad \frac{20}{25} = \boxed{} \quad \frac{3}{10} = \boxed{}$$

$$\frac{8}{16} = \boxed{} \quad \frac{12}{16} = \boxed{} \quad \frac{10}{40} = \boxed{}$$

5.) *Complete so the fractions and decimal are equal.*

$$2.5 = \frac{\boxed{}}{10} = \frac{\boxed{}}{2} \quad 1.5 = \frac{\boxed{}}{10} = \frac{\boxed{}}{2}$$

7.) *Write the factor strings for each number.*

5: _____ 9: _____ 13: _____
 6: _____ 10: _____ 14: _____
 7: _____ 11: _____ 15: _____
 8: _____ 12: _____ 16: _____

6.) *Circle the COMPOSITE Numbers in Problem 7.*

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) *Divide.*

$$\frac{7}{4} \div \frac{1}{3} = \boxed{} \quad \frac{2}{3} \div \frac{1}{3} = \boxed{}$$

2.) *Multiply.*

$$4\frac{1}{3} \times 1\frac{1}{5} = \boxed{} \quad 2\frac{1}{2} \times 6 = \boxed{}$$

3.) a.) What is the GCF of $\frac{5}{15}$? _____

b.) Is the fraction $\frac{5}{15}$ in lowest terms? Yes No

4.) *Write the following fractions in lowest terms.*

$$\frac{3}{6} = \boxed{} \quad \frac{20}{25} = \boxed{} \quad \frac{3}{10} = \boxed{}$$

$$\frac{8}{16} = \boxed{} \quad \frac{12}{16} = \boxed{} \quad \frac{10}{40} = \boxed{}$$

5.) *Complete so the fractions and decimal are equal.*

$$2.5 = \frac{\boxed{}}{10} = \frac{\boxed{}}{2} \quad 1.5 = \frac{\boxed{}}{10} = \frac{\boxed{}}{2}$$

7.) *Write the factor strings for each number.*

5: _____ 9: _____ 13: _____
 6: _____ 10: _____ 14: _____
 7: _____ 11: _____ 15: _____
 8: _____ 12: _____ 16: _____

6.) *Circle the COMPOSITE Numbers in Problem 7.*

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Divide. $2 \div \text{equal } (1/3) \sim 6\text{ish}$ $2/3 \div \text{equal } (1/3) \sim 2$

$$\frac{7}{4} \div \frac{1}{3} = \boxed{5\frac{1}{4}} \quad \frac{2}{3} \div \frac{1}{3} = \boxed{2}$$

$$\frac{7}{4} \times \frac{3}{1} = \boxed{\frac{21}{4}} \quad \frac{2}{3} \times \frac{3}{1} = \boxed{\frac{6}{3}}$$

Talk through the physical solutions with students.

2.) Multiply. $5 \times 1 \text{ is about } 5\text{ish.}$ $2 \times 6 \text{ is about } 12\text{ish.}$

$$4\frac{1}{3} \times 1\frac{1}{5} = \boxed{5\frac{1}{5}} \quad 2\frac{1}{2} \times 6 = \boxed{15}$$

$$\frac{13}{5} \times \frac{2}{3} = \boxed{\frac{26}{5}} \quad \frac{5}{2} \times \frac{6}{1} = \boxed{\frac{30}{2}}$$

Talk through the physical solutions with students.

- 3.) a.) What is the GCF of $5/15$? 5 b.) Is the fraction $5/15$ in lowest terms? Yes No $\frac{1}{3}$ LT

No, the GCF between the numerator and denominator is 5. Can be reduced further.

- 4.) Write the following fractions in lowest terms.

$$\frac{3}{6} = \boxed{\frac{1}{2}} \quad \frac{20}{25} = \boxed{\frac{4}{5}} \quad \frac{3}{10} = \boxed{\frac{3}{10}}$$

The GCF is 1 when a fraction is in lowest terms!

$$\frac{8}{16} = \boxed{\frac{1}{2}} \quad \frac{12}{16} = \boxed{\frac{3}{4}} \quad \frac{10}{40} = \boxed{\frac{1}{4}}$$

- 6.) Circle the COMPOSITE Numbers in Problem 7.

- 5.) Complete so the fractions and decimal are equal.

$$2.5 = \frac{\boxed{25}}{\boxed{10}} = \frac{\boxed{5}}{\boxed{2}} \quad 1.5 = \frac{\boxed{15}}{\boxed{10}} = \frac{\boxed{3}}{\boxed{2}}$$

Decimal that ends in 5...quick numeracy trick!!!

- 7.) Write the factor strings for each number.

5: {1, 5} 9: {1, 3, 9} 13: {1, 13}
 6: {1, 2, 3, 6} 10: {1, 2, 5, 10} 14: {1, 2, 7, 14}
 7: {1, 7} 11: {1, 11} 15: {1, 3, 5, 15}
 8: {1, 2, 4, 8} 12: {1, 2, 3, 4, 6, 12} 16: {1, 2, 4, 8, 16}

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Divide. $2 \div \text{equal } (1/3) \sim 6\text{ish}$ $2/3 \div \text{equal } (1/3) \sim 2$

$$\frac{7}{4} \div \frac{1}{3} = \boxed{5\frac{1}{4}} \quad \frac{2}{3} \div \frac{1}{3} = \boxed{2}$$

$$\frac{7}{4} \times \frac{3}{1} = \boxed{\frac{21}{4}} \quad \frac{2}{3} \times \frac{3}{1} = \boxed{\frac{6}{3}}$$

Talk through the physical solutions with students.

2.) Multiply. $5 \times 1 \text{ is about } 5\text{ish.}$ $2 \times 6 \text{ is about } 12\text{ish.}$

$$4\frac{1}{3} \times 1\frac{1}{5} = \boxed{5\frac{1}{5}} \quad 2\frac{1}{2} \times 6 = \boxed{15}$$

$$\frac{13}{5} \times \frac{2}{3} = \boxed{\frac{26}{5}} \quad \frac{5}{2} \times \frac{6}{1} = \boxed{\frac{30}{2}}$$

Talk through the physical solutions with students.

- 3.) a.) What is the GCF of $5/15$? 5 b.) Is the fraction $5/15$ in lowest terms? Yes No $\frac{1}{3}$ LT

No, the GCF between the numerator and denominator is 5. Can be reduced further.

- 4.) Write the following fractions in lowest terms.

$$\frac{3}{6} = \boxed{\frac{1}{2}} \quad \frac{20}{25} = \boxed{\frac{4}{5}} \quad \frac{3}{10} = \boxed{\frac{3}{10}}$$

The GCF is 1 when a fraction is in lowest terms!

$$\frac{8}{16} = \boxed{\frac{1}{2}} \quad \frac{12}{16} = \boxed{\frac{3}{4}} \quad \frac{10}{40} = \boxed{\frac{1}{4}}$$

- 6.) Circle the COMPOSITE Numbers in Problem 7.

- 5.) Complete so the fractions and decimal are equal.

Decimal that ends in 5...quick numeracy trick!!!

$$2.5 = \frac{\boxed{25}}{\boxed{10}} = \frac{\boxed{5}}{\boxed{2}} \quad 1.5 = \frac{\boxed{15}}{\boxed{10}} = \frac{\boxed{3}}{\boxed{2}}$$

- 7.) Write the factor strings for each number.

5: {1, 5} 9: {1, 3, 9} 13: {1, 13}
 6: {1, 2, 3, 6} 10: {1, 2, 5, 10} 14: {1, 2, 7, 14}
 7: {1, 7} 11: {1, 11} 15: {1, 3, 5, 15}
 8: {1, 2, 4, 8} 12: {1, 2, 3, 4, 6, 12} 16: {1, 2, 4, 8, 16}

Teaching Tip Number 13

Focusing on the Fundamentals – Daily Warm-ups, Formative Loop, Spaced Repetition Pedagogical Session and Daily Homework

As has been stated repeatedly up to this point in the warm-ups, many sixth graders lack basic math foundational skills from their elementary school years. To press students back to grade level, principals must implement an accelerated numeracy program. However, the real work happens in the classroom: *teachers must consistently bridge those learning gaps throughout the 18-week fall semester to academically catch students up.*

To achieve this numeracy objective, daily warm-ups should integrate sixth-grade standards with the pivotal foundational skills required to master them. By reinforcing these concepts through Formative Loop, daily Spaced Repetition, and daily homework, teachers ensure students reach the mastery threshold necessary for long-term success. The following arithmetic skills must be prioritized, or a significant number of students will remain inadequately prepared for their entire secondary education. In short, students must practice the skill until it is mastered through multiple learning sessions.

The arithmetic skills that must be addressed are listed below in order of priority:

- 1.) **Math Facts** (Multiplication and Division Facts prioritized. Then, circle back to addition and subtraction.
- 2.) **Multiples** (*skip counting*) (1-12, 15, 20, 25, 30, 40, 50, 60, 70, 75, 90, and 100). Key Numeracy!
- 3.) **Making 10, 100 and Making 1.**
- 4.) **Halves and Doubles**
- 5.) **Even and Odd Numbers – Extend this skill into divisibility rules for 2, 3, 5, 6, 9 and 10)**
- 6.) **Whole Number and Decimal Place Value and Digit Value**
- 7.) **Computational 2 digit and 3 digit Addition, Subtraction.**
- 8.) **Computational 2 and 3 by 1 multiplication and 2 by 3 digit division with remainders.**
- 9.) **Fractional divisional – proper and improper fraction conversions into equivalent division numbers.**
- 10.) **Converting Improper Numbers to Mixed Numbers and vice versa.**
- 11.) **Decimal Magnitude Understanding** – The relative size of a decimal number and distance from adjacent whole numbers.
- 12.) **Factor Strings** (as indicated in Teaching Tip Number 11) – a key numeracy skill for students to own!

Teaching Tip Number 13 is strategically placed in the warm-up sequence for a specific reason: if students are persistently struggling with daily work at this point in the school year, it stems from a failure to achieve skill mastery on corrective action of the prior grade level academic (skill) numeracy gaps – the above list of numeracy items. Unfortunately, this was the case for these same academically struggling students in elementary school; a lack of rigorous focus on mastery from both teachers and leadership in those elementary grade levels left them significantly underprepared for sixth-grade mathematics standards.

In summary, sixth grade mathematics must be a parallel stop-gap numeracy process on pivotal elementary math skills that dependently affect learning of the sixth grade Tier 1 curriculum. Otherwise, students will continue to be innumerate mathematicians, as they were in their elementary school years.

*Prior grade level academic numeracy gaps are not going away quietly on their own! Their must be a plan with consistency that **directly** rectifies students' academic numeracy gaps. "Effective planning is the differentiator between intent and achievement."*

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) *Divide.*

$$\frac{4}{4} \div \frac{1}{3} = \boxed{} \quad \frac{6}{12} \div \frac{1}{4} = \boxed{}$$

2.) *Multiply.*

$$1\frac{1}{2} \times 3\frac{1}{3} = \boxed{} \quad 5\frac{1}{2} \times 2 = \boxed{}$$

3.) *Divide.*

$$2\frac{1}{3} \div 1\frac{1}{2} = \boxed{} \quad 2\frac{1}{2} \div 2 = \boxed{}$$

4.) *Complete so the fractions and decimal are equal.*

$$4.5 = \frac{\boxed{}}{10} = \frac{\boxed{}}{2} \quad 3.5 = \frac{\boxed{}}{10} = \frac{\boxed{}}{2}$$

5.) *Write the following fractions in lowest terms.*

$$\frac{8}{12} = \boxed{} \quad \frac{12}{16} = \boxed{} \quad \frac{12}{14} = \boxed{}$$

6.) *Write the factor strings for each number. Circle the prime numbers.*

9: _____ 13: _____ 17: _____
 10: _____ 14: _____ 18: _____
 11: _____ 15: _____ 19: _____
 12: _____ 16: _____ 20: _____

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) *Divide.*

$$\frac{4}{4} \div \frac{1}{3} = \boxed{} \quad \frac{6}{12} \div \frac{1}{4} = \boxed{}$$

2.) *Multiply.*

$$1\frac{1}{2} \times 3\frac{1}{3} = \boxed{} \quad 5\frac{1}{2} \times 2 = \boxed{}$$

3.) *Divide.*

$$2\frac{1}{3} \div 1\frac{1}{2} = \boxed{} \quad 2\frac{1}{2} \div 2 = \boxed{}$$

4.) *Complete so the fractions and decimal are equal.*

$$4.5 = \frac{\boxed{}}{10} = \frac{\boxed{}}{2} \quad 3.5 = \frac{\boxed{}}{10} = \frac{\boxed{}}{2}$$

5.) *Write the following fractions in lowest terms.*

$$\frac{8}{12} = \boxed{} \quad \frac{12}{16} = \boxed{} \quad \frac{12}{14} = \boxed{}$$

6.) *Write the factor strings for each number. Circle the prime numbers.*

9: _____ 13: _____ 17: _____
 10: _____ 14: _____ 18: _____
 11: _____ 15: _____ 19: _____
 12: _____ 16: _____ 20: _____

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) *Divide.* $1 \div \text{equal } (1/3) \sim 3 \text{ groups}$ $1/2 \div \text{equal } (1/4) \sim 2 \text{ groups}$ 2.) *Multiply.* $2 \times 5 \text{ is about } 10\text{ish.}$

$$\frac{4}{4} \div \frac{1}{3} = \boxed{3} \quad \frac{6}{12} \div \frac{1}{4} = \boxed{2} \quad 1\frac{1}{2} \times 3\frac{1}{3} = \boxed{5} \quad 5\frac{1}{2} \times 2 = \boxed{11}$$

$$\frac{4}{4} \times \frac{3}{1} = \boxed{\frac{12}{4}} \quad \frac{1}{2} \times \frac{4}{1} = \boxed{\frac{4}{2}} \quad \cancel{1}^{\cancel{2}} \times \cancel{10}^5_{\cancel{2}} = \boxed{5} \quad \frac{11}{2} \times \frac{2}{1} = \boxed{\frac{22}{2}}$$

Commutative property

3.) *Divide.* $2.5 \div 2 \text{ equal groups} - 1\frac{1}{4}$ 4.) *Complete so the fractions and decimal are equal.*

$$2\frac{1}{3} \div 1\frac{1}{2} = \boxed{1\frac{5}{9}} \quad 2\frac{1}{2} \div 2 = \boxed{1\frac{1}{4}} \quad 4.5 = \frac{\boxed{45}}{\boxed{10}} = \frac{\boxed{9}}{\boxed{2}} \quad 3.5 = \frac{\boxed{35}}{\boxed{10}} = \frac{\boxed{7}}{\boxed{2}}$$

1 equal group of 1 1/4 + more than a half more

$$\frac{7}{3} \times \frac{2}{3} = \boxed{\frac{14}{9}} \quad \frac{5}{2} \times \frac{1}{2} = \boxed{\frac{5}{4}}$$

5.) *Write the following fractions in lowest terms.*

$$\frac{8}{12} = \boxed{\frac{2}{3}} \quad \frac{12}{16} = \boxed{\frac{3}{4}} \quad \frac{12}{14} = \boxed{\frac{6}{7}}$$

6.) *Write the factor strings for each number. Circle the prime numbers.*

9: {1, 3, 9} 13: {1, 13} 17: {1, 17}

10: {1, 2, 5, 10} 14: {1, 2, 7, 14} 18: {1, 2, 3, 6, 9, 18}

11: {1, 11} 15: {1, 3, 5, 15} 19: {1, 19}

12: {1, 2, 3, 4, 6, 12} 16: {1, 2, 4, 8, 16} 20: {1, 2, 4, 5, 10, 20}

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) *Divide.* $1 \div \text{equal } (1/3) \sim 3 \text{ groups}$ $1/2 \div \text{equal } (1/4) \sim 2 \text{ groups}$ 2.) *Multiply.* $2 \times 5 \text{ is about } 10\text{ish.}$

$$\frac{4}{4} \div \frac{1}{3} = \boxed{3} \quad \frac{6}{12} \div \frac{1}{4} = \boxed{2} \quad 1\frac{1}{2} \times 3\frac{1}{3} = \boxed{5} \quad 5\frac{1}{2} \times 2 = \boxed{11}$$

$$\frac{4}{4} \times \frac{3}{1} = \boxed{\frac{12}{4}} \quad \frac{1}{2} \times \frac{4}{1} = \boxed{\frac{4}{2}} \quad \cancel{1}^{\cancel{2}} \times \cancel{10}^5_{\cancel{2}} = \boxed{5} \quad \frac{11}{2} \times \frac{2}{1} = \boxed{\frac{22}{2}}$$

Commutative property

3.) *Divide.* $2.5 \div 2 \text{ equal groups} - 1\frac{1}{4}$ 4.) *Complete so the fractions and decimal are equal.*

$$2\frac{1}{3} \div 1\frac{1}{2} = \boxed{1\frac{5}{9}} \quad 2\frac{1}{2} \div 2 = \boxed{1\frac{1}{4}} \quad 4.5 = \frac{\boxed{45}}{\boxed{10}} = \frac{\boxed{9}}{\boxed{2}} \quad 3.5 = \frac{\boxed{35}}{\boxed{10}} = \frac{\boxed{7}}{\boxed{2}}$$

1 equal group of 1 1/4 + more than a half more

$$\frac{7}{3} \times \frac{2}{3} = \boxed{\frac{14}{9}} \quad \frac{5}{2} \times \frac{1}{2} = \boxed{\frac{5}{4}}$$

5.) *Write the following fractions in lowest terms.*

$$\frac{8}{12} = \boxed{\frac{2}{3}} \quad \frac{12}{16} = \boxed{\frac{3}{4}} \quad \frac{12}{14} = \boxed{\frac{6}{7}}$$

6.) *Write the factor strings for each number. Circle the prime numbers.*

9: {1, 3, 9} 13: {1, 13} 17: {1, 17}

10: {1, 2, 5, 10} 14: {1, 2, 7, 14} 18: {1, 2, 3, 6, 9, 18}

11: {1, 11} 15: {1, 3, 5, 15} 19: {1, 19}

12: {1, 2, 3, 4, 6, 12} 16: {1, 2, 4, 8, 16} 20: {1, 2, 4, 5, 10, 20}

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) *Divide.*

$$\frac{2}{5} \div \frac{1}{5} = \boxed{} \quad \frac{8}{12} \div \frac{1}{4} = \boxed{}$$

2.) *Multiply.*

$$2\frac{1}{2} \times 3\frac{1}{3} = \boxed{} \quad 3\frac{1}{2} \times 3 = \boxed{}$$

3.) *Divide.*

$$1\frac{1}{4} \div 1\frac{1}{3} = \boxed{} \quad 3\frac{1}{2} \div 3 = \boxed{}$$

4.) *Fill in the Box and Multiply the Decimals.*

Where is the decimal point in the number 6?

$$6 = \boxed{}$$

$$\begin{array}{r} 0.5 \\ \times 0.5 \\ \hline \end{array}$$

$$\begin{array}{r} 0.1 \\ \times 0.7 \\ \hline \end{array}$$

5.) *Write the following fractions in lowest terms.*

$$\frac{2}{12} = \boxed{} \quad \frac{14}{16} = \boxed{} \quad \frac{12}{20} = \boxed{}$$

6.) *Write the factor strings for each number. Circle the prime numbers.*

9: _____ 13: _____ 17: _____
 10: _____ 14: _____ 18: _____
 11: _____ 15: _____ 19: _____
 12: _____ 16: _____ 20: _____

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) *Divide.*

$$\frac{2}{5} \div \frac{1}{5} = \boxed{} \quad \frac{8}{12} \div \frac{1}{4} = \boxed{}$$

2.) *Multiply.*

$$2\frac{1}{2} \times 3\frac{1}{3} = \boxed{} \quad 3\frac{1}{2} \times 3 = \boxed{}$$

3.) *Divide.*

$$1\frac{1}{4} \div 1\frac{1}{3} = \boxed{} \quad 3\frac{1}{2} \div 3 = \boxed{}$$

4.) *Fill in the Box and Multiply the Decimals.*

Where is the decimal point in the number 6?

$$6 = \boxed{}$$

$$\begin{array}{r} 0.5 \\ \times 0.5 \\ \hline \end{array}$$

$$\begin{array}{r} 0.1 \\ \times 0.7 \\ \hline \end{array}$$

6.) *Write the factor strings for each number. Circle the prime numbers.*

9: _____ 13: _____ 17: _____
 10: _____ 14: _____ 18: _____
 11: _____ 15: _____ 19: _____
 12: _____ 16: _____ 20: _____

5.) *Write the following fractions in lowest terms.*

$$\frac{2}{12} = \boxed{} \quad \frac{14}{16} = \boxed{} \quad \frac{12}{20} = \boxed{}$$

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Divide.

$$\frac{2}{5} \div \frac{1}{5} = \boxed{2} \quad \frac{8}{12} \div \frac{1}{4} = \boxed{2\frac{2}{3}}$$

$$\frac{2}{5} \times \frac{5}{1} = \boxed{\frac{10}{5}} \quad \frac{8}{12} \times \frac{4}{1} = \boxed{\frac{32}{12}}$$

2.) Multiply.

$$2\frac{1}{2} \times 3\frac{1}{3} = \boxed{8\frac{1}{3}} \quad 3\frac{1}{2} \times 3 = \boxed{10\frac{1}{2}}$$

$$\frac{5}{3} \times \frac{10}{2} = \boxed{\frac{25}{3}} \quad \frac{7}{2} \times \frac{3}{1} = \boxed{\frac{21}{2}}$$

3.) Divide.

$$1\frac{1}{4} \div 1\frac{1}{3} = \boxed{\frac{15}{16}} \quad 3\frac{1}{2} \div 3 = \boxed{1\frac{1}{6}}$$

$$\frac{5}{4} \times \frac{3}{4} = \boxed{\frac{15}{16}} \quad \frac{7}{2} \times \frac{1}{3} = \boxed{\frac{7}{6}}$$

5.) Write the following fractions in lowest terms.

$$\frac{2}{12} = \boxed{\frac{1}{6}} \quad \frac{14}{16} = \boxed{\frac{7}{8}} \quad \frac{12}{20} = \boxed{\frac{3}{5}}$$

4.) Fill in the Box and Multiply the Decimals.

Decimal is behind whole number - Show: 6 = 6. = 6.0 (Many kids clueless.)

Where is the decimal point in the number 6? $\begin{array}{r} 0.5 \textcircled{1} \\ \times 0.5 \textcircled{1} \\ \hline 0.25 \textcircled{2} \end{array}$ $\begin{array}{r} 0.1 \textcircled{1} \\ \times 0.7 \textcircled{1} \\ \hline 0.07 \textcircled{2} \end{array}$

6 = $\boxed{6.}$

Count. 1 + 1 = 2. Move 2 places in product.

6.) Write the factor strings for each number. Circle the prime numbers.

- 9: {1, 3, 9} $\textcircled{13}$: {1, 13} $\textcircled{17}$: {1, 17}
 10: {1, 2, 5, 10} 14: {1, 2, 7, 14} 18: {1, 2, 3, 6, 9, 18}
 $\textcircled{11}$: {1, 11} 15: {1, 3, 5, 15} $\textcircled{19}$: {1, 19}
 12: {1, 2, 3, 4, 6, 12} 16: {1, 2, 4, 8, 16} 20: {1, 2, 4, 5, 10, 20}

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Divide.

$$\frac{2}{5} \div \frac{1}{5} = \boxed{2} \quad \frac{8}{12} \div \frac{1}{4} = \boxed{2\frac{2}{3}}$$

$$\frac{2}{5} \times \frac{5}{1} = \boxed{\frac{10}{5}} \quad \frac{8}{12} \times \frac{4}{1} = \boxed{\frac{32}{12}}$$

2.) Multiply.

$$2\frac{1}{2} \times 3\frac{1}{3} = \boxed{8\frac{1}{3}} \quad 3\frac{1}{2} \times 3 = \boxed{10\frac{1}{2}}$$

$$\frac{5}{3} \times \frac{10}{2} = \boxed{\frac{25}{3}} \quad \frac{7}{2} \times \frac{3}{1} = \boxed{\frac{21}{2}}$$

3.) Divide.

$$1\frac{1}{4} \div 1\frac{1}{3} = \boxed{\frac{15}{16}} \quad 3\frac{1}{2} \div 3 = \boxed{1\frac{1}{6}}$$

$$\frac{5}{4} \times \frac{3}{4} = \boxed{\frac{15}{16}} \quad \frac{7}{2} \times \frac{1}{3} = \boxed{\frac{7}{6}}$$

4.) Fill in the Box and Multiply the Decimals.

Decimal is behind whole number - Show: 6 = 6. = 6.0 (Many kids clueless.)

Where is the decimal point in the number 6? $\begin{array}{r} 0.5 \textcircled{1} \\ \times 0.5 \textcircled{1} \\ \hline 0.25 \textcircled{2} \end{array}$ $\begin{array}{r} 0.1 \textcircled{1} \\ \times 0.7 \textcircled{1} \\ \hline 0.07 \textcircled{2} \end{array}$

6 = $\boxed{6.}$

Count. 1 + 1 = 2. Move 2 places in product.

6.) Write the factor strings for each number. Circle the prime numbers.

- 9: {1, 3, 9} $\textcircled{13}$: {1, 13} $\textcircled{17}$: {1, 17}
 10: {1, 2, 5, 10} 14: {1, 2, 7, 14} 18: {1, 2, 3, 6, 9, 18}
 $\textcircled{11}$: {1, 11} 15: {1, 3, 5, 15} $\textcircled{19}$: {1, 19}
 12: {1, 2, 3, 4, 6, 12} 16: {1, 2, 4, 8, 16} 20: {1, 2, 4, 5, 10, 20}

5.) Write the following fractions in lowest terms.

$$\frac{2}{12} = \boxed{\frac{1}{6}} \quad \frac{14}{16} = \boxed{\frac{7}{8}} \quad \frac{12}{20} = \boxed{\frac{3}{5}}$$

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) *Fill in the Box and Multiply the Decimals.*

Where is the decimal point in the number 3?

3 =

$$\begin{array}{r} 0.5 \\ \times 3 \\ \hline \end{array} \quad \begin{array}{r} 0.4 \\ \times 0.7 \\ \hline \end{array}$$

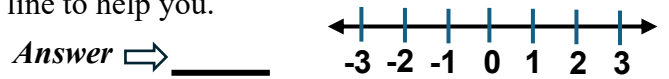
2.) *Multiply or Divide.*

$$2\frac{1}{2} \times 3\frac{1}{3} = \boxed{} \quad 6\frac{3}{4} \div 3 = \boxed{}$$

3.) John noticed that the temperature was -9.2°C on Wednesday and 3°C on Thursday. What temperature is **lower** than these two Celsius readings?

- F.) 9.21°C G.) -9.5°C
 H.) -9.13°C J.) 9.1°C

4.) What is 3 less than the integer 2? Use the number line to help you.



6.) *Write the factor strings for each number.*

Circle the composite numbers.

5.) *Write the following fractions in lowest terms.*

$$\frac{2}{20} = \boxed{} \quad \frac{15}{16} = \boxed{} \quad \frac{18}{20} = \boxed{}$$

- 9: _____ 13: _____ 17: _____
 10: _____ 14: _____ 18: _____
 11: _____ 15: _____ 19: _____
 12: _____ 16: _____ 20: _____

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) *Fill in the Box and Multiply the Decimals.*

Where is the decimal point in the number 3?

3 =

$$\begin{array}{r} 0.5 \\ \times 3 \\ \hline \end{array} \quad \begin{array}{r} 0.4 \\ \times 0.7 \\ \hline \end{array}$$

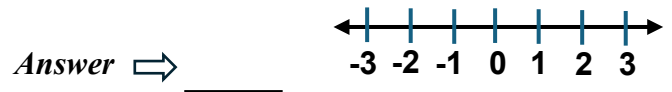
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$$2\frac{1}{2} \times 3\frac{1}{3} = \boxed{} \quad 6\frac{3}{4} \div 3 = \boxed{}$$

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- 9: _____ 13: _____ 17: _____
 10: _____ 14: _____ 18: _____
 11: _____ 15: _____ 19: _____
 12: _____ 16: _____ 20: _____

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Fill in the Box and Multiply the Decimals.

Where is the decimal point in the number 3?

3 = 3.

$$\begin{array}{r} 0.5 \textcircled{1} \\ \times 3. \textcircled{0} \\ \hline 1.5 \textcircled{1} \end{array} \quad \begin{array}{r} 0.4 \textcircled{1} \\ \times 0.7 \textcircled{1} \\ \hline 0.28 \textcircled{2} \end{array}$$

Count. $1+0=1$.
The decimal point is Directly behind the 3. Zero jumps!
 $1+1=2$

2.) Multiply or Divide.

$2\frac{1}{2} \times 3\frac{1}{3} = \boxed{8\frac{1}{3}} \quad 6\frac{3}{4} \div 3 = \boxed{2\frac{1}{4}}$

$\frac{5}{3} \times \frac{10}{2} = \boxed{\frac{25}{3}} \quad \frac{27}{3} \times \frac{1}{4} = \boxed{\frac{9}{4}}$

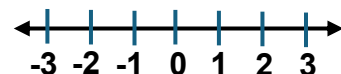
Commutative Property of Multiplication – easier for kids to understand the math.

3.) John noticed that the temperature was -9.2°C on Wednesday and 3°C on Thursday. What temperature is **lower** than these two Celsius readings?

- F.) 9.21°C G.) -9.5°C
H.) -9.13°C J.) 9.1°C

4.) What is 3 less than the integer 2? Use the number line to help you.

Answer \Rightarrow -1



6.) Write the factor strings for each number.

Circle the **composite numbers**. Invaluable Skill Set to Own!

5.) Write the following fractions in lowest terms.

$\frac{2}{20} = \boxed{\frac{1}{10}} \quad \frac{15}{16} = \boxed{\frac{15}{16}} \quad \frac{18}{20} = \boxed{\frac{9}{10}}$

- 9: {1, 3, 9} 13: {1, 13} 17: {1, 17}
10: {1, 2, 5, 10} 14: {1, 2, 7, 14} 18: {1, 2, 3, 6, 9, 18}
11: {1, 11} 15: {1, 3, 5, 15} 19: {1, 19}
12: {1, 2, 3, 4, 6, 12} 16: {1, 2, 4, 8, 16} 20: {1, 2, 4, 5, 10, 20}

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Fill in the Box and Multiply the Decimals.

Where is the decimal point in the number 3?

3 = 3.

$$\begin{array}{r} 0.5 \textcircled{1} \\ \times 3. \textcircled{0} \\ \hline 1.5 \textcircled{1} \end{array} \quad \begin{array}{r} 0.4 \textcircled{1} \\ \times 0.7 \textcircled{1} \\ \hline 0.28 \textcircled{2} \end{array}$$

Count. $1+0=1$.
The decimal point is Directly behind the 3. Zero jumps!
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2.) Multiply or Divide.

$2\frac{1}{2} \times 3\frac{1}{3} = \boxed{8\frac{1}{3}} \quad 6\frac{3}{4} \div 3 = \boxed{2\frac{1}{4}}$

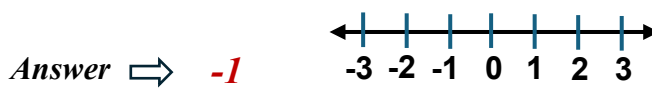
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Commutative Property of Multiplication – easier for kids to understand the math.

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Circle the **composite numbers**. Invaluable Skill Set to Own!

5.) Write the following fractions in lowest terms.

$\frac{2}{20} = \boxed{\frac{1}{10}} \quad \frac{15}{16} = \boxed{\frac{15}{16}} \quad \frac{18}{20} = \boxed{\frac{9}{10}}$

- 9: {1, 3, 9} 13: {1, 13} 17: {1, 17}
10: {1, 2, 5, 10} 14: {1, 2, 7, 14} 18: {1, 2, 3, 6, 9, 18}
11: {1, 11} 15: {1, 3, 5, 15} 19: {1, 19}
12: {1, 2, 3, 4, 6, 12} 16: {1, 2, 4, 8, 16} 20: {1, 2, 4, 5, 10, 20}

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) *Fill in the Box and Multiply the Decimals.*

Where is the decimal point in the number 8?

8 =

$$\begin{array}{r} 0.2 \\ \times 8 \\ \hline \end{array}$$

$$\begin{array}{r} 0.04 \\ \times 0.7 \\ \hline \end{array}$$

2.) *Multiply or Divide.*

$$3\frac{3}{5} \times 1\frac{2}{3} = \boxed{} \quad 2\frac{1}{3} \div 1\frac{1}{2} = \boxed{}$$

3.) Maria noticed that the temperature fell below -4.5°C . Which temperature choice below is a possible reading on her thermometer?

F.) 4.45°C

G.) -4.5°C

H.) -4.45°C

J.) -4.55°C

4.) What is 4 more than the integer -2 ? Use the number line to help you.

Answer \Rightarrow _____



5.) *Write the following fractions in lowest terms.*

$$\frac{12}{8} = \boxed{}$$

$$\frac{4}{16} = \boxed{}$$

$$\frac{10}{20} = \boxed{}$$

6.) *Write the factor strings for each number.*

Circle the prime numbers.

17: _____

21: _____

18: _____

22: _____

19: _____

23: _____

20: _____

24: _____

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) *Fill in the Box and Multiply the Decimals.*

Where is the decimal point in the number 8?

8 =

$$\begin{array}{r} 0.2 \\ \times 8 \\ \hline \end{array}$$

$$\begin{array}{r} 0.04 \\ \times 0.7 \\ \hline \end{array}$$

2.) *Multiply or Divide.*

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F.) 4.45°C

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H.) -4.45°C

J.) -4.55°C

4.) What is 4 more than the integer -2 ? Use the number line to help you.

Answer \Rightarrow _____



5.) *Write the following fractions in lowest terms.*

$$\frac{12}{8} = \boxed{}$$

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6.) *Write the factor strings for each number.*

Circle the prime numbers.

17: _____

21: _____

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22: _____

19: _____

23: _____

20: _____

24: _____

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) *Fill in the Box and Multiply the Decimals.*

Where is the decimal point in the number 8?

8 = 8.

$\begin{array}{r} 0.2 \\ \times 8. \\ \hline 1.6 \end{array}$	$\begin{array}{r} 0.04 \\ \times 0.7 \\ \hline 0.028 \end{array}$
$1 + 0 = 1.$ <i>The decimal point is Directly behind the 3. Zero jumps!</i>	$2 + 1 = 3 \text{ jumps.}$

2.) *Multiply or Divide.*

$3\frac{3}{5} \times 1\frac{2}{3} =$ 6

$2\frac{1}{3} \div 1\frac{1}{2} =$ 1\frac{5}{9}

$\frac{18}{3} \times \frac{5}{5} =$ \frac{18}{3}

$\frac{7}{3} \times \frac{2}{3} =$ \frac{14}{9}

3.) Maria noticed that the temperature fell below -4.5°C . Which temperature choice below is a possible reading on her thermometer?

F.) 4.45°C

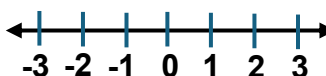
G.) -4.5°C

H.) -4.45°C

J.) -4.55°C

4.) What is 4 more than the integer -2 ? Use the number line to help you.

Answer \Rightarrow 2



5.) *Write the following fractions in lowest terms.*

$\frac{12}{8} =$ 1\frac{1}{2}

$\frac{4}{16} =$ \frac{1}{4}

$\frac{10}{20} =$ \frac{1}{2}

6.) *Write the factor strings for each number.*

Circle the prime numbers.

Invaluable Skill Set to Own!

17: {1, 17}

21: {1, 3, 7, 21}

18: {1, 2, 3, 6, 9, 18}

22: {1, 2, 11, 22}

19: {1, 19}

23: {1, 23}

20: {1, 2, 4, 5, 10, 20}

24: {1, 2, 3, 4, 6, 8, 12, 24}

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) *Fill in the Box and Multiply the Decimals.*

Where is the decimal point in the number 8?

8 = 8.

$\begin{array}{r} 0.2 \\ \times 8. \\ \hline 1.6 \end{array}$	$\begin{array}{r} 0.04 \\ \times 0.7 \\ \hline 0.028 \end{array}$
$1 + 0 = 1.$ <i>The decimal point is Directly behind the 3. Zero jumps!</i>	$2 + 1 = 3 \text{ jumps.}$

2.) *Multiply or Divide.*

$3\frac{3}{5} \times 1\frac{2}{3} =$ 6

$2\frac{1}{3} \div 1\frac{1}{2} =$ 1\frac{5}{9}

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$\frac{7}{3} \times \frac{2}{3} =$ \frac{14}{9}

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F.) 4.45°C

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H.) -4.45°C

J.) -4.55°C

4.) What is 4 more than the integer -2 ? Use the number line to help you.

Answer \Rightarrow 2



5.) *Write the following fractions in lowest terms.*

$\frac{12}{8} =$ 1\frac{1}{2}

$\frac{4}{16} =$ \frac{1}{4}

$\frac{10}{20} =$ \frac{1}{2}

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18: {1, 2, 3, 6, 9, 18}

22: {1, 2, 11, 22}

19: {1, 19}

23: {1, 23}

20: {1, 2, 4, 5, 10, 20}

24: {1, 2, 3, 4, 6, 8, 12, 24}

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) *Fill in the Box and Multiply the Decimals.*

Where is the decimal point in the number 14?

14 =

$$\begin{array}{r} 0.05 \\ \times 0.9 \\ \hline \end{array}$$

$$\begin{array}{r} 0.6 \\ \times 4 \\ \hline \end{array}$$

$$\begin{array}{r} 2.1 \\ \times 3.1 \\ \hline \end{array}$$

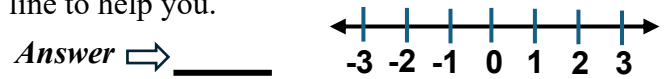
2.) *Divide.*

$$3\frac{1}{3} \div 1\frac{2}{3} = \boxed{}$$

3.) Which rational number below is between -3.8 and -3.75?

- A.) 3.7° C C.) -3.9° C
 B.) -3.79° C D.) -3.81° C

4.) What is 5 less than the integer 2? Use the number line to help you.



5.) *Write the following fractions in lowest terms.*

$$\frac{12}{9} = \boxed{} \quad \frac{4}{18} = \boxed{} \quad \frac{10}{50} = \boxed{}$$

6.) *Write the factor strings for each number.*

Circle the prime numbers.

- 21: _____ 25: _____
 22: _____ 27: _____
 23: _____ 28: _____
 24: _____ 30: _____

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) *Fill in the Box and Multiply the Decimals.*

Where is the decimal point in the number 14?

14 =

$$\begin{array}{r} 0.05 \\ \times 0.9 \\ \hline \end{array}$$

$$\begin{array}{r} 0.6 \\ \times 4 \\ \hline \end{array}$$

$$\begin{array}{r} 2.1 \\ \times 3.1 \\ \hline \end{array}$$

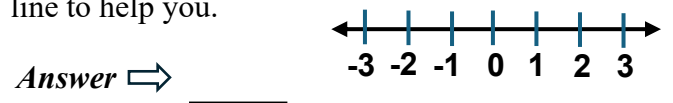
2.) *Divide.*

$$3\frac{1}{3} \div 1\frac{2}{3} = \boxed{}$$

3.) Which rational number below is between -3.8 and -3.75?

- A.) 3.7° C C.) -3.9° C
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4.) What is 5 less than the integer 2? Use the number line to help you.



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$$\frac{12}{9} = \boxed{} \quad \frac{4}{18} = \boxed{} \quad \frac{10}{50} = \boxed{}$$

6.) *Write the factor strings for each number.*

Circle the prime numbers.

- 21: _____ 25: _____
 22: _____ 27: _____
 23: _____ 28: _____
 24: _____ 30: _____

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) *Fill in the Box and Multiply the Decimals.*

Where is the decimal point in the number 14?

14 = 14.

$$\begin{array}{r} 0.05 \text{ (2)} \\ \times 0.9 \text{ (1)} \\ \hline 0.045 \text{ (3)} \end{array}$$

2 + 1 = 3 jumps.

$$\begin{array}{r} 0.6 \text{ (1)} \\ \times 4. \text{ (0)} \\ \hline 2.4 \text{ (1)} \end{array}$$

Count. 1 + 0 = 1.

$$\begin{array}{r} 2.1 \text{ (1)} \\ \times 3.1 \text{ (1)} \\ \hline 6.51 \text{ (2)} \end{array}$$

*1 + 1 = 2 jumps.
Approximately 6 (2 x 3)*

2.) *Divide.*

$$3\frac{1}{3} \div 1\frac{2}{3} = \span style="border: 1px solid black; padding: 5px;">2$$

$$\frac{10}{3} \times \frac{3}{5} = \span style="border: 1px solid black; padding: 5px;">\frac{30}{15}$$

3.) Which rational number below is between -3.8 and -3.75?

A.) 3.7° C

C.) -3.9° C

B.) -3.79° C

D.) -3.81° C

4.) What is 5 less than the integer 2? Use the number line to help you.

Answer \Rightarrow -3



5.) *Write the following fractions in lowest terms.*

$$\frac{12}{9} = \span style="border: 1px solid black; padding: 5px;">1\frac{1}{3} \quad \frac{4}{18} = \span style="border: 1px solid black; padding: 5px;">\frac{2}{9} \quad \frac{10}{50} = \span style="border: 1px solid black; padding: 5px;">\frac{1}{5}$$

6.) *Write the factor strings for each number. Circle the prime numbers.*

21: {1, 3, 7, 21}

25: {1, 5, 25}

22: {1, 2, 11, 22}

27: {1, 3, 9, 27}

23: {1, 23}

28: {1, 2, 4, 7, 14, 28}

24: {1, 2, 3, 4, 6, 8, 12, 24} 30: {1, 2, 3, 5, 6, 10, 15, 30}

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) *Fill in the Box and Multiply the Decimals.*

Where is the decimal point in the number 14?

14 = 14.

$$\begin{array}{r} 0.05 \text{ (2)} \\ \times 0.9 \text{ (1)} \\ \hline 0.045 \text{ (3)} \end{array}$$

2 + 1 = 3 jumps.

$$\begin{array}{r} 0.6 \text{ (1)} \\ \times 4. \text{ (0)} \\ \hline 2.4 \text{ (1)} \end{array}$$

Count. 1 + 0 = 1.

$$\begin{array}{r} 2.1 \text{ (1)} \\ \times 3.1 \text{ (1)} \\ \hline 6.51 \text{ (2)} \end{array}$$

*1 + 1 = 2 jumps.
Approximately 6 (2 x 3)*

$$3\frac{1}{3} \div 1\frac{2}{3} = \span style="border: 1px solid black; padding: 5px;">2$$

$$\frac{10}{3} \times \frac{3}{5} = \span style="border: 1px solid black; padding: 5px;">\frac{30}{15}$$

3.) Which rational number below is between -3.8 and -3.75?

A.) 3.7° C

C.) -3.9° C

B.) -3.79° C

D.) -3.81° C

4.) What is 5 less than the integer 2? Use the number line to help you.

Answer \Rightarrow -3



6.) *Write the factor strings for each number. Circle the prime numbers.*

21: {1, 3, 7, 21}

25: {1, 5, 25}

22: {1, 2, 11, 22}

27: {1, 3, 9, 27}

23: {1, 23}

28: {1, 2, 4, 7, 14, 28}

24: {1, 2, 3, 4, 6, 8, 12, 24} 30: {1, 2, 3, 5, 6, 10, 15, 30}

5.) *Write the following fractions in lowest terms.*

$$\frac{12}{9} = \span style="border: 1px solid black; padding: 5px;">1\frac{1}{3} \quad \frac{4}{18} = \span style="border: 1px solid black; padding: 5px;">\frac{2}{9} \quad \frac{10}{50} = \span style="border: 1px solid black; padding: 5px;">\frac{1}{5}$$

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) *Fill in the Box and Multiply the Decimals.*

$$\begin{array}{r} 0.09 \\ \times 0.05 \\ \hline \end{array}$$

$$\begin{array}{r} 0.9 \\ \times 9 \\ \hline \end{array}$$

$$\begin{array}{r} 7.8 \\ \times 2.1 \\ \hline \end{array}$$

2.)

$$2 \overline{)14.6}$$

$$5 \frac{1}{2} \div 2 = \boxed{}$$

3.) What is the absolute value of -3? _____

5.) Joan started at zero. She took 3 steps to the right. Stopped. Took 1 step backwards. Stopped. Then, she took 3 more steps backward. What integer did she land on?

Use the number line in problem 4 to help you.

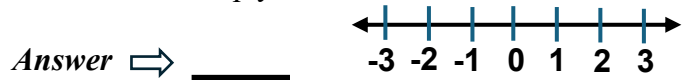
6.) *Compute the missing number.*

$$\frac{1}{2} = \frac{\boxed{}}{6}$$

$$\frac{2}{3} = \frac{\boxed{}}{9}$$

$$\frac{6}{4} = \frac{12}{\boxed{}}$$

4.) What is 4 more than the integer -3? Use the number line to help you.



7.) *Write the factor strings for each number.*

21: _____

25: _____

22: _____

27: _____

23: _____

28: _____

24: _____

30: _____

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) *Multiply the Decimals.*

$$\begin{array}{r} 0.09 \\ \times 0.05 \\ \hline \end{array}$$

$$\begin{array}{r} 0.9 \\ \times 9 \\ \hline \end{array}$$

$$\begin{array}{r} 7.8 \\ \times 2.1 \\ \hline \end{array}$$

2.) *Divide.*

$$2 \overline{)14.6}$$

$$5 \frac{1}{2} \div 2 = \boxed{}$$

3.) What is the absolute value of -3? _____

5.) Joan started at zero. She took 3 steps to the right. Stopped. Took 1 step backwards. Stopped. Then, she took 3 more steps backward. What integer did she land on?

Use the number line in problem 4 to help you.

6.) *Compute the missing number.*

$$\frac{1}{2} = \frac{\boxed{}}{6}$$

$$\frac{2}{3} = \frac{\boxed{}}{9}$$

$$\frac{6}{4} = \frac{12}{\boxed{}}$$

4.) What is 4 more than the integer -3? Use the number line to help you.



7.) *Write the factor strings for each number.*

21: _____

25: _____

22: _____

27: _____

23: _____

28: _____

24: _____

30: _____

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) *Fill in the Box and Multiply the Decimals.*

2.)

$$\begin{array}{r} 0.09 \text{ (2)} \\ \times 0.05 \text{ (2)} \\ \hline 0.0045 \text{ (4)} \end{array}$$

2 + 2 = 4 jumps.

$$\begin{array}{r} 0.9 \text{ (1)} \\ \times 9.0 \text{ (0)} \\ \hline 8.1 \text{ (1)} \end{array}$$

Count. 1 + 0 = 1.

$$\begin{array}{r} 7.8 \text{ (1)} \\ \times 2.1 \text{ (1)} \\ \hline 16.38 \text{ (2)} \end{array}$$

*1 + 1 = 2 jumps.
Approximately 14 (2 x 7)*

$$\begin{array}{r} 7.3 \\ 2 \overline{)14.6} \\ \underline{-14} \\ 6 \\ \underline{-6} \\ 0 \end{array}$$

2 equal groups of 7.3

(7.3) (7.3)

$$5 \frac{1}{2} \div 2 = \boxed{2 \frac{3}{4}}$$

$$\frac{11}{2} \times \frac{1}{2} = \boxed{\frac{11}{4}}$$

3.) What is the absolute value of -3? 3

4.) What is 4 more than the integer -3? Use the number line to help you.

5.) Joan started at zero. She took 3 steps to the right. Stopped. Took 1 step backwards. Stopped. Then, she took 3 more steps backward. What integer did she land on?

Answer \Rightarrow 1



Use the number line in problem 4 to help you.

-1

7.) *Write the factor strings for each number.*

6.) *Compute the missing number.*

21: {1, 3, 7, 21}

25: {1, 5, 25}

22: {1, 2, 11, 22}

27: {1, 3, 9, 27}

23: {1, 23}

28: {1, 2, 4, 7, 14, 28}

24: {1, 2, 3, 4, 6, 8, 12, 24} 30: {1, 2, 3, 5, 6, 10, 15, 30}

$$\frac{1}{2} = \frac{\boxed{3}}{6} \quad \frac{2}{3} = \frac{\boxed{6}}{9} \quad \frac{6}{4} = \frac{12}{\boxed{8}}$$

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) *Multiply the Decimals.*

2.) *Divide.*

$$\begin{array}{r} 0.09 \text{ (2)} \\ \times 0.05 \text{ (2)} \\ \hline 0.0045 \text{ (4)} \end{array}$$

2 + 2 = 4 jumps.

$$\begin{array}{r} 0.9 \text{ (1)} \\ \times 9.0 \text{ (0)} \\ \hline 8.1 \text{ (1)} \end{array}$$

Count. 1 + 0 = 1.

$$\begin{array}{r} 7.8 \text{ (1)} \\ \times 2.1 \text{ (1)} \\ \hline 16.38 \text{ (2)} \end{array}$$

*1 + 1 = 2 jumps.
Approximately 14 (2 x 7)*

$$\begin{array}{r} 7.3 \\ 2 \overline{)14.6} \\ \underline{-14} \\ 6 \\ \underline{-6} \\ 0 \end{array}$$

2 equal groups of 7.3

(7.3) (7.3)

$$5 \frac{1}{2} \div 2 = \boxed{2 \frac{3}{4}}$$

$$\frac{11}{2} \times \frac{1}{2} = \boxed{\frac{11}{4}}$$

3.) What is the absolute value of -3? 3

4.) What is 4 more than the integer -3? Use the number line to help you.

5.) Joan started at zero. She took 3 steps to the right. Stopped. Took 1 step backwards. Stopped. Then, she took 3 more steps backward. What integer did she land on?

Answer \Rightarrow 1



Use the number line in problem 4 to help you.

-1

7.) *Write the factor strings for each number.*

6.) *Compute the missing number.*

21: {1, 3, 7, 21}

25: {1, 5, 25}

22: {1, 2, 11, 22}

27: {1, 3, 9, 27}

23: {1, 23}

28: {1, 2, 4, 7, 14, 28}

24: {1, 2, 3, 4, 6, 8, 12, 24} 30: {1, 2, 3, 5, 6, 10, 15, 30}

$$\frac{1}{2} = \frac{\boxed{3}}{6} \quad \frac{2}{3} = \frac{\boxed{6}}{9} \quad \frac{6}{4} = \frac{12}{\boxed{8}}$$

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) *Fill in the Box and Multiply the Decimals.*

$$\begin{array}{r} 0.04 \\ \times 0.06 \\ \hline \end{array}$$

$$\begin{array}{r} 0.008 \\ \times \quad 3 \\ \hline \end{array}$$

$$\begin{array}{r} 6.8 \\ \times \quad 2 \\ \hline \end{array}$$

2.) *Divide*

$$4 \overline{)16.4}$$

3.) *Circle all proper fractions.*

$$\frac{2}{2} \quad \frac{1}{2} \quad \frac{4}{3} \quad \frac{1}{3}$$

$$\frac{1}{10} \quad \frac{4}{4} \quad \frac{3}{4} \quad \frac{5}{6}$$

4.) *Multiply by moving the decimal point.*

$$3.4 \times 10 = \underline{\quad}$$

$$0.45 \times 10 = \underline{\quad}$$

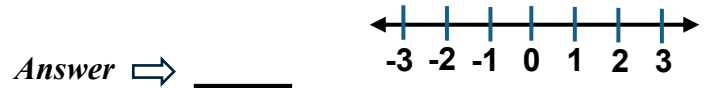
$$67 \times 10 = \underline{\quad}$$

$$234.56 \times 10 = \underline{\quad}$$

6.) *Compute the missing number.*

$$\frac{20}{40} = \frac{\square}{2} \quad \frac{9}{3} = \frac{27}{\square} \quad \frac{2}{7} = \frac{\square}{14}$$

5.) What is 1 more than the integer -1?



7.) *Write the factor strings for each number.*

- 21: _____ 25: _____
 22: _____ 27: _____
 23: _____ 28: _____
 24: _____ 30: _____

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) *Multiply the Decimals.*

$$\begin{array}{r} 0.04 \\ \times 0.06 \\ \hline \end{array}$$

$$\begin{array}{r} 0.008 \\ \times \quad 3 \\ \hline \end{array}$$

$$\begin{array}{r} 6.8 \\ \times \quad 2 \\ \hline \end{array}$$

2.) *Divide.*

$$4 \overline{)16.4}$$

3.) *Circle all proper fractions.*

$$\frac{2}{2} \quad \frac{1}{2} \quad \frac{4}{3} \quad \frac{1}{3}$$

$$\frac{1}{10} \quad \frac{4}{4} \quad \frac{3}{4} \quad \frac{5}{6}$$

4.) *Multiply by moving the decimal point.*

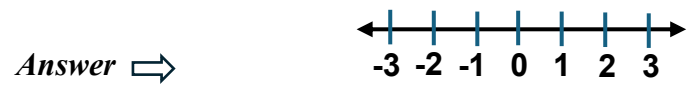
$$3.4 \times 10 = \underline{\quad}$$

$$0.45 \times 10 = \underline{\quad}$$

$$67 \times 10 = \underline{\quad}$$

$$234.56 \times 10 = \underline{\quad}$$

5.) What is 1 more than the integer -1?



7.) *Write the factor strings for each number.*

- 21: _____ 25: _____
 22: _____ 27: _____
 23: _____ 28: _____
 24: _____ 30: _____

6.) *Compute the missing number.*

$$\frac{20}{40} = \frac{\square}{2} \quad \frac{9}{3} = \frac{27}{\square} \quad \frac{2}{7} = \frac{\square}{14}$$

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) *Fill in the Box and Multiply the Decimals.*

$$\begin{array}{r} 0.04 \text{ (2)} \\ \times 0.06 \text{ (2)} \\ \hline 0.0024 \text{ (4)} \end{array}$$

2 + 2 = 4 jumps.

$$\begin{array}{r} 0.008 \text{ (3)} \\ \times 3. \text{ (0)} \\ \hline 0.024 \text{ (3)} \end{array}$$

Count. 3 + 0 = 3.

$$\begin{array}{r} 6.8 \text{ (1)} \\ \times 2. \text{ (0)} \\ \hline 13.6 \text{ (1)} \end{array}$$

*1 + 0 = 1 jump.
Approximately 14 (2 x 7)*

2.) *Divide*

$$\begin{array}{r} 4.1 \\ 4 \overline{)16.4} \\ \underline{-16} \\ 4 \\ \underline{-4} \\ 0 \end{array}$$

4 equal groups of 4.1

3.) *Circle all proper fractions.*

$$\frac{2}{2} \quad \left(\frac{1}{2}\right) \quad \frac{4}{3} \quad \left(\frac{1}{3}\right)$$

$$\left(\frac{1}{10}\right) \quad \frac{4}{4} \quad \left(\frac{3}{4}\right) \quad \left(\frac{5}{6}\right)$$

4.) *Multiply by moving the decimal point.*

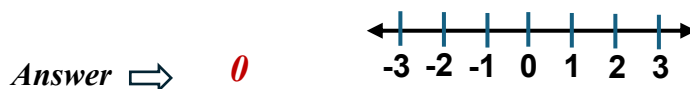
$3.4 \times 10 = \underline{34}$

$0.45 \times 10 = \underline{4.5}$

$67 \times 10 = \underline{670}$

$234.56 \times 10 = \underline{2,345.6}$

5.) What is 1 more than the integer -1?



6.) *Compute the missing number.*

$\frac{20}{40} = \frac{\boxed{1}}{2} \quad \frac{9}{3} = \frac{27}{\boxed{9}} \quad \frac{2}{7} = \frac{\boxed{4}}{14}$

7.) *Write the factor strings for each number.*

- 21: {1, 3, 7, 21} 25: {1, 5, 25}
 22: {1, 2, 11, 22} 27: {1, 3, 9, 27}
 23: {1, 23} 28: {1, 2, 4, 7, 14, 28}
 24: {1, 2, 3, 4, 6, 8, 12, 24} 30: {1, 2, 3, 5, 6, 10, 15, 30}

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) *Multiply the Decimals.*

$$\begin{array}{r} 0.04 \text{ (2)} \\ \times 0.06 \text{ (2)} \\ \hline 0.0024 \text{ (4)} \end{array}$$

2 + 2 = 4 jumps.

$$\begin{array}{r} 0.008 \text{ (3)} \\ \times 3. \text{ (0)} \\ \hline 0.024 \text{ (3)} \end{array}$$

Count. 3 + 0 = 3.

$$\begin{array}{r} 6.8 \text{ (1)} \\ \times 2. \text{ (0)} \\ \hline 13.6 \text{ (1)} \end{array}$$

*1 + 0 = 1 jump.
Approximately 14 (2 x 7)*

2.) *Divide.*

$$\begin{array}{r} 4.1 \\ 4 \overline{)16.4} \\ \underline{-16} \\ 4 \\ \underline{-4} \\ 0 \end{array}$$

4 equal groups of 4.1

3.) *Circle all proper fractions.*

$$\frac{2}{2} \quad \left(\frac{1}{2}\right) \quad \frac{4}{3} \quad \left(\frac{1}{3}\right)$$

$$\left(\frac{1}{10}\right) \quad \frac{4}{4} \quad \left(\frac{3}{4}\right) \quad \left(\frac{5}{6}\right)$$

4.) *Multiply by moving the decimal point.*

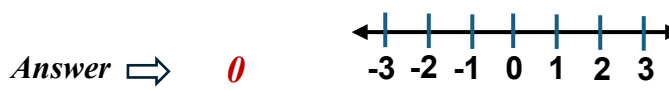
$3.4 \times 10 = \underline{34}$

$0.45 \times 10 = \underline{4.5}$

$67 \times 10 = \underline{670}$

$234.56 \times 10 = \underline{2,345.6}$

5.) What is 1 more than the integer -1?



6.) *Compute the missing number.*

$\frac{20}{40} = \frac{\boxed{1}}{2} \quad \frac{9}{3} = \frac{27}{\boxed{9}} \quad \frac{2}{7} = \frac{\boxed{4}}{14}$

7.) *Write the factor strings for each number.*

- 21: {1, 3, 7, 21} 25: {1, 5, 25}
 22: {1, 2, 11, 22} 27: {1, 3, 9, 27}
 23: {1, 23} 28: {1, 2, 4, 7, 14, 28}
 24: {1, 2, 3, 4, 6, 8, 12, 24} 30: {1, 2, 3, 5, 6, 10, 15, 30}

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) *ADD the integers using the number line.*



$3 + 2 = \underline{\quad}$ $-3 + 2 = \underline{\quad}$
 $0 + 2 = \underline{\quad}$ $2 + -2 = \underline{\quad}$
 $-1 + 4 = \underline{\quad}$ $-1 + -1 = \underline{\quad}$

2.) *Divide*

$8 \overline{)32.8}$

3.) *Circle all improper fractions.*

$\frac{5}{2}$ $\frac{3}{4}$ $\frac{7}{5}$ $\frac{2}{3}$
 $\frac{8}{12}$ $\frac{7}{7}$ $\frac{3}{1}$ $\frac{7}{8}$

4.) *Multiply by moving the decimal point.*

$1.42 \times 10 = \underline{\quad}$
 $0.45 \times 100 = \underline{\quad}$
 $17 \times 100 = \underline{\quad}$

5.) *Solve the string of operations (PEMDAS).*

$5 \times (3 + 2) = \underline{\quad}$ $(1 \times 8) \div 4 = \underline{\quad}$
 $7 - (1 + 3) = \underline{\quad}$ $6 - 6 \div 3 = \underline{\quad}$

6.) *Compute the missing number.*

$\frac{30}{40} = \frac{\square}{4}$ $\frac{9}{5} = \frac{27}{\square}$ $\frac{6}{7} = \frac{\square}{21}$

7.) *Write the factor strings for each number.*

25: _____ 32: _____
 27: _____ 33: _____
 28: _____ 35: _____
 30: _____ 36: _____

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) *ADD the integers using the number line.*



$3 + 2 = \underline{\quad}$ $-3 + 2 = \underline{\quad}$
 $0 + 2 = \underline{\quad}$ $2 + -2 = \underline{\quad}$
 $-1 + 4 = \underline{\quad}$ $-1 + -1 = \underline{\quad}$

2.) *Divide.*

$8 \overline{)32.8}$

3.) *Circle all improper fractions.*

$\frac{5}{2}$ $\frac{3}{4}$ $\frac{7}{5}$ $\frac{2}{3}$
 $\frac{8}{12}$ $\frac{7}{7}$ $\frac{3}{1}$ $\frac{7}{8}$

4.) *Multiply by moving the decimal point.*

$1.42 \times 10 = \underline{\quad}$
 $0.45 \times 100 = \underline{\quad}$
 $17 \times 100 = \underline{\quad}$

5.) *Solve the string of operations (PEMDAS).*

$5 \times (3 + 2) = \underline{\quad}$ $(1 \times 8) \div 4 = \underline{\quad}$
 $7 - (1 + 3) = \underline{\quad}$ $6 - 6 \div 3 = \underline{\quad}$

7.) *Write the factor strings for each number.*

25: _____ 32: _____
 27: _____ 33: _____
 28: _____ 35: _____
 30: _____ 36: _____

6.) *Compute the missing number.*

$\frac{30}{40} = \frac{\square}{4}$ $\frac{9}{5} = \frac{27}{\square}$ $\frac{6}{7} = \frac{\square}{21}$

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) ADD the integers using the number line.



$$3 + 2 = \underline{5} \quad -3 + 2 = \underline{-1}$$

$$0 + 2 = \underline{2} \quad 2 + -2 = \underline{0}$$

$$-1 + 4 = \underline{3} \quad -1 + -1 = \underline{-2}$$

4.) Multiply by moving the decimal point.

$$1.42 \times 10 = \underline{14.2}$$

$$0.45 \times 100 = \underline{45}$$

$$17 \times 100 = \underline{1,700}$$

6.) Compute the missing number.

$$\frac{30}{40} = \frac{\boxed{3}}{4} \quad \frac{9}{5} = \frac{27}{\boxed{15}} \quad \frac{6}{7} = \frac{\boxed{18}}{21}$$

2.) Divide

$$\begin{array}{r} 4.1 \\ 8 \overline{)32.8} \\ \underline{-32} \\ 8 \\ \underline{-8} \\ 0 \end{array}$$

8 equal groups of 4.1

3.) Circle all improper fractions.

$$\left(\frac{5}{2}\right) \quad \frac{3}{4} \quad \left(\frac{7}{5}\right) \quad \frac{2}{3}$$

$$\frac{8}{12} \quad \left(\frac{7}{7}\right) \quad \left(\frac{3}{1}\right) \quad \frac{7}{8}$$

5.) Solve the string of operations (PEMDAS).

$$5 \times (3 + 2) = \underline{25} \quad (1 \times 8) \div 4 = \underline{2}$$

$$7 - (1 + 3) = \underline{3} \quad 6 - 6 \div 3 = \underline{4}$$

7.) Write the factor strings for each number.

25: {1, 5, 25}

32: {1, 2, 4, 8, 16, 32}

27: {1, 3, 9, 27}

33: {1, 3, 11, 33}

28: {1, 2, 4, 7, 14, 28}

35: {1, 5, 7, 35}

30: {1, 2, 3, 5, 6, 10, 15, 30} 36: {1, 2, 3, 4, 6, 9, 12, 18, 36}

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) ADD the integers using the number line.



$$3 + 2 = \underline{5} \quad -3 + 2 = \underline{-1}$$

$$0 + 2 = \underline{2} \quad 2 + -2 = \underline{0}$$

$$-1 + 4 = \underline{3} \quad -1 + -1 = \underline{-2}$$

2.) Divide.

$$\begin{array}{r} 4.1 \\ 8 \overline{)32.8} \\ \underline{-32} \\ 8 \\ \underline{-8} \\ 0 \end{array}$$

8 equal groups of 4.1

3.) Circle all improper fractions.

$$\left(\frac{5}{2}\right) \quad \frac{3}{4} \quad \left(\frac{7}{5}\right) \quad \frac{2}{3}$$

$$\frac{8}{12} \quad \left(\frac{7}{7}\right) \quad \left(\frac{3}{1}\right) \quad \frac{7}{8}$$

5.) Solve the string of operations (PEMDAS).

$$5 \times (3 + 2) = \underline{25} \quad (1 \times 8) \div 4 = \underline{2}$$

$$7 - (1 + 3) = \underline{3} \quad 6 - 6 \div 3 = \underline{4}$$

7.) Write the factor strings for each number.

25: {1, 5, 25}

32: {1, 2, 4, 8, 16, 32}

27: {1, 3, 9, 27}

33: {1, 3, 11, 33}

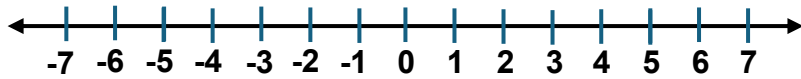
28: {1, 2, 4, 7, 14, 28}

35: {1, 5, 7, 35}

30: {1, 2, 3, 5, 6, 10, 15, 30} 36: {1, 2, 3, 4, 6, 9, 12, 18, 36}

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) *ADD the integers using the number line.*



$1 + 6 = \underline{\quad}$ $-3 + -2 = \underline{\quad}$ $-5 + -1 = \underline{\quad}$

$0 + -2 = \underline{\quad}$ $5 + -5 = \underline{\quad}$ $-1 + 0 = \underline{\quad}$

2.) *Divide*

$6 \overline{)37.8}$

$3.1 \overline{)37.2}$

3.) *Multiply or divide by moving the decimal point.*

$0.3 \times 100 = \underline{\quad}$ $2.4 \div 10 = \underline{\quad}$

$0.045 \times 100 = \underline{\quad}$ $0.5 \div 100 = \underline{\quad}$

$3.1 \times 1,000 = \underline{\quad}$ $19 \div 100 = \underline{\quad}$

4.) *Solve the string of operations (PEMDAS).*

$6 \times (3 - 2) = \underline{\quad}$ $6 \times 6 \div 3 = \underline{\quad}$

$4 \div 2 \times 5 = \underline{\quad}$ $6 - 6 \div 3 = \underline{\quad}$

6.) *Write the factor strings for each number.*

32: _____ 40: _____

33: _____ 42: _____

35: _____ 45: _____

36: _____

5.) *Compute the missing number.*

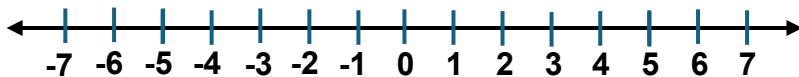
$\frac{6}{9} = \frac{2}{\square}$

$\frac{3}{\square} = \frac{12}{16}$

$\frac{\square}{2} = \frac{8}{16}$

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) *ADD the integers using the number line.*



$1 + 6 = \underline{\quad}$ $-3 + -2 = \underline{\quad}$ $-5 + -1 = \underline{\quad}$

$0 + -2 = \underline{\quad}$ $5 + -5 = \underline{\quad}$ $-1 + 0 = \underline{\quad}$

2.) *Divide*

$6 \overline{)37.8}$

$3.1 \overline{)37.2}$

3.) *Multiply or divide by moving the decimal point.*

$0.3 \times 100 = \underline{\quad}$ $2.4 \div 10 = \underline{\quad}$

$0.045 \times 100 = \underline{\quad}$ $0.5 \div 100 = \underline{\quad}$

$3.1 \times 1,000 = \underline{\quad}$ $19 \div 100 = \underline{\quad}$

4.) *Solve the string of operations (PEMDAS).*

$6 \times (3 - 2) = \underline{\quad}$ $6 \times 6 \div 3 = \underline{\quad}$

$4 \div 2 \times 5 = \underline{\quad}$ $6 - 6 \div 3 = \underline{\quad}$

6.) *Write the factor strings for each number.*

32: _____ 40: _____

33: _____ 42: _____

35: _____ 45: _____

36: _____

5.) *Compute the missing number.*

$\frac{6}{9} = \frac{2}{\square}$

$\frac{3}{\square} = \frac{12}{16}$

$\frac{\square}{2} = \frac{8}{16}$

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) *ADD the integers using the number line.*



$1 + 6 = \underline{7} \quad -3 + -2 = \underline{-5} \quad -5 + -1 = \underline{-6}$

$0 + -2 = \underline{-2} \quad 5 + -5 = \underline{0} \quad -1 + 0 = \underline{-1}$

2.) *Divide*

$$\begin{array}{r} 6.3 \\ 6 \overline{)37.8} \\ \underline{-36} \\ 18 \\ \underline{-18} \\ 0 \end{array}$$

$$\begin{array}{r} 12 \\ 3.1 \overline{)37.2} \\ \underline{31} \\ 62 \\ \underline{-62} \\ 0 \end{array}$$

3.) *Multiply or divide by moving the decimal point.*

$0.3 \times 100 = \underline{30} \quad 2.4 \div 10 = \underline{0.24}$

$0.045 \times 100 = \underline{4.5} \quad 0.5 \div 100 = \underline{0.005}$

$3.1 \times 1,000 = \underline{3,100} \quad 19 \div 100 = \underline{0.19}$

4.) *Solve the string of operations (PEMDAS).*

$6 \times (3 - 2) = \underline{6} \quad 6 \times 6 \div 3 = \underline{12}$

$4 \div 2 \times 5 = \underline{10} \quad 6 - 6 \div 3 = \underline{4}$

6.) *Write the factor strings for each number.*

32: {1, 2, 4, 8, 16, 32} 40: {1, 2, 4, 5, 8, 10, 20, 40}

33: {1, 3, 11, 33} 42: {1, 2, 3, 6, 7, 14, 21, 42}

35: {1, 5, 7, 35} 45: {1, 3, 5, 9, 15, 45}

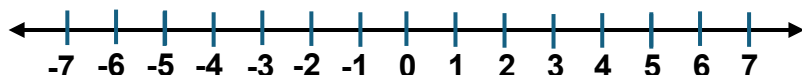
36: {1, 2, 3, 4, 6, 9, 12, 18, 36}

5.) *Compute the missing number.*

$\frac{6}{9} = \frac{2}{\boxed{3}} \quad \frac{3}{\boxed{4}} = \frac{12}{16} \quad \frac{\boxed{1}}{2} = \frac{8}{16}$

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) *ADD the integers using the number line.*



$1 + 6 = \underline{7} \quad -3 + -2 = \underline{-5} \quad -5 + -1 = \underline{-6}$

$0 + -2 = \underline{-2} \quad 5 + -5 = \underline{0} \quad -1 + 0 = \underline{-1}$

2.) *Divide*

$$\begin{array}{r} 6.3 \\ 6 \overline{)37.8} \\ \underline{-36} \\ 18 \\ \underline{-18} \\ 0 \end{array}$$

$$\begin{array}{r} 12 \\ 3.1 \overline{)37.2} \\ \underline{31} \\ 62 \\ \underline{-62} \\ 0 \end{array}$$

3.) *Multiply or divide by moving the decimal point.*

$0.3 \times 100 = \underline{30} \quad 2.4 \div 10 = \underline{0.24}$

$0.045 \times 100 = \underline{4.5} \quad 0.5 \div 100 = \underline{0.005}$

$3.1 \times 1,000 = \underline{3,100} \quad 19 \div 100 = \underline{0.19}$

4.) *Solve the string of operations (PEMDAS).*

$6 \times (3 - 2) = \underline{6} \quad 6 \times 6 \div 3 = \underline{12}$

$4 \div 2 \times 5 = \underline{10} \quad 6 - 6 \div 3 = \underline{4}$

6.) *Write the factor strings for each number.*

32: {1, 2, 4, 8, 16, 32} 40: {1, 2, 4, 5, 8, 10, 20, 40}

33: {1, 3, 11, 33} 42: {1, 2, 3, 6, 7, 14, 21, 42}

35: {1, 5, 7, 35} 45: {1, 3, 5, 9, 15, 45}

36: {1, 2, 3, 4, 6, 9, 12, 18, 36}

5.) *Compute the missing number.*

$\frac{6}{9} = \frac{2}{\boxed{3}} \quad \frac{3}{\boxed{4}} = \frac{12}{16} \quad \frac{\boxed{1}}{2} = \frac{8}{16}$

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) *ADD the integers using the number line.*



$-4 + -2 = \underline{\hspace{2cm}}$ $-3 + 7 = \underline{\hspace{2cm}}$ $-5 + 4 = \underline{\hspace{2cm}}$

$2 + 4 = \underline{\hspace{2cm}}$ $7 + -5 = \underline{\hspace{2cm}}$ $-6 + 0 = \underline{\hspace{2cm}}$

2.) *Multiply or Divide*

$\frac{1}{2} \times 5.5 = \underline{\hspace{2cm}}$

$0.2 \overline{) 20}$

3.) *Multiply or divide by moving the decimal point.*

$0.062 \times 10 = \underline{\hspace{2cm}}$ $12.9 \div 1,000 = \underline{\hspace{2cm}}$

$0.05 \times 100 = \underline{\hspace{2cm}}$ $0.95 \div 10 = \underline{\hspace{2cm}}$

$9.18 \times 1,000 = \underline{\hspace{2cm}}$ $7 \div 100 = \underline{\hspace{2cm}}$

4.) *Solve the string of operations (PEMDAS).*

$(10 - 7) \div 3 = \underline{\hspace{2cm}}$ $8 \times 6 \div 3 = \underline{\hspace{2cm}}$

$14 - 2 \times 6 = \underline{\hspace{2cm}}$ $50 - 10 \div 2 = \underline{\hspace{2cm}}$

5.) *How many equal spaces between the two integers?*

1 and 4? $\underline{\hspace{2cm}}$ -1 and -6? $\underline{\hspace{2cm}}$

0 and -2? $\underline{\hspace{2cm}}$ -2 and 2? $\underline{\hspace{2cm}}$

6.) *Write the factor strings for each number.*

40: $\underline{\hspace{2cm}}$ 49: $\underline{\hspace{2cm}}$

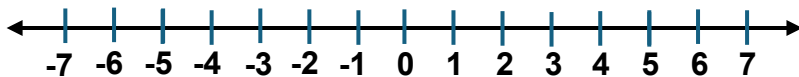
42: $\underline{\hspace{2cm}}$

45: $\underline{\hspace{2cm}}$

48: $\underline{\hspace{2cm}}$

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) *ADD the integers using the number line.*



$-4 + -2 = \underline{\hspace{2cm}}$ $-3 + 7 = \underline{\hspace{2cm}}$ $-5 + 4 = \underline{\hspace{2cm}}$

$2 + 4 = \underline{\hspace{2cm}}$ $7 + -5 = \underline{\hspace{2cm}}$ $-6 + 0 = \underline{\hspace{2cm}}$

2.) *Multiply or Divide*

$\frac{1}{2} \times 5.5 = \underline{\hspace{2cm}}$

$0.2 \overline{) 20}$

3.) *Multiply or divide by moving the decimal point.*

$0.062 \times 10 = \underline{\hspace{2cm}}$ $12.9 \div 1,000 = \underline{\hspace{2cm}}$

$0.05 \times 100 = \underline{\hspace{2cm}}$ $0.95 \div 10 = \underline{\hspace{2cm}}$

$9.18 \times 1,000 = \underline{\hspace{2cm}}$ $7 \div 100 = \underline{\hspace{2cm}}$

4.) *Solve the string of operations (PEMDAS).*

$(10 - 7) \div 3 = \underline{\hspace{2cm}}$ $8 \times 6 \div 3 = \underline{\hspace{2cm}}$

$14 - 2 \times 6 = \underline{\hspace{2cm}}$ $50 - 10 \div 2 = \underline{\hspace{2cm}}$

5.) *How many equal spaces between the two integers?*

1 and 4? $\underline{\hspace{2cm}}$ -1 and -6? $\underline{\hspace{2cm}}$

0 and -2? $\underline{\hspace{2cm}}$ -2 and 2? $\underline{\hspace{2cm}}$

6.) *Write the factor strings for each number.*

40: $\underline{\hspace{2cm}}$ 49: $\underline{\hspace{2cm}}$

42: $\underline{\hspace{2cm}}$

45: $\underline{\hspace{2cm}}$

48: $\underline{\hspace{2cm}}$

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) ADD the integers using the number line.



$-4 + -2 = \underline{-6}$ $-3 + 7 = \underline{4}$ $-5 + 4 = \underline{-1}$
 $2 + 4 = \underline{6}$ $7 + -5 = \underline{2}$ $-6 + 0 = \underline{-6}$

2.) Multiply or Divide

$\frac{1}{2} \times 5.5 = \underline{2.75}$
 Two ways: decimal or fraction mult.
 $\frac{1}{2} \times \frac{55}{10} = \frac{55}{20} = \underline{2\frac{3}{4}}$
 $0.5 \times 5.5 = \underline{2.75}$

$0.2 \overline{) 20} \begin{array}{r} 100 \\ 2 \overline{) 200} \\ -2 \\ \hline 0 \\ -0 \\ \hline 0 \\ -0 \\ \hline 0 \\ -0 \\ \hline 0 \end{array}$

3.) Multiply or divide by moving the decimal point.

$0.062 \times 10 = \underline{0.62}$ $12.9 \div 1,000 = \underline{0.0129}$
 $0.05 \times 100 = \underline{5}$ $0.95 \div 10 = \underline{0.095}$
 $9.18 \times 1,000 = \underline{9,180}$ $7 \div 100 = \underline{0.07}$

4.) Solve the string of operations (PEMDAS).

$(10 - 7) \div 3 = \underline{1}$ $8 \times 6 \div 3 = \underline{16}$
 $14 - 2 \times 6 = \underline{2}$ $50 - 10 \div 2 = \underline{45}$

5.) How many equal spaces between the two integers?

1 and 4? 3 -1 and -6? 5
 0 and -2? 2 -2 and 2? 4

6.) Write the factor strings for each number.

40: {1, 2, 4, 5, 8, 10 20, 40} 49: {1, 7, 49}
 42: {1, 2, 3, 6, 7, 14 21, 42}
 45: {1, 3, 5, 9, 15, 45}
 48: {1, 2, 3, 4, 6, 8, 12, 16, 24, 48}

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) ADD the integers using the number line.



$-4 + -2 = \underline{-6}$ $-3 + 7 = \underline{4}$ $-5 + 4 = \underline{-1}$
 $2 + 4 = \underline{6}$ $7 + -5 = \underline{2}$ $-6 + 0 = \underline{-6}$

2.) Multiply or Divide

$\frac{1}{2} \times 5.5 = \underline{2.75}$
 Two ways: decimal or fraction mult.
 $\frac{1}{2} \times \frac{55}{10} = \frac{55}{20} = \underline{2\frac{3}{4}}$
 $0.5 \times 5.5 = \underline{2.75}$

$0.2 \overline{) 20} \begin{array}{r} 100 \\ 2 \overline{) 200} \\ -2 \\ \hline 0 \\ -0 \\ \hline 0 \\ -0 \\ \hline 0 \\ -0 \\ \hline 0 \end{array}$

3.) Multiply or divide by moving the decimal point.

$0.062 \times 10 = \underline{0.62}$ $12.9 \div 1,000 = \underline{0.0129}$
 $0.05 \times 100 = \underline{5}$ $0.95 \div 10 = \underline{0.095}$
 $9.18 \times 1,000 = \underline{9,180}$ $7 \div 100 = \underline{0.07}$

4.) Solve the string of operations (PEMDAS).

$(10 - 7) \div 3 = \underline{1}$ $8 \times 6 \div 3 = \underline{16}$
 $14 - 2 \times 6 = \underline{2}$ $50 - 10 \div 2 = \underline{45}$

5.) How many equal spaces between the two integers?

1 and 4? 3 -1 and -6? 5
 0 and -2? 2 -2 and 2? 4

6.) Write the factor strings for each number.

40: {1, 2, 4, 5, 8, 10 20, 40} 49: {1, 7, 49}
 42: {1, 2, 3, 6, 7, 14 21, 42}
 45: {1, 3, 5, 9, 15, 45}
 48: {1, 2, 3, 4, 6, 8, 12, 16, 24, 48}

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) *ADD the integers using the number line.*



$-7 + 8 = \underline{\quad}$ $-7 + 10 = \underline{\quad}$ $-3 + 0 = \underline{\quad}$
 $3 + 4 = \underline{\quad}$ $6 + -5 = \underline{\quad}$ $-6 + -1 = \underline{\quad}$

2.) *Multiply or Divide*

$\frac{1}{4} \times 4.8 = \underline{\quad}$

$0.41 \overline{) 8.2}$

3.) Josh checked the temperature at 6 A.M. The thermometer indicated it was -2° F. At 2 P.M., he checked, and the temperature was 1° F. How many degrees did the temperature increase?

 $^\circ$ F

4.) *Solve the string of operations (PEMDAS).*

$(17 - 5) \div 4 = \underline{\quad}$ $7 \times 7 \div 7 = \underline{\quad}$
 $16 + 2 \times 5 = \underline{\quad}$ $20 - 10 \div 2 = \underline{\quad}$

6.) *Write the factor strings for each number.*

5.) *How many equal spaces between the two integers?*

-2 and 4 ? _____ -5 and -4 ? _____
 0 and -7 ? _____ -3 and 5 ? _____

40 : _____ 49 : _____
 42 : _____
 45 : _____
 48 : _____

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) *ADD the integers using the number line.*



$-7 + 8 = \underline{\quad}$ $-7 + 10 = \underline{\quad}$ $-3 + 0 = \underline{\quad}$
 $3 + 4 = \underline{\quad}$ $6 + -5 = \underline{\quad}$ $-6 + -1 = \underline{\quad}$

2.) *Multiply or Divide*

$\frac{1}{4} \times 4.8 = \underline{\quad}$

$0.41 \overline{) 8.2}$

3.) Josh checked the temperature at 6 A.M. The thermometer indicated it was -2° F. At 2 P.M., he checked, and the temperature was 1° F. How many degrees did the temperature increase?

 $^\circ$ F

4.) *Solve the string of operations (PEMDAS).*

$(17 - 5) \div 4 = \underline{\quad}$ $7 \times 7 \div 7 = \underline{\quad}$
 $16 + 2 \times 5 = \underline{\quad}$ $20 - 10 \div 2 = \underline{\quad}$

6.) *Write the factor strings for each number.*

5.) *How many equal spaces between the two integers?*

-2 and 4 ? _____ -5 and -4 ? _____
 0 and -7 ? _____ -3 and 5 ? _____

40 : _____ 49 : _____
 42 : _____
 45 : _____
 48 : _____

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) *ADD the integers using the number line.*



$-7 + 8 = \underline{1}$ $-7 + 10 = \underline{3}$ $-3 + 0 = \underline{-3}$
 $3 + 4 = \underline{7}$ $6 + -5 = \underline{1}$ $-6 + -1 = \underline{-7}$

2.) *Multiply or Divide*

$\frac{1}{4} \times 4.8 = \underline{2.2}$
 $\frac{1}{4} \times \frac{48}{10} = \frac{48}{40} = \underline{2.2}$
 $0.25 \times 4.8 = \underline{2.2}$

$0.41 \overline{) 8.2}$
 $\underline{20}$
 $41 \overline{) 820}$
 $\underline{820}$
 0
 $\underline{0}$
 0

3.) Josh checked the temperature at 6 A.M. The thermometer indicated it was -2° F. At 2 P.M., he checked, and the temperature was 1° F. How many degrees did the temperature increase?

3° F

4.) *Solve the string of operations (PEMDAS).*

$(17 - 5) \div 4 = \underline{3}$ $7 \times 7 \div 7 = \underline{7}$
 $16 + 2 \times 5 = \underline{26}$ $20 - 10 \div 2 = \underline{15}$

6.) *Write the factor strings for each number.*

5.) *How many equal spaces between the two integers?*

-2 and 4 ? 6 -5 and -4 ? 1
 0 and -7 ? 7 -3 and 5 ? 8

40: $\{1, 2, 4, 5, 8, 10, 20, 40\}$ 49: $\{1, 7, 49\}$
 42: $\{1, 2, 3, 6, 7, 14, 21, 42\}$
 45: $\{1, 3, 5, 9, 15, 45\}$
 48: $\{1, 2, 3, 4, 6, 8, 12, 16, 24, 48\}$

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) *ADD the integers using the number line.*



$-7 + 8 = \underline{1}$ $-7 + 10 = \underline{3}$ $-3 + 0 = \underline{-3}$
 $3 + 4 = \underline{7}$ $6 + -5 = \underline{1}$ $-6 + -1 = \underline{-7}$

2.) *Multiply or Divide*

$\frac{1}{4} \times 4.8 = \underline{2.2}$
 $\frac{1}{4} \times \frac{48}{10} = \frac{48}{40} = \underline{2.2}$
 $0.25 \times 4.8 = \underline{2.2}$

$0.41 \overline{) 8.2}$
 $\underline{20}$
 $41 \overline{) 820}$
 $\underline{820}$
 0
 $\underline{0}$
 0

3.) Josh checked the temperature at 6 A.M. The thermometer indicated it was -2° F. At 2 P.M., he checked, and the temperature was 1° F. How many degrees did the temperature increase?

3° F

4.) *Solve the string of operations (PEMDAS).*

$(17 - 5) \div 4 = \underline{3}$ $7 \times 7 \div 7 = \underline{7}$
 $16 + 2 \times 5 = \underline{26}$ $20 - 10 \div 2 = \underline{15}$

6.) *Write the factor strings for each number.*

5.) *How many equal spaces between the two integers?*

-2 and 4 ? 6 -5 and -4 ? 1
 0 and -7 ? 7 -3 and 5 ? 8

40: $\{1, 2, 4, 5, 8, 10, 20, 40\}$ 49: $\{1, 7, 49\}$
 42: $\{1, 2, 3, 6, 7, 14, 21, 42\}$
 45: $\{1, 3, 5, 9, 15, 45\}$
 48: $\{1, 2, 3, 4, 6, 8, 12, 16, 24, 48\}$

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) *ADD the integers using the number line.*



$-8 + 2 = \underline{\quad}$ $-5 + 10 = \underline{\quad}$ $-9 + 0 = \underline{\quad}$

$-3 + 4 = \underline{\quad}$ $6 + -3 = \underline{\quad}$ $-4 + -2 = \underline{\quad}$

3.) *Which integer is larger?*

-2 or 4 ? _____ -5 or -4 ? _____

0 or -7 ? _____ -3 or -10 ? _____

The integer further to the right is larger. True or False

5.) *How many equal spaces between the two integers?*

-7 and 7 ? _____ -4 and -4 ? _____

-3 and 0 ? _____ -1 and 6 ? _____

2.) *Multiply or Divide*

$\frac{1}{2} \times 4.2 = \underline{\quad}$

$0.8 \overline{)0.32}$

4.) *Solve the string of operations (PEMDAS).*

$6 \times 2 \div 4 = \underline{\quad}$ $4 + 9 \div 3 = \underline{\quad}$

$4 \times (-2 + 3) = \underline{\quad}$ $13 - 40 \div 4 = \underline{\quad}$

6.) *Write the factor strings for each number.*

40: _____ 49: _____

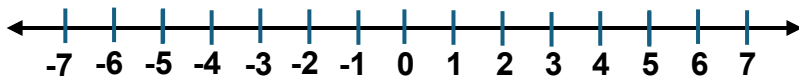
42: _____

45: _____

48: _____

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) *ADD the integers using the number line.*



$-8 + 2 = \underline{\quad}$ $-5 + 10 = \underline{\quad}$ $-9 + 0 = \underline{\quad}$

$-3 + 4 = \underline{\quad}$ $6 + -3 = \underline{\quad}$ $-4 + -2 = \underline{\quad}$

3.) *Which integer is larger?*

-2 or 4 ? _____ -5 or -4 ? _____

0 or -7 ? _____ -3 or -10 ? _____

The integer further to the right is larger. True or False

5.) *How many equal spaces between the two integers?*

-7 and 7 ? _____ -4 and -4 ? _____

-3 and 0 ? _____ -1 and 6 ? _____

2.) *Multiply or Divide*

$\frac{1}{2} \times 4.2 = \underline{\quad}$

$0.8 \overline{)0.32}$

4.) *Solve the string of operations (PEMDAS).*

$6 \times 2 \div 4 = \underline{\quad}$ $4 + 9 \div 3 = \underline{\quad}$

$4 \times (-2 + 3) = \underline{\quad}$ $13 - 40 \div 4 = \underline{\quad}$

6.) *Write the factor strings for each number.*

40: _____ 49: _____

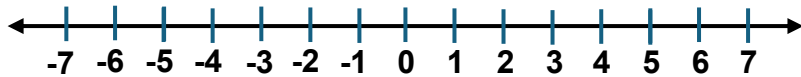
42: _____

45: _____

48: _____

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) *ADD the integers using the number line.*



$-8 + 2 = \underline{-6}$ $-5 + 10 = \underline{5}$ $-9 + 0 = \underline{-9}$

$-3 + 4 = \underline{1}$ $6 + -3 = \underline{3}$ $-4 + -2 = \underline{-6}$

3.) *Which integer is larger?*

-2 or 4 ? 4 -5 or -4 ? -4

0 or -7 ? 0 -3 or -10 ? -3

The integer further to the right is larger. True or False

5.) *How many equal spaces between the two integers?*

-7 and 7 ? 14 -4 and -4 ? 0

-3 and 0 ? 3 -1 and 6 ? 7

2.) *Multiply or Divide*

$\frac{1}{2} \times 4.2 = \underline{2.1}$

$\frac{1}{2} \times \frac{42}{10} = \frac{42}{20} = \underline{2.1}$

$0.5 \times 4.2 = \underline{2.1}$

$0.8 \overline{)0.32}$

$\begin{array}{r} 4.0 \\ 8 \overline{)3.2} \\ \underline{-3.2} \\ 0 \end{array}$

4.) *Solve the string of operations (PEMDAS).*

$6 \times 2 \div 4 = \underline{3}$ $4 + 9 \div 3 = \underline{7}$

$4 \times (-2 + 3) = \underline{1}$ $13 - 40 \div 4 = \underline{3}$

6.) *Write the factor strings for each number.*

40: {1, 2, 4, 5, 8, 10, 20, 40} 49: {1, 7, 49}

42: {1, 2, 3, 6, 7, 14, 21, 42}

45: {1, 3, 5, 9, 15, 45}

48: {1, 2, 3, 4, 6, 8, 12, 16, 24, 48}

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) *ADD the integers using the number line.*



$-8 + 2 = \underline{-6}$ $-5 + 10 = \underline{5}$ $-9 + 0 = \underline{-9}$

$-3 + 4 = \underline{1}$ $6 + -3 = \underline{3}$ $-4 + -2 = \underline{-6}$

3.) *Which integer is larger?*

-2 or 4 ? 4 -5 or -4 ? -4

0 or -7 ? 0 -3 or -10 ? -3

The integer further to the right is larger. True or False

5.) *How many equal spaces between the two integers?*

-7 and 7 ? 14 -4 and -4 ? 0

-3 and 0 ? 3 -1 and 6 ? 7

2.) *Multiply or Divide*

$\frac{1}{2} \times 4.2 = \underline{2.1}$

$\frac{1}{2} \times \frac{42}{10} = \frac{42}{20} = \underline{2.1}$

$0.5 \times 4.2 = \underline{2.1}$

$0.8 \overline{)0.32}$

$\begin{array}{r} 4.0 \\ 8 \overline{)3.2} \\ \underline{-3.2} \\ 0 \end{array}$

4.) *Solve the string of operations (PEMDAS).*

$6 \times 2 \div 4 = \underline{3}$ $4 + 9 \div 3 = \underline{7}$

$4 \times (-2 + 3) = \underline{1}$ $13 - 40 \div 4 = \underline{3}$

6.) *Write the factor strings for each number.*

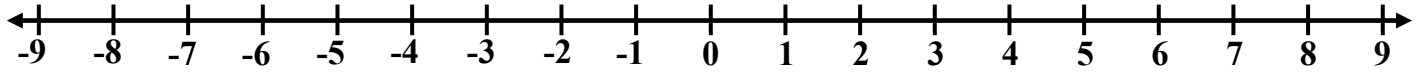
40: {1, 2, 4, 5, 8, 10, 20, 40} 49: {1, 7, 49}

42: {1, 2, 3, 6, 7, 14, 21, 42}

45: {1, 3, 5, 9, 15, 45}

48: {1, 2, 3, 4, 6, 8, 12, 16, 24, 48}

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.



1.) **ADD** the integers using the number line.

2.) **SUBTRACT** the integers using the number line.

$7 + 2 =$ _____ $-5 + 6 =$ _____ $-2 + 0 =$ _____

$9 - 2 =$ _____ $-1 - (+1) =$ _____

$-2 + 4 =$ _____ $-2 + -3 =$ _____ $4 + -7 =$ _____

$-4 - (-2) =$ _____ $2 - (-3) =$ _____

3.) Which integer is larger?

4.) Solve the string of operations (PEMDAS).

-3 or -4 ? _____ 3 or -4 ? _____

$2 \div 2 + 4 =$ _____ $1 + 9 - 3 =$ _____

-1 or 0 ? _____ -5 or -9 ? _____

$4 \div (-1 + 3) =$ _____ $11 - 6 \div 6 =$ _____

The integer further to the LEFT is larger. True or False

6.) Write the factor strings for each number.

5.) How many equal spaces between the two integers?

40: _____ 49: _____

-3 and 3 ? _____ -2 and -1 ? _____

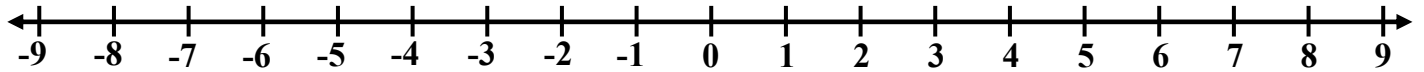
42: _____

-6 and 0 ? _____ -2 and 5 ? _____

45: _____

48: _____

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.



1.) **ADD** the integers using the number line.

2.) **SUBTRACT** the integers using the number line.

$7 + 2 =$ _____ $-5 + 6 =$ _____ $-2 + 0 =$ _____

$9 - 2 =$ _____ $-1 - (+1) =$ _____

$-2 + 4 =$ _____ $-2 + -3 =$ _____ $4 + -7 =$ _____

$-4 - (-2) =$ _____ $2 - (-3) =$ _____

3.) Which integer is larger?

4.) Solve the string of operations (PEMDAS).

-3 or -4 ? _____ 3 or -4 ? _____

$2 \div 2 + 4 =$ _____ $1 + 9 - 3 =$ _____

-1 or 0 ? _____ -5 or -9 ? _____

$4 \div (-1 + 3) =$ _____ $11 - 6 \div 6 =$ _____

The integer further to the LEFT is larger. True or False

6.) Write the factor strings for each number.

5.) How many equal spaces between the two integers?

40: _____ 49: _____

-3 and 3 ? _____ -2 and -1 ? _____

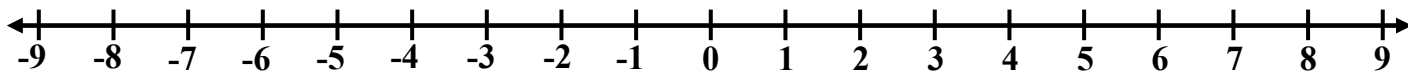
42: _____

-6 and 0 ? _____ -2 and 5 ? _____

45: _____

48: _____

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.



1.) **ADD** the integers using the number line.

$7 + 2 = \underline{9}$ $-5 + 6 = \underline{1}$ $-2 + 0 = \underline{-2}$

$-2 + 4 = \underline{2}$ $-2 + -3 = \underline{-5}$ $4 + -7 = \underline{-3}$

3.) Which integer is larger?

-3 or -4? -3 3 or -4? 3

-1 or 0? 0 -5 or -9? -5

The integer further to the LEFT is larger. True or False

5.) How many equal spaces between the two integers?

-3 and 3? 6 -2 and -1? 1

-6 and 0? 6 -2 and 5? 7

2.) **SUBTRACT** the integers using the number line.

$9 - 2 = \underline{7}$ $-1 - (+1) = \underline{-2}$

$-4 - (-2) = \underline{-2}$ $2 - (-3) = \underline{5}$

4.) Solve the string of operations (PEMDAS).

$2 \div 2 + 4 = \underline{5}$ $1 + 9 - 3 = \underline{7}$

$4 \div (-1 + 3) = \underline{2}$ $11 - 6 \div 6 = \underline{10}$

6.) Write the factor strings for each number.

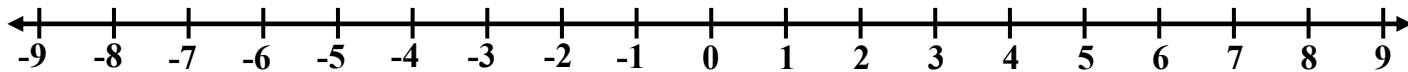
40: {1, 2, 4, 5, 8, 10, 20, 40} 49: {1, 7, 49}

42: {1, 2, 3, 6, 7, 14, 21, 42}

45: {1, 3, 5, 9, 15, 45}

48: {1, 2, 3, 4, 6, 8, 12, 16, 24, 48}

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.



1.) **ADD** the integers using the number line.

$7 + 2 = \underline{9}$ $-5 + 6 = \underline{1}$ $-2 + 0 = \underline{-2}$

$-2 + 4 = \underline{2}$ $-2 + -3 = \underline{-5}$ $4 + -7 = \underline{-3}$

3.) Which integer is larger?

-3 or -4? -3 3 or -4? 3

-1 or 0? 0 -5 or -9? -5

The integer further to the LEFT is larger. True or False

5.) How many equal spaces between the two integers?

-3 and 3? 6 -2 and -1? 1

-6 and 0? 6 -2 and 5? 7

2.) **SUBTRACT** the integers using the number line.

$9 - 2 = \underline{7}$ $-1 - (+1) = \underline{-2}$

$-4 - (-2) = \underline{-2}$ $2 - (-3) = \underline{5}$

4.) Solve the string of operations (PEMDAS).

$2 \div 2 + 4 = \underline{5}$ $1 + 9 - 3 = \underline{7}$

$4 \div (-1 + 3) = \underline{2}$ $11 - 6 \div 6 = \underline{10}$

6.) Write the factor strings for each number.

40: {1, 2, 4, 5, 8, 10, 20, 40} 49: {1, 7, 49}

42: {1, 2, 3, 6, 7, 14, 21, 42}

45: {1, 3, 5, 9, 15, 45}

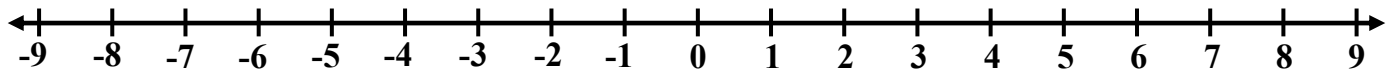
48: {1, 2, 3, 4, 6, 8, 12, 16, 24, 48}

Teaching Tip Number 14

Addition and Subtraction of Positive and Negative Integers

Adding and subtracting integers should be a straightforward process for three primary reasons. **First**, the numerical magnitude of the integers involved is typically small. **Second**, it utilizes the exact same arithmetic operations students have performed since the first grade, though they frequently fail to recognize this continuity. **Third**, many educators inadvertently hinder understanding by teaching "shortcuts" – such as "two negatives make a positive" – rather than focusing on the physical reality of the arithmetic process. Subtraction is fundamentally about finding the difference between two values, while addition is the act of summing them.

Let us work an example of each addition and subtraction that preserves a consistent arithmetic process.



ADDITION of integers examples:

Given $3 + 4 = ?$ Have students begin at either 3 or 4 and move the corresponding number of equal spaces. For example, starting at 3 and moving 4 spaces to the right results in 7; starting at 4 and moving 3 spaces also results in 7. Because we are summing two positive integers, a skill students have practiced since first grade, the starting point does not change the outcome. This same logic applies consistently when adding negative integers as well. Show students on a number line as is drawn above so they see the visual movement of the operations.

Given $-3 + 4 = ?$ Same pedagogy as above. Have students begin at either -3 or 4 and move the corresponding number of equal spaces. For example, starting at -3 and moving 4 spaces to the right results in 1; starting at 4 and moving 3 spaces to the left also results in 1. Importantly, the operations are consistent with addition and subtraction as they have always done. There is nothing magical happening with addition of negative integers. Same process as they learned in elementary school classrooms. It is imperative to show students this mathematical process on a number line as is drawn above so they see the visual movement of the operations.

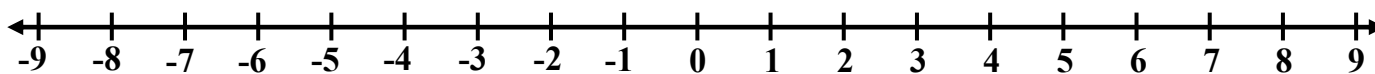
SUBTRACTION of integers examples:

Given $5 - 2 = ?$ Subtraction lacks the commutative property; unlike addition, the order of the numbers changes the result. Because of this, subtraction is a multi-step process. In early elementary grades, students typically subtract a smaller whole number from a larger one, focusing only on the "distance" or equal spaces between them.

For example, since there are 3 equal spaces between 5 and 2, students conclude that $5 - 2 = 3$. Because 5 is larger than 2, the result is a positive 3. However, it is only when students begin working with negative integers that they must develop a deeper, more absolute understanding of how subtraction operations function.

Teaching Tip Number 14

Addition and Subtraction of Positive and Negative Integers



SUBTRACTION of integers examples (Continued):

Given $-3 - (-2) = ?$ As mentioned previously, subtraction is a multi-step process. By following this method, students avoid common errors in integer subtraction and develop a concrete physical understanding of how these mathematical mechanics work.

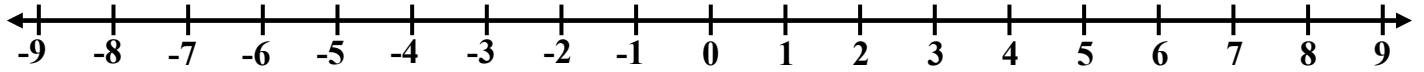
When subtracting -2 from -3 , *we first* identify that there is one equal space between the two integers (i.e. -2 and -3), making the numerical difference 1. *The second step* is to determine the correct integer sign of the computed difference (i.e. 1 in this example). Since -2 is greater than -3 , subtracting a larger integer (-2) from the smaller one (-3) results in a negative value. Thus, $-3 - (-2) = -1$. As in the other examples, a positive and negative number line is compulsory for students in learning this process.

Given $4 - (-3) = ?$ When subtracting -3 from 4 , *we first* identify that there are seven equal spaces between the two integers (i.e. -3 and 4), making the numerical difference 7. Again, *the second step* is to determine the correct integer sign of the computed difference (i.e. 7 in this example). Since -3 is less than 4 , subtracting a smaller integer (-3) from a larger one (4) yields a positive value. Thus, $4 - (-3) = +7$. As in the other examples, a positive and negative number line is compulsory for students in learning this process. **Note:** This summing operation explains why students are often taught that subtracting a negative number is equivalent to addition. In reality, they are adding the equal intervals between integers. However, this is poor pedagogy because it prioritizes a rote rule over a deep numerical understanding of the subtraction process itself.

This mathematical pedagogy of addition and subtraction of positive and negative integers mirrors the process of adding and subtracting decimals and student arithmetic understanding. In addition and subtraction of decimals, vertical alignment is essential to preserving place value. In reality, elementary students have **always** aligned decimal points; they simply remain unaware of the "elusive obviousness" of this practice. For instance, the operation, $3 + 2 = 5$ is functionally identical to $3. + 2. = 5.$ or $3.0 + 2.0 = 5.0$ Because decimal points are inherently aligned in all addition and subtraction, students should be taught this arithmetic truth directly. By making this connection explicit, educators can help students realize that decimal operations are not a separate, "special" category, but rather a consistent application of the same rules used for the addition and subtraction of whole numbers. Analogously, similar consistent rules apply for the addition and subtraction of positive and negative integers as they did with the same arithmetic operations of whole numbers.

In both a pragmatic and mathematical sense, subtraction does not truly exist as a distinct operation. It is more accurately defined as the addition of a negative number, or 'adding the inverse.' For example, the expression $a - b$ is functionally identical to $a + (-b)$. Following this logic, the operation $4 - (-3)$ is the same arithmetic operation as $4 + (3)$. However, most students struggle to grasp this qualitative concept without the support of a positive and negative number line as well as the repeated quantitative practice demonstrated in the above examples until they ingrain the concepts into long-term memory.

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.



1.) *ADD the integers using the number line.* 2.) *SUBTRACT the integers using the number line.*

$-5 + 2 = \underline{\quad}$ $-1 + 6 = \underline{\quad}$ $9 - 8 = \underline{\quad}$ $-9 - 2 = \underline{\quad}$ $-4 - 4 = \underline{\quad}$

$-2 + -4 = \underline{\quad}$ $-5 + 9 = \underline{\quad}$ $-2 - (-6) = \underline{\quad}$ $6 - (-2) = \underline{\quad}$ $-4 - (-3) = \underline{\quad}$

3.) *Find the missing number.*

$\frac{30}{60} = \frac{\square}{2}$ $\frac{11}{3} = \frac{33}{\square}$ $\frac{3}{7} = \frac{\square}{14}$

4.) *Solve the string of operations (PEMDAS).*

$10 - 2 \div 2 + 4 = \underline{\quad}$ $1 \times 9 - 3 = \underline{\quad}$

$8 \div (-1 + 5) = \underline{\quad}$ $11 - 24 \div 6 = \underline{\quad}$

5.) *Divide.*

$2\frac{1}{4} \div 1\frac{1}{3} = \square$

6.) *Write the factor strings for each number.*

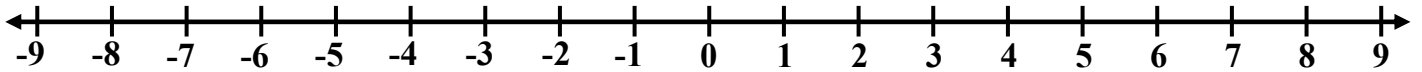
49: _____

50: _____

54: _____

56: _____

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.



1.) *ADD the integers using the number line.* 2.) *SUBTRACT the integers using the number line.*

$-5 + 2 = \underline{\quad}$ $-1 + 6 = \underline{\quad}$ $9 - 8 = \underline{\quad}$ $-9 - 2 = \underline{\quad}$ $-4 - 4 = \underline{\quad}$

$-2 + -4 = \underline{\quad}$ $-5 + 9 = \underline{\quad}$ $-2 - (-6) = \underline{\quad}$ $6 - (-2) = \underline{\quad}$ $-4 - (-3) = \underline{\quad}$

3.) *Find the missing number.*

$\frac{30}{60} = \frac{\square}{2}$ $\frac{11}{3} = \frac{33}{\square}$ $\frac{3}{7} = \frac{\square}{14}$

4.) *Solve the string of operations (PEMDAS).*

$10 - 2 \div 2 + 4 = \underline{\quad}$ $1 \times 9 - 3 = \underline{\quad}$

$8 \div (-1 + 5) = \underline{\quad}$ $11 - 24 \div 6 = \underline{\quad}$

6.) *Write the factor strings for each number.*

49: _____

50: _____

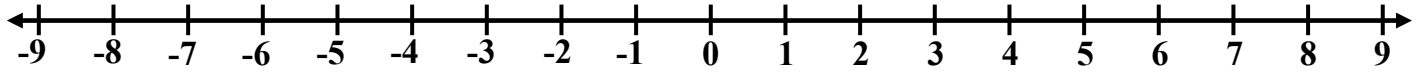
54: _____

56: _____

5.) *Divide.*

$2\frac{1}{4} \div 1\frac{1}{3} = \square$

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.



- 1.) ADD the integers using the number line. 2.) SUBTRACT the integers using the number line.

$$-5 + 2 = \underline{-3} \quad -1 + 6 = \underline{5} \quad 9 - 8 = \underline{1} \quad -9 - 2 = \underline{-11} \quad -4 - 4 = \underline{-8}$$

$$-2 + -4 = \underline{-6} \quad -5 + 9 = \underline{4} \quad -2 - (-6) = \underline{4} \quad 6 - (-2) = \underline{8} \quad -4 - (-3) = \underline{-1}$$

- 3.) Find the missing number.

$$\frac{30}{60} = \frac{\boxed{1}}{2} \quad \frac{11}{3} = \frac{33}{\boxed{9}} \quad \frac{3}{7} = \frac{\boxed{6}}{14}$$

- 4.) Solve the string of operations (PEMDAS).

$$10 - 2 \div 2 + 4 = \underline{13} \quad 1 \times 9 - 3 = \underline{6}$$

$$8 \div (-1 + 5) = \underline{2} \quad 11 - 24 \div 6 = \underline{7}$$

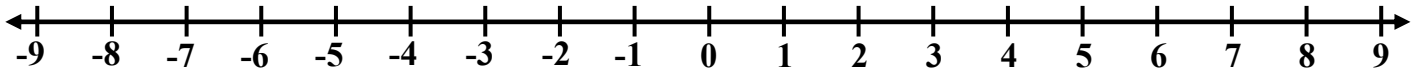
- 5.) Divide.

$$2\frac{1}{4} \div 1\frac{1}{3} = \boxed{1\frac{11}{16}} \quad \frac{9}{4} \times \frac{3}{4} = \boxed{\frac{27}{16}}$$

- 6.) Write the factor strings for each number.

49: {1, 7, 49}
 50: {1, 2, 5, 10, 25, 50}
 54: {1, 2, 6, 9, 27, 54}
 56: {1, 2, 4, 7, 8, 14, 28, 56}

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.



- 1.) ADD the integers using the number line. 2.) SUBTRACT the integers using the number line.

$$-5 + 2 = \underline{-3} \quad -1 + 6 = \underline{5} \quad 9 - 8 = \underline{1} \quad -9 - 2 = \underline{-11} \quad -4 - 4 = \underline{-8}$$

$$-2 + -4 = \underline{-6} \quad -5 + 9 = \underline{4} \quad -2 - (-6) = \underline{4} \quad 6 - (-2) = \underline{8} \quad -4 - (-3) = \underline{-1}$$

- 3.) Find the missing number.

$$\frac{30}{60} = \frac{\boxed{1}}{2} \quad \frac{11}{3} = \frac{33}{\boxed{9}} \quad \frac{3}{7} = \frac{\boxed{6}}{14}$$

- 4.) Solve the string of operations (PEMDAS).

$$10 - 2 \div 2 + 4 = \underline{13} \quad 1 \times 9 - 3 = \underline{6}$$

$$8 \div (-1 + 5) = \underline{2} \quad 11 - 24 \div 6 = \underline{7}$$

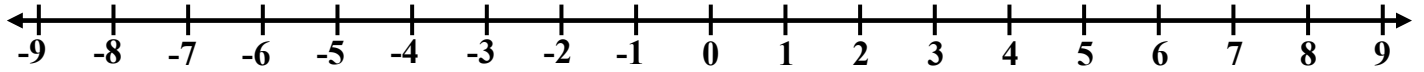
- 6.) Write the factor strings for each number.

49: {1, 7, 49}
 50: {1, 2, 5, 10, 25, 50}
 54: {1, 2, 6, 9, 27, 54}
 56: {1, 2, 4, 7, 8, 14, 28, 56}

- 5.) Divide.

$$2\frac{1}{4} \div 1\frac{1}{3} = \boxed{1\frac{11}{16}} \quad \frac{9}{4} \times \frac{3}{4} = \boxed{\frac{27}{16}}$$

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.



- 1.) *ADD* the integers using the number line. 2.) *SUBTRACT* the integers using the number line.

$-8 + -1 = \underline{\quad}$ $-5 + 6 = \underline{\quad}$ $7 - 2 = \underline{\quad}$ $-3 - 2 = \underline{\quad}$ $-9 - 9 = \underline{\quad}$

$4 + -4 = \underline{\quad}$ $-5 + 2 = \underline{\quad}$ $-4 - (5) = \underline{\quad}$ $8 - (-3) = \underline{\quad}$ $0 - (-3) = \underline{\quad}$

- 3.) Find the missing number.

$\frac{5}{2} = \frac{25}{\square}$ $\frac{50}{100} = \frac{1}{\square}$ $\frac{\square}{7} = \frac{6}{21}$

- 4.) Solve the string of operations (PEMDAS).

$8 + 6 \div 2 - 4 = \underline{\quad}$ $2 \times 9 \div 3 = \underline{\quad}$

$8 \times (-4 + 5) = \underline{\quad}$ $7 - 25 \div 5 = \underline{\quad}$

- 5.) Computing Exponents – Squaring – Perfect Squares

$2^2 = 2 \times 2 = \underline{\quad}$ $3^2 = 3 \times 3 = \underline{\quad}$

4 Squared = $4^2 = 4 \times 4 = \underline{\quad}$ $5^2 = \underline{\quad}$

- 6.) Write the factor strings for each number.

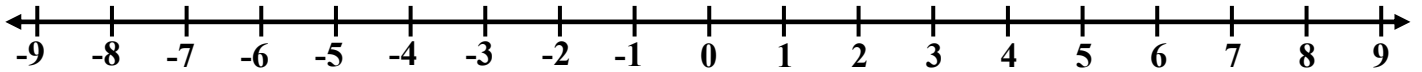
50: _____

54: _____

55: _____

56: _____

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.



- 1.) *ADD* the integers using the number line. 2.) *SUBTRACT* the integers using the number line.

$-8 + -1 = \underline{\quad}$ $-5 + 6 = \underline{\quad}$ $7 - 2 = \underline{\quad}$ $-3 - 2 = \underline{\quad}$ $-9 - 9 = \underline{\quad}$

$4 + -4 = \underline{\quad}$ $-5 + 2 = \underline{\quad}$ $-4 - (5) = \underline{\quad}$ $8 - (-3) = \underline{\quad}$ $0 - (-3) = \underline{\quad}$

- 3.) Find the missing number.

$\frac{5}{2} = \frac{25}{\square}$ $\frac{50}{100} = \frac{1}{\square}$ $\frac{\square}{7} = \frac{6}{21}$

- 4.) Solve the string of operations (PEMDAS).

$8 + 6 \div 2 - 4 = \underline{\quad}$ $2 \times 9 \div 3 = \underline{\quad}$

$8 \times (-4 + 5) = \underline{\quad}$ $7 - 25 \div 5 = \underline{\quad}$

- 6.) Write the factor strings for each number.

50: _____

54: _____

55: _____

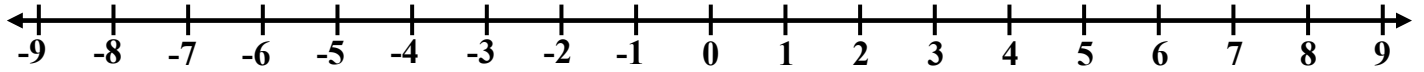
56: _____

- 5.) Computing Exponents – Squaring – Perfect Squares

$2^2 = 2 \times 2 = \underline{\quad}$ $3^2 = 3 \times 3 = \underline{\quad}$

4 Squared = $4^2 = 4 \times 4 = \underline{\quad}$ $5^2 = \underline{\quad}$

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.



1.) *ADD* the integers using the number line. 2.) *SUBTRACT* the integers using the number line.

$-8 + -1 = \underline{-9}$ $-5 + 6 = \underline{1}$ $7 - 2 = \underline{5}$ $-3 - 2 = \underline{-5}$ $-9 - 9 = \underline{-18}$

$4 + -4 = \underline{0}$ $-5 + 2 = \underline{-3}$ $-4 - (5) = \underline{-9}$ $8 - (-3) = \underline{11}$ $0 - (-3) = \underline{3}$

3.) Find the missing number.

$\frac{5}{2} = \frac{25}{\boxed{10}}$ $\frac{50}{100} = \frac{1}{\boxed{2}}$ $\frac{\boxed{2}}{7} = \frac{6}{21}$

4.) Solve the string of operations (PEMDAS).

$8 + 6 \div 2 - 4 = \underline{7}$ $2 \times 9 \div 3 = \underline{6}$

$8 \times (-4 + 5) = \underline{8}$ $7 - 25 \div 5 = \underline{2}$

5.) Computing Exponents – Squaring – Perfect Squares

$2^2 = 2 \times 2 = \underline{4}$ $3^2 = 3 \times 3 = \underline{9}$

4 Squared = $4^2 = 4 \times 4 = \underline{16}$ $5^2 = \underline{25}$

6.) Write the factor strings for each number.

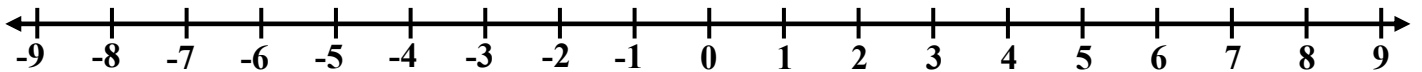
50: {1, 2, 5, 10, 25, 50}

54: {1, 2, 6, 9, 27, 54}

55: {1, 5, 11, 55}

56: {1, 2, 4, 7, 8, 14, 28, 56}

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.



1.) *ADD* the integers using the number line. 2.) *SUBTRACT* the integers using the number line.

$-8 + -1 = \underline{-9}$ $-5 + 6 = \underline{1}$ $7 - 2 = \underline{5}$ $-3 - 2 = \underline{-5}$ $-9 - 9 = \underline{-18}$

$4 + -4 = \underline{0}$ $-5 + 2 = \underline{-3}$ $-4 - (5) = \underline{-9}$ $8 - (-3) = \underline{11}$ $0 - (-3) = \underline{3}$

3.) Find the missing number.

$\frac{5}{2} = \frac{25}{\boxed{10}}$ $\frac{50}{100} = \frac{1}{\boxed{2}}$ $\frac{\boxed{2}}{7} = \frac{6}{21}$

4.) Solve the string of operations (PEMDAS).

$8 + 6 \div 2 - 4 = \underline{7}$ $2 \times 9 \div 3 = \underline{6}$

$8 \times (-4 + 5) = \underline{8}$ $7 - 25 \div 5 = \underline{2}$

6.) Write the factor strings for each number.

50: {1, 2, 5, 10, 25, 50}

54: {1, 2, 6, 9, 27, 54}

55: {1, 5, 11, 55}

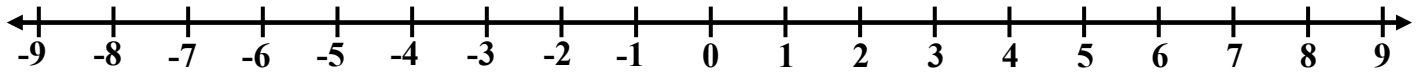
56: {1, 2, 4, 7, 8, 14, 28, 56}

5.) Computing Exponents – Squaring – Perfect Squares

$2^2 = 2 \times 2 = \underline{4}$ $3^2 = 3 \times 3 = \underline{9}$

4 Squared = $4^2 = 4 \times 4 = \underline{16}$ $5^2 = \underline{25}$

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.



1.) **MULTIPLY** the integers using the number line.

2.) **SUBTRACT** the integers using the number line.

$$2 \times 3 = \underline{\quad} \quad 3(2) = \underline{\quad} \quad (3)(2) = \underline{\quad} \quad -3 - 2 = \underline{\quad} \quad -9 - 9 = \underline{\quad}$$

$$-2 \times 3 = \underline{\quad} \quad (-4) \times (-2) = \underline{\quad} \quad -2(2) = \underline{\quad} \quad 8 - (-3) = \underline{\quad} \quad 0 - (-3) = \underline{\quad}$$

3.) Find the missing number.

4.) Solve the string of operations (PEMDAS).

$$\frac{\square}{6} = \frac{10}{12} \quad \frac{4}{8} = \frac{1}{\square} \quad \frac{5}{2} = \frac{25}{\square}$$

$$3 \times 10 \div 5 - 4 = \underline{\quad} \quad 2 \times 3 \div 3 = \underline{\quad}$$

$$3 \times (-2 + 6) = \underline{\quad} \quad 6 - 30 \div 5 = \underline{\quad}$$

5.) **Computing Exponents – Squaring – Perfect Squares**

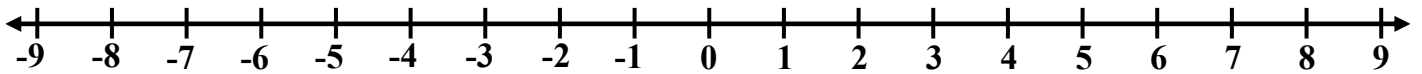
6.) Write the factor strings for each number.

$$1^2 = 1 \times 1 = \underline{\quad} \quad 4^2 = 4 \times 4 = \underline{\quad}$$

$$6 \text{ Squared} = 6^2 = 6 \times 6 = \underline{\quad} \quad 7^2 = \underline{\quad}$$

50: _____
54: _____
55: _____
56: _____

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.



1.) **MULTIPLY** the integers using the number line.

2.) **SUBTRACT** the integers using the number line.

$$2 \times 3 = \underline{\quad} \quad 3(2) = \underline{\quad} \quad (3)(2) = \underline{\quad} \quad -3 - 2 = \underline{\quad} \quad -9 - 9 = \underline{\quad}$$

$$-2 \times 3 = \underline{\quad} \quad (-4) \times (-2) = \underline{\quad} \quad -2(2) = \underline{\quad} \quad 8 - (-3) = \underline{\quad} \quad 0 - (-3) = \underline{\quad}$$

3.) Find the missing number.

4.) Solve the string of operations (PEMDAS).

$$\frac{\square}{6} = \frac{10}{12} \quad \frac{4}{8} = \frac{1}{\square} \quad \frac{5}{2} = \frac{25}{\square}$$

$$3 \times 10 \div 5 - 4 = \underline{\quad} \quad 2 \times 3 \div 3 = \underline{\quad}$$

$$3 \times (-2 + 6) = \underline{\quad} \quad 6 - 30 \div 5 = \underline{\quad}$$

5.) **Computing Exponents – Squaring – Perfect Squares**

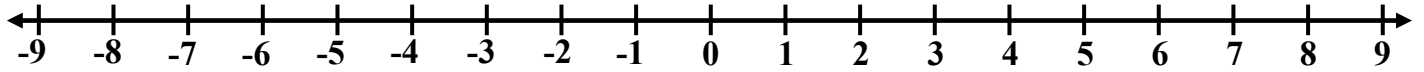
6.) Write the factor strings for each number.

$$1^2 = 1 \times 1 = \underline{\quad} \quad 4^2 = 4 \times 4 = \underline{\quad}$$

$$6 \text{ Squared} = 6^2 = 6 \times 6 = \underline{\quad} \quad 7^2 = \underline{\quad}$$

50: _____
54: _____
55: _____
56: _____

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.



- 1.) *MULTIPLY* the integers using the number line. 2.) *SUBTRACT* the integers using the number line.

$2 \times 3 = \underline{6}$ $3(2) = \underline{6}$ $(3)(2) = \underline{6}$ $-3 - 2 = \underline{-5}$ $-9 - 9 = \underline{-18}$

$-2 \times 3 = \underline{-6}$ $(-4) \times (-2) = \underline{8}$ $-2(2) = \underline{-4}$ $8 - (-3) = \underline{11}$ $0 - (-3) = \underline{3}$

- 3.) Find the missing number. 4.) Solve the string of operations (PEMDAS).

$\boxed{5} \over 6 = \frac{10}{12}$ $\frac{4}{8} = \frac{1}{\boxed{2}}$ $\frac{5}{2} = \frac{25}{\boxed{10}}$ $3 \times 10 \div 5 - 4 = \underline{2}$ $2 \times 3 \div 3 = \underline{2}$

$3 \times (-2 + 6) = \underline{12}$ $6 - 30 \div 5 = \underline{0}$

- 5.) Computing Exponents – Squaring – Perfect Squares

$1^2 = 1 \times 1 = \underline{1}$ $4^2 = 4 \times 4 = \underline{16}$

6 Squared = $6^2 = 6 \times 6 = \underline{36}$ $7^2 = \underline{49}$

- 6.) Write the factor strings for each number.

50: {1, 2, 5, 10, 25, 50}

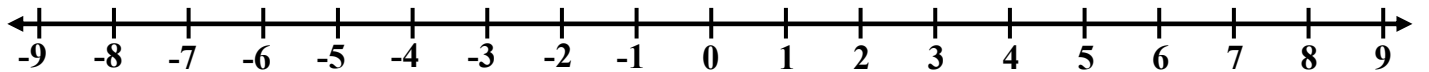
54: {1, 2, 6, 9, 27, 54}

55: {1, 5, 11, 55}

56: {1, 2, 4, 7, 8, 14, 28, 56}

$7^2 = \boxed{49}$

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.



- 1.) *MULTIPLY* the integers using the number line. 2.) *SUBTRACT* the integers using the number line.

$2 \times 3 = \underline{6}$ $3(2) = \underline{6}$ $(3)(2) = \underline{6}$ $-3 - 2 = \underline{-5}$ $-9 - 9 = \underline{-18}$

$-2 \times 3 = \underline{-6}$ $(-4) \times (-2) = \underline{8}$ $-2(2) = \underline{-4}$ $8 - (-3) = \underline{11}$ $0 - (-3) = \underline{3}$

- 3.) Find the missing number. 4.) Solve the string of operations (PEMDAS).

$\boxed{5} \over 6 = \frac{10}{12}$ $\frac{4}{8} = \frac{1}{\boxed{2}}$ $\frac{5}{2} = \frac{25}{\boxed{10}}$ $3 \times 10 \div 5 - 4 = \underline{2}$ $2 \times 3 \div 3 = \underline{2}$

$3 \times (-2 + 6) = \underline{12}$ $6 - 30 \div 5 = \underline{0}$

- 5.) Computing Exponents – Squaring – Perfect Squares 6.) Write the factor strings for each number.

$1^2 = 1 \times 1 = \underline{1}$ $4^2 = 4 \times 4 = \underline{16}$ 50: {1, 2, 5, 10, 25, 50}

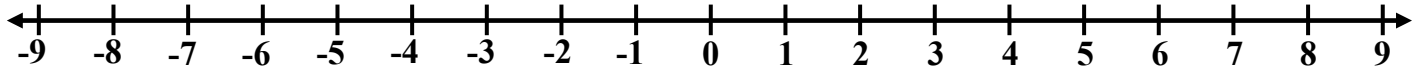
6 Squared = $6^2 = 6 \times 6 = \underline{36}$ $7^2 = \underline{49}$ 54: {1, 2, 6, 9, 27, 54}

55: {1, 5, 11, 55}

56: {1, 2, 4, 7, 8, 14, 28, 56}

$7^2 = \boxed{49}$

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.



1.) **MULTIPLY** the integers using the number line.

$3 \times 3 =$ _____ $3(3) =$ _____ $(3)(-3) =$ _____

$-3 \times 3 =$ _____ $(-3) \times (-3) =$ _____ $-3(-3) =$ _____

2.) **SUBTRACT** the integers using the number line.

$-6 - 2 =$ _____ $-9 - (+5) =$ _____

$3 - (-3) =$ _____ $0 - (-5) =$ _____

3.) Ring all the ratios that describes stars to circles.



3 to 2 2 to 3 3:2 2:3 $\frac{2}{3}$ $\frac{3}{2}$

4.) Solve the string of operations (PEMDAS).

$3 \times 10 \div 5 - 4 =$ _____ $2 - 3 \div 3 =$ _____

$3 \times (-2 + 0) =$ _____ $3 - 30 \div 10 =$ _____

5.) **Computing Exponents – Squaring – Perfect Squares**

$7^2 =$ _____ $8^2 = 8 \times 8 =$ _____

9 Squared = $9^2 = 9 \times 9 =$ _____ $10^2 =$ _____

6.) Write the factor strings for each number.

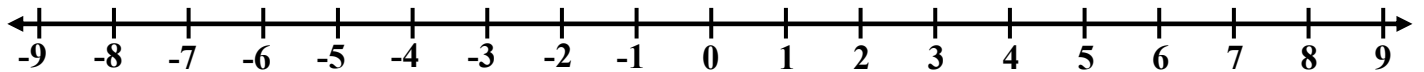
60: _____

63: _____

64: _____

70: _____

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.



1.) **MULTIPLY** the integers using the number line.

$3 \times 3 =$ _____ $3(3) =$ _____ $(3)(-3) =$ _____

$-3 \times 3 =$ _____ $(-3) \times (-3) =$ _____ $-3(-3) =$ _____

2.) **SUBTRACT** the integers using the number line.

$-6 - 2 =$ _____ $-9 - (+5) =$ _____

$3 - (-3) =$ _____ $0 - (-5) =$ _____

3.) Ring all the ratios that describes stars to circles.



3 to 2 2 to 3 3:2 2:3 $\frac{2}{3}$ $\frac{3}{2}$

4.) Solve the string of operations (PEMDAS).

$3 \times 10 \div 5 - 4 =$ _____ $2 - 3 \div 3 =$ _____

$3 \times (-2 + 0) =$ _____ $3 - 30 \div 10 =$ _____

5.) **Computing Exponents – Squaring – Perfect Squares**

$7^2 =$ _____ $8^2 = 8 \times 8 =$ _____

9 Squared = $9^2 = 9 \times 9 =$ _____ $10^2 =$ _____

6.) Write the factor strings for each number.

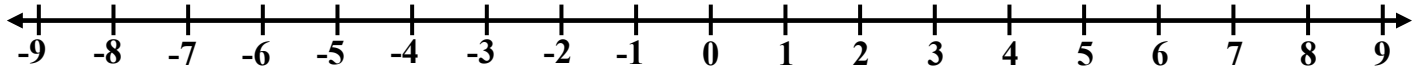
60: _____

63: _____

64: _____

70: _____

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.



1.) **MULTIPLY** the integers using the number line.

$3 \times 3 = \underline{9}$ $3(3) = \underline{9}$ $(3)(-3) = \underline{-9}$

$-3 \times 3 = \underline{-9}$ $(-3) \times (-3) = \underline{9}$ $-3(-3) = \underline{9}$

2.) **SUBTRACT** the integers using the number line.

$-6 - 2 = \underline{-8}$ $-9 - (+5) = \underline{-14}$

$3 - (-3) = \underline{6}$ $0 - (-5) = \underline{5}$

3.) Ring all the ratios that describes stars to circles.



3 to 2 2 to 3 3:2 2:3 $\frac{2}{3}$ $\frac{3}{2}$

4.) Solve the string of operations (PEMDAS).

$3 \times 10 \div 5 - 4 = \underline{2}$ $2 - 3 \div 3 = \underline{1}$

$3 \times (-2 + 0) = \underline{-6}$ $3 - 30 \div 10 = \underline{0}$

5.) Computing Exponents – Squaring – Perfect Squares

$7^2 = \underline{49}$ $8^2 = 8 \times 8 = \underline{64}$

9 Squared = $9^2 = 9 \times 9 = \underline{81}$ $10^2 = \underline{100}$ **10** **100**

6.) Write the factor strings for each number.

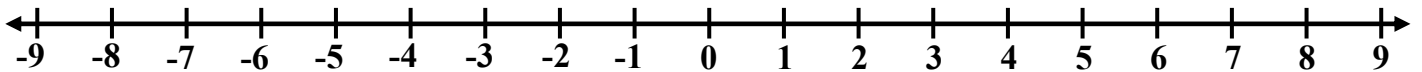
60: {1, 2, 3, 4, 5, 6, 12, 10, 15, 20, 30, 60}

63: {1, 3, 7, 9, 21, 63}

64: {1, 2, 4, 8, 16, 32, 64}

70: {1, 2, 7, 10, 35, 70}

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.



1.) **MULTIPLY** the integers using the number line.

$3 \times 3 = \underline{9}$ $3(3) = \underline{9}$ $(3)(-3) = \underline{-9}$

$-3 \times 3 = \underline{-9}$ $(-3) \times (-3) = \underline{9}$ $-3(-3) = \underline{9}$

2.) **SUBTRACT** the integers using the number line.

$-6 - 2 = \underline{-8}$ $-9 - (+5) = \underline{-14}$

$3 - (-3) = \underline{6}$ $0 - (-5) = \underline{5}$

3.) Ring all the ratios that describes stars to circles.



3 to 2 2 to 3 3:2 2:3 $\frac{2}{3}$ $\frac{3}{2}$

4.) Solve the string of operations (PEMDAS).

$3 \times 10 \div 5 - 4 = \underline{2}$ $2 - 3 \div 3 = \underline{1}$

$3 \times (-2 + 0) = \underline{-6}$ $3 - 30 \div 10 = \underline{0}$

5.) Computing Exponents – Squaring – Perfect Squares

$7^2 = \underline{49}$ $8^2 = 8 \times 8 = \underline{64}$

9 Squared = $9^2 = 9 \times 9 = \underline{81}$ $10^2 = \underline{100}$ **10** **100**

6.) Write the factor strings for each number.

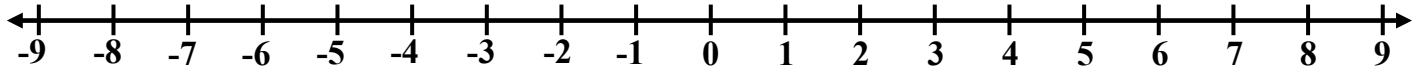
60: {1, 2, 3, 4, 5, 6, 12, 10, 15, 20, 30, 60}

63: {1, 3, 7, 9, 21, 63}

64: {1, 2, 4, 8, 16, 32, 64}

70: {1, 2, 7, 10, 35, 70}

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.



1.) **MULTIPLY.**

$3 \times 4 = \underline{\quad}$ $4(3) = \underline{\quad}$ $(4)(-3) = \underline{\quad}$
 $-3 \times 4 = \underline{\quad}$ $(-4) \times (-3) = \underline{\quad}$ $-3(-4) = \underline{\quad}$

2.) **DIVIDE** the integers using the number line.

$8 \div 2 = \underline{\quad}$ $-9 \div (-3) = \underline{\quad}$
 $8 \div (-2) = \underline{\quad}$ $-9 \div (3) = \underline{\quad}$

3.) Ring all the ratios that describes circles to stars.



3 to 2 2 to 3 3:2 2:3 $\frac{2}{3}$ $\frac{3}{2}$

4.) **Computing Exponents – Cubes - Volume**

$1^3 = 1 \times 1 \times 1 = \underline{\quad}$ $3^3 = 3 \times 3 \times 3 = \underline{\quad}$
 2 cubed = $2^3 = 2 \times 2 \times 2 = \underline{\quad}$

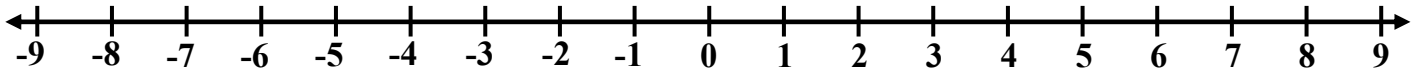
5.) **Computing Exponents – Squaring – Perfect Squares**

$5^2 = \underline{\quad}$ $8^2 = \underline{\quad}$ $9^2 = \underline{\quad}$ $3^2 = \underline{\quad}$
 $2^2 = \underline{\quad}$ $1^2 = \underline{\quad}$ $4^2 = \underline{\quad}$ $10^2 = \underline{\quad}$

6.) Write the factor strings for each number.

60: _____
 63: _____
 64: _____
 70: _____

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.



1.) **MULTIPLY.**

$3 \times 4 = \underline{\quad}$ $4(3) = \underline{\quad}$ $(4)(-3) = \underline{\quad}$
 $-3 \times 4 = \underline{\quad}$ $(-4) \times (-3) = \underline{\quad}$ $-3(-4) = \underline{\quad}$

2.) **DIVIDE** the integers using the number line.

$8 \div 2 = \underline{\quad}$ $-9 \div (-3) = \underline{\quad}$
 $8 \div (-2) = \underline{\quad}$ $-9 \div (3) = \underline{\quad}$

3.) Ring all the ratios that describes circles to stars.



3 to 2 2 to 3 3:2 2:3 $\frac{2}{3}$ $\frac{3}{2}$

4.) **Computing Exponents – Cubes - Volume**

$1^3 = 1 \times 1 \times 1 = \underline{\quad}$ $3^3 = 3 \times 3 \times 3 = \underline{\quad}$
 2 cubed = $2^3 = 2 \times 2 \times 2 = \underline{\quad}$

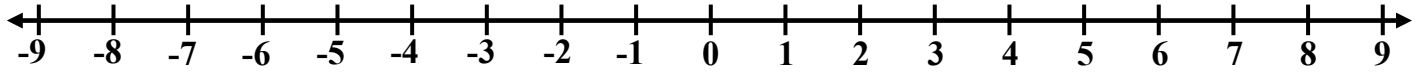
5.) **Computing Exponents – Squaring – Perfect Squares**

$5^2 = \underline{\quad}$ $8^2 = \underline{\quad}$ $9^2 = \underline{\quad}$ $3^2 = \underline{\quad}$
 $2^2 = \underline{\quad}$ $1^2 = \underline{\quad}$ $4^2 = \underline{\quad}$ $10^2 = \underline{\quad}$

6.) Write the factor strings for each number.

60: _____
 63: _____
 64: _____
 70: _____

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.



1.) **MULTIPLY.**

$3 \times 4 = \underline{12}$ $4(3) = \underline{12}$ $(4)(-3) = \underline{-12}$
 $-3 \times 4 = \underline{-12}$ $(-4) \times (-3) = \underline{12}$ $-3(-4) = \underline{12}$

2.) **DIVIDE** the integers using the number line.

$8 \div 2 = \underline{4}$ $-9 \div (-3) = \underline{3}$
 $8 \div (-2) = \underline{-4}$ $-9 \div (3) = \underline{-3}$

3.) Ring all the ratios that describes circles to stars.



3 to 2 2 to 3 3:2 2:3 $\frac{2}{3}$ $\frac{3}{2}$

4.) Computing Exponents – Cubes - Volume

$1^3 = 1 \times 1 \times 1 = \underline{1}$ $3^3 = 3 \times 3 \times 3 = \underline{27}$

2 cubed = $2^3 = 2 \times 2 \times 2 = \underline{8}$
Volume

5.) Computing Exponents – Squaring – Perfect Squares

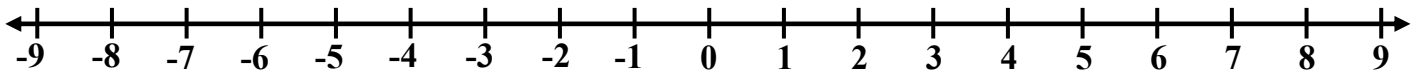
$5^2 = \underline{25}$ $8^2 = \underline{64}$ $9^2 = \underline{81}$ $3^2 = \underline{9}$
 $2^2 = \underline{4}$ $1^2 = \underline{1}$ $4^2 = \underline{16}$ $10^2 = \underline{100}$

Area

6.) Write the factor strings for each number.

- 60: {1, 2, 3, 4, 5, 6, 12, 10, 15, 20, 30, 60}
 63: {1, 3, 7, 9, 21, 63}
 64: {1, 2, 4, 8, 16, 32, 64}
 70: {1, 2, 7, 10, 35, 70}

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.



1.) **MULTIPLY.**

$3 \times 4 = \underline{12}$ $4(3) = \underline{12}$ $(4)(-3) = \underline{-12}$
 $-3 \times 4 = \underline{-12}$ $(-4) \times (-3) = \underline{12}$ $-3(-4) = \underline{12}$

2.) **DIVIDE** the integers using the number line.

$8 \div 2 = \underline{4}$ $-9 \div (-3) = \underline{3}$
 $8 \div (-2) = \underline{-4}$ $-9 \div (3) = \underline{-3}$

3.) Ring all the ratios that describes circles to stars.



3 to 2 2 to 3 3:2 2:3 $\frac{2}{3}$ $\frac{3}{2}$

4.) Computing Exponents – Cubes - Volume

$1^3 = 1 \times 1 \times 1 = \underline{1}$ $3^3 = 3 \times 3 \times 3 = \underline{27}$

2 cubed = $2^3 = 2 \times 2 \times 2 = \underline{8}$
Volume

5.) Computing Exponents – Squaring – Perfect Squares

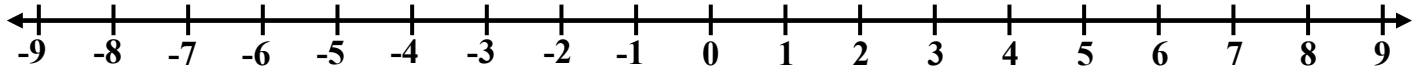
$5^2 = \underline{25}$ $8^2 = \underline{64}$ $9^2 = \underline{81}$ $3^2 = \underline{9}$
 $2^2 = \underline{4}$ $1^2 = \underline{1}$ $4^2 = \underline{16}$ $10^2 = \underline{100}$

Area

6.) Write the factor strings for each number.

- 60: {1, 2, 3, 4, 5, 6, 12, 10, 15, 20, 30, 60}
 63: {1, 3, 7, 9, 21, 63}
 64: {1, 2, 4, 8, 16, 32, 64}
 70: {1, 2, 7, 10, 35, 70}

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

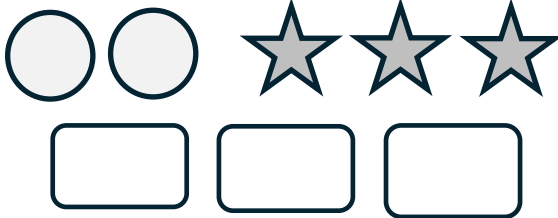


1.) **MULTIPLY.**

$5 \times 4 = \underline{\quad}$ $8(3) = \underline{\quad}$ $6(-4) = \underline{\quad}$ $6 \div 3 = \underline{\quad}$ $-6 \div (-2) = \underline{\quad}$
 $-3 \times 7 = \underline{\quad}$ $(-5) \times (-3) = \underline{\quad}$ $(-4)(-3) = \underline{\quad}$ $-9 \div -9 = \underline{\quad}$ $-8 \div (4) = \underline{\quad}$

2.) **DIVIDE** the integers using the number line.

3.) Write the 3 ratios that describes circles to stars.



4.) **Computing Exponents – Cubes - Volume**

$3^3 = 3 \times 3 \times 3 = \underline{\quad}$ $5^3 = 5 \times 5 \times 5 = \underline{\quad}$
 $4 \text{ cubed} = 4^3 = 4 \times 4 \times 4 = \underline{\quad}$

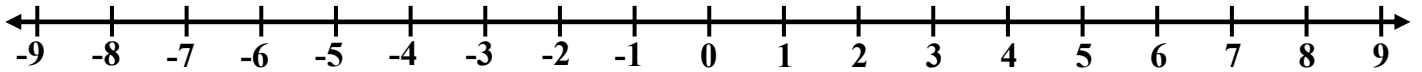
5.) **Computing Exponents – Squaring – Perfect Squares**

$7^2 = \underline{\quad}$ $9^2 = \underline{\quad}$ $5^2 = \underline{\quad}$ $3^2 = \underline{\quad}$
 $2^2 = \underline{\quad}$ $10^2 = \underline{\quad}$ $4^2 = \underline{\quad}$ $12^2 = \underline{\quad}$

6.) Write the **factor strings** for each number.

60: _____
 63: _____
 64: _____
 70: _____

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.



1.) **MULTIPLY.**

$5 \times 4 = \underline{\quad}$ $8(3) = \underline{\quad}$ $(-4)(-3) = \underline{\quad}$ $6 \div 3 = \underline{\quad}$ $-6 \div (-2) = \underline{\quad}$
 $-3 \times 7 = \underline{\quad}$ $(-5) \times (-3) = \underline{\quad}$ $6(-4) = \underline{\quad}$ $-9 \div -9 = \underline{\quad}$ $-8 \div (4) = \underline{\quad}$

2.) **DIVIDE** the integers using the number line.

3.) Write the 3 ratios that describes circles to stars.



4.) **Computing Exponents – Cubes - Volume**

$3^3 = 3 \times 3 \times 3 = \underline{\quad}$ $5^3 = 5 \times 5 \times 5 = \underline{\quad}$
 $4 \text{ cubed} = 4^3 = 4 \times 4 \times 4 = \underline{\quad}$

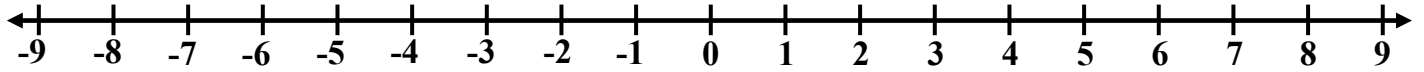
5.) **Computing Exponents – Squaring – Perfect Squares**

$7^2 = \underline{\quad}$ $9^2 = \underline{\quad}$ $5^2 = \underline{\quad}$ $3^2 = \underline{\quad}$
 $2^2 = \underline{\quad}$ $10^2 = \underline{\quad}$ $4^2 = \underline{\quad}$ $12^2 = \underline{\quad}$

6.) Write the **factor strings** for each number.

60: _____
 63: _____
 64: _____
 70: _____

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.



1.) **MULTIPLY.**

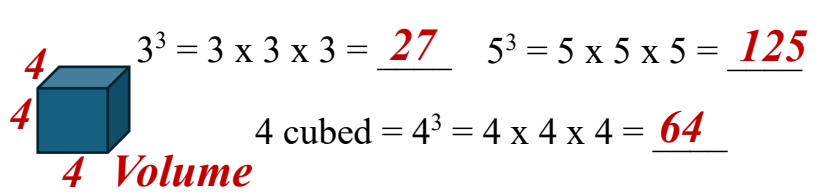
$5 \times 4 = \underline{20}$ $8(3) = \underline{24}$ $6(-4) = \underline{-24}$ $6 \div 3 = \underline{2}$ $-6 \div (-2) = \underline{3}$
 $-3 \times 7 = \underline{-21}$ $(-5) \times (-3) = \underline{15}$ $(-4)(-3) = \underline{12}$ $-9 \div -9 = \underline{1}$ $-8 \div (4) = \underline{-2}$

2.) **DIVIDE** the integers using the number line.

3.) Write the 3 ratios that describes circles to stars.



4.) Computing Exponents – Cubes - Volume



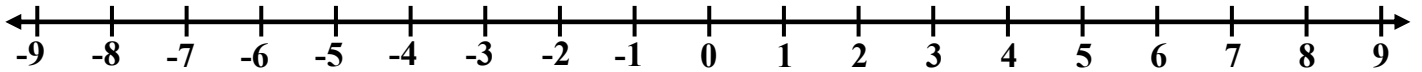
5.) Computing Exponents – Squaring – Perfect Squares

$7^2 = \underline{49}$ $9^2 = \underline{81}$ $5^2 = \underline{25}$ $3^2 = \underline{9}$
 $2^2 = \underline{4}$ $10^2 = \underline{100}$ $4^2 = \underline{16}$ $12^2 = \underline{144}$

6.) Write the factor strings for each number.

- 60: {1, 2, 3, 4, 5, 6, 12, 10, 15, 20, 30, 60}
 63: {1, 3, 7, 9, 21, 63}
 64: {1, 2, 4, 8, 16, 32, 64}
 70: {1, 2, 7, 10, 35, 70}

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

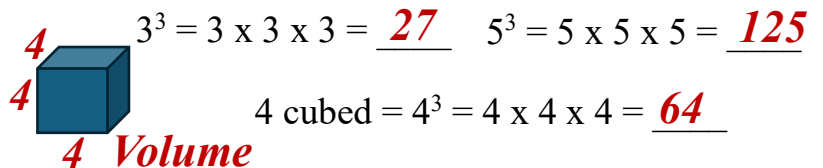


1.) **MULTIPLY.**

$5 \times 4 = \underline{20}$ $8(3) = \underline{24}$ $6(-4) = \underline{-24}$ $6 \div 3 = \underline{2}$ $-6 \div (-2) = \underline{3}$
 $-3 \times 7 = \underline{-21}$ $(-5) \times (-3) = \underline{15}$ $(-4)(-3) = \underline{12}$ $-9 \div -9 = \underline{1}$ $-8 \div (4) = \underline{-2}$

2.) **DIVIDE** the integers using the number line.

3.) Write the 3 ratios that describes circles to stars.



5.) Computing Exponents – Squaring – Perfect Squares

$7^2 = \underline{49}$ $9^2 = \underline{81}$ $5^2 = \underline{25}$ $3^2 = \underline{9}$
 $2^2 = \underline{4}$ $10^2 = \underline{100}$ $4^2 = \underline{16}$ $12^2 = \underline{144}$

6.) Write the factor strings for each number.

- 60: {1, 2, 3, 4, 5, 6, 12, 10, 15, 20, 30, 60}
 63: {1, 3, 7, 9, 21, 63}
 64: {1, 2, 4, 8, 16, 32, 64}
 70: {1, 2, 7, 10, 35, 70}

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) **MULTIPLY.**

$9 \times 4 = \underline{\quad}$ $-8(8) = \underline{\quad}$ $(-4)(9) = \underline{\quad}$

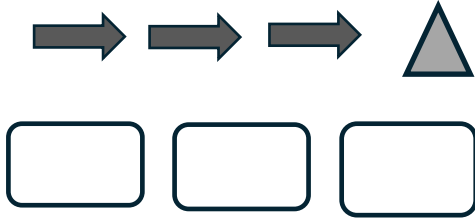
$9 \times -9 = \underline{\quad}$ $(-7) \times (-8) = \underline{\quad}$ $8(-4) = \underline{\quad}$

2.) **DIVIDE**

$-24 \div 3 = \underline{\quad}$ $-30 \div -2 = \underline{\quad}$

$81 \div -9 = \underline{\quad}$ $-40 \div (4) = \underline{\quad}$

3.) Write the 3 ratios that describes arrows to triangles.



4.) **Computing Exponents – Cubes - Volume**

$1^3 = \underline{\quad}$ $4^3 = \underline{\quad}$ $2^3 = \underline{\quad}$

$5^3 = \underline{\quad}$ $6^3 = \underline{\quad}$ $10^3 = \underline{\quad}$

$(\frac{1}{2})^3 = \underline{\quad} \times \underline{\quad} \times \underline{\quad} = \underline{\quad}$ ← *Think Cubes*

5.) **Computing Exponents – Squaring – Perfect Squares**

$4^2 = \underline{\quad}$ $9^2 = \underline{\quad}$ $3^2 = \underline{\quad}$ $2^2 = \underline{\quad}$

$(\frac{1}{2})^2 = \underline{\quad}$ $10^2 = \underline{\quad}$ $6^2 = \underline{\quad}$ $12^2 = \underline{\quad}$

6.) Write the factor strings for each number.

72: _____

81: _____

100: _____

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) **MULTIPLY.**

$9 \times 4 = \underline{\quad}$ $-8(8) = \underline{\quad}$ $(-4)(9) = \underline{\quad}$

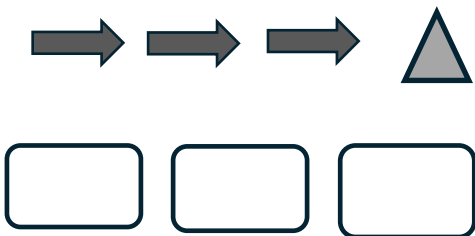
$9 \times -9 = \underline{\quad}$ $(-7) \times (-8) = \underline{\quad}$ $8(-4) = \underline{\quad}$

2.) **DIVIDE**

$-24 \div 3 = \underline{\quad}$ $-30 \div -2 = \underline{\quad}$

$81 \div -9 = \underline{\quad}$ $-40 \div (4) = \underline{\quad}$

3.) Write the 3 ratios that describes arrows to triangles.



4.) **Computing Exponents – Cubes - Volume**

$1^3 = \underline{\quad}$ $4^3 = \underline{\quad}$ $2^3 = \underline{\quad}$

$5^3 = \underline{\quad}$ $6^3 = \underline{\quad}$ $10^3 = \underline{\quad}$

$(\frac{1}{2})^3 = \underline{\quad} \times \underline{\quad} \times \underline{\quad} = \underline{\quad}$ ← *Think Cubes*

6.) Write the factor strings for each number.

72: _____

81: _____

100: _____

5.) **Computing Exponents – Squaring – Perfect Squares**

$4^2 = \underline{\quad}$ $9^2 = \underline{\quad}$ $3^2 = \underline{\quad}$ $2^2 = \underline{\quad}$

$(\frac{1}{2})^2 = \underline{\quad}$ $10^2 = \underline{\quad}$ $6^2 = \underline{\quad}$ $12^2 = \underline{\quad}$

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) **MULTIPLY.**

$9 \times 4 = \underline{36}$ $-8(8) = \underline{-64}$ $(-4)(9) = \underline{-36}$

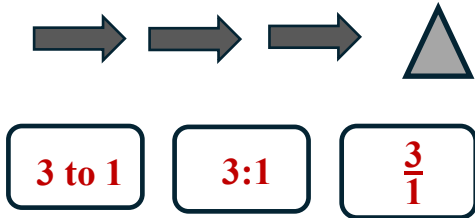
$9 \times -9 = \underline{-81}$ $(-7) \times (-8) = \underline{56}$ $8(-4) = \underline{-32}$

2.) **DIVIDE**

$-24 \div 3 = \underline{-8}$ $-30 \div -2 = \underline{15}$

$81 \div -9 = \underline{-9}$ $-40 \div (4) = \underline{-10}$

3.) Write the 3 ratios that describes arrows to triangles.



4.) **Computing Exponents – Cubes - Volume**

$1^3 = \underline{1}$ $4^3 = \underline{64}$ $2^3 = \underline{8}$

$5^3 = \underline{125}$ $6^3 = \underline{216}$ $10^3 = \underline{1,000}$

$(\frac{1}{2})^3 = \underline{\frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} = \frac{1}{8}}$ ← Think Cubes

5.) **Computing Exponents – Squaring – Perfect Squares**

$4^2 = \underline{16}$ $9^2 = \underline{81}$ $3^2 = \underline{9}$ $2^2 = \underline{4}$

$(\frac{1}{2})^2 = \underline{\frac{1}{4}}$ $10^2 = \underline{100}$ $6^2 = \underline{36}$ $12^2 = \underline{144}$

6.) Write the factor strings for each number.

72: {1, 2, 3, 8, 9, 24, 36, 72}

81: {1, 3, 9, 27, 81}

100: {1, 2, 4, 5, 10, 25, 50, 100}

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) **MULTIPLY.**

$9 \times 4 = \underline{36}$ $-8(8) = \underline{-64}$ $(-4)(9) = \underline{-36}$

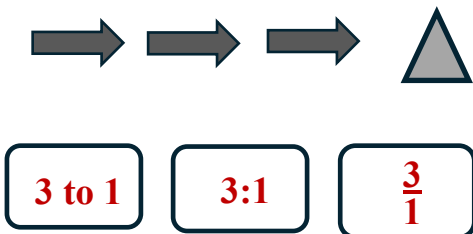
$9 \times -9 = \underline{-81}$ $(-7) \times (-8) = \underline{56}$ $8(-4) = \underline{-32}$

2.) **DIVIDE**

$-24 \div 3 = \underline{-8}$ $-30 \div -2 = \underline{15}$

$81 \div -9 = \underline{-9}$ $-40 \div (4) = \underline{-10}$

3.) Write the 3 ratios that describes arrows to triangles.



4.) **Computing Exponents – Cubes - Volume**

$1^3 = \underline{1}$ $4^3 = \underline{64}$ $2^3 = \underline{8}$

$5^3 = \underline{125}$ $6^3 = \underline{216}$ $10^3 = \underline{1,000}$

$(\frac{1}{2})^3 = \underline{\frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} = \frac{1}{8}}$ ← Think Cubes

5.) **Computing Exponents – Squaring – Perfect Squares**

$4^2 = \underline{16}$ $9^2 = \underline{81}$ $3^2 = \underline{9}$ $2^2 = \underline{4}$

$(\frac{1}{2})^2 = \underline{\frac{1}{4}}$ $10^2 = \underline{100}$ $6^2 = \underline{36}$ $12^2 = \underline{144}$

6.) Write the factor strings for each number.

72: {1, 2, 3, 8, 9, 24, 36, 72}

81: {1, 3, 9, 27, 81}

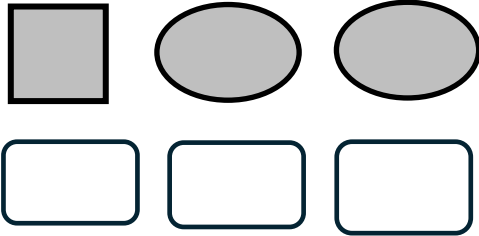
100: {1, 2, 4, 5, 10, 25, 50, 100}

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) **MULTIPLY or DIVIDE.**

$7 \times 4 = \underline{\quad}$ $-8(-4) = \underline{\quad}$ $-27 \div 3 = \underline{\quad}$ $2 \times -9 = \underline{\quad}$ $-50 \div -2 = \underline{\quad}$
 $-9 \times -8 = \underline{\quad}$ $(-7) \times (9) = \underline{\quad}$ $63 \div -9 = \underline{\quad}$ $-36 \div (4) = \underline{\quad}$ $5 \times 4 = \underline{\quad}$

2.) Write the 3 ratios that describes squares to ovals.



3.) Circle all the Prime Numbers.

- | | | | | |
|---|---|----|---|----|
| 2 | 7 | 12 | 9 | 11 |
| 4 | 3 | 10 | 5 | 13 |
| 6 | 8 | 14 | 1 | 15 |

4.) Computing Exponents – Squaring – Perfect Squares

5.) Write the factor strings for each number.

$9^2 = \underline{\quad}$ $(\frac{1}{3})^2 = \underline{\quad}$ $(\frac{1}{8})^2 = \underline{\quad}$ $(\frac{3}{5})^2 = \underline{\quad}$
 $(\frac{1}{2})^2 = \underline{\quad}$ $3^2 = \underline{\quad}$ $12^2 = \underline{\quad}$ $(\frac{2}{3})^2 = \underline{\quad}$

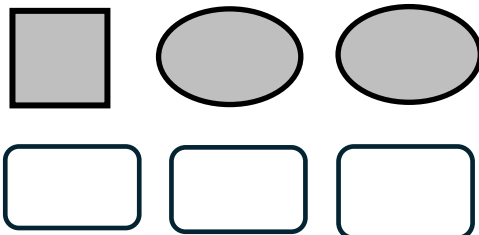
72: _____
 81: _____
 100: _____

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) **MULTIPLY or DIVIDE.**

$7 \times 4 = \underline{\quad}$ $-8(-4) = \underline{\quad}$ $-27 \div 3 = \underline{\quad}$ $2 \times -9 = \underline{\quad}$ $-50 \div -2 = \underline{\quad}$
 $-9 \times -8 = \underline{\quad}$ $(-7) \times (9) = \underline{\quad}$ $63 \div -9 = \underline{\quad}$ $-36 \div (4) = \underline{\quad}$ $5 \times 4 = \underline{\quad}$

2.) Write the 3 ratios that describes squares to ovals.



3.) Circle all the Prime Numbers.

- | | | | | |
|---|---|----|---|----|
| 2 | 7 | 12 | 9 | 11 |
| 4 | 3 | 10 | 5 | 13 |
| 6 | 8 | 14 | 1 | 15 |

4.) Computing Exponents – Squaring – Perfect Squares

5.) Write the factor strings for each number.

$9^2 = \underline{\quad}$ $(\frac{1}{3})^2 = \underline{\quad}$ $(\frac{1}{8})^2 = \underline{\quad}$ $(\frac{3}{5})^2 = \underline{\quad}$
 $(\frac{1}{2})^2 = \underline{\quad}$ $3^2 = \underline{\quad}$ $12^2 = \underline{\quad}$ $(\frac{2}{3})^2 = \underline{\quad}$

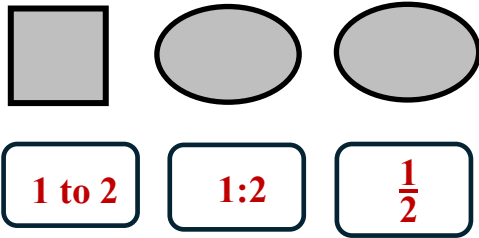
72: _____
 81: _____
 100: _____

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) **MULTIPLY or DIVIDE.**

$7 \times 4 = \underline{28}$ $-8(-4) = \underline{32}$ $-27 \div 3 = \underline{-9}$ $2 \times -9 = \underline{-18}$ $-50 \div -2 = \underline{25}$
 $-9 \times -8 = \underline{72}$ $(-7) \times (9) = \underline{-63}$ $63 \div -9 = \underline{-7}$ $-36 \div (4) = \underline{-9}$ $5 \times 4 = \underline{20}$

2.) Write the 3 ratios that describes squares to ovals.



3.) Circle all the Prime Numbers.

1 is NOT prime or composite

2	7	12	9	11
4	3	10	5	13
6	8	14	1	15

4.) Computing Exponents – Squaring – Perfect Squares

5.) Write the factor strings for each number.

$9^2 = \underline{81}$ $(\frac{1}{3})^2 = \underline{\frac{1}{9}}$ $(\frac{1}{8})^2 = \underline{\frac{1}{64}}$ $(\frac{3}{5})^2 = \underline{\frac{9}{25}}$
 $(\frac{1}{2})^2 = \underline{\frac{1}{4}}$ $3^2 = \underline{9}$ $12^2 = \underline{144}$ $(\frac{2}{3})^2 = \underline{\frac{4}{9}}$

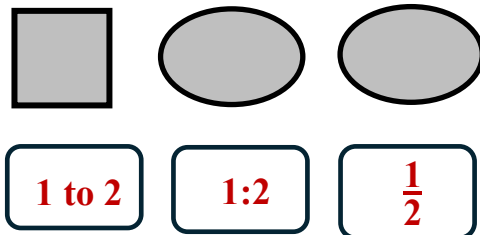
72: {1, 2, 3, 8, 9, 24, 36, 72}
 81: {1, 3, 9, 27, 81}
 100: {1, 2, 4, 5, 10, 25, 50, 100}

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

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72: {1, 2, 3, 8, 9, 24, 36, 72}
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Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) **MULTIPLY or DIVIDE.**

$-9(-4) = \underline{\quad}$ $7 \times 8 = \underline{\quad}$ $-27 \div -3 = \underline{\quad}$ $4 \times -6 = \underline{\quad}$ $-50 \div -5 = \underline{\quad}$
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2.) Beth collected coins. She collected 9 nickels for every 2 dimes. If she has 18 dimes, and the ratio of nickels and dimes remains the same, how many nickels does she have?

$\frac{9}{2} = \frac{\boxed{\quad}}{18}$ Nickels: _____

3.) **Circle all the Prime Numbers.**

- | | | | | |
|----|---|----|----|----|
| 4 | 8 | 1 | 19 | 11 |
| 2 | 3 | 10 | 5 | 13 |
| 21 | 7 | 17 | 25 | 12 |

4.) **Multiplying using Exponents.**

$2^3 = \underline{\quad}$ $(\frac{1}{7})^2 = \underline{\quad}$ $(\frac{1}{8})^2 = \underline{\quad}$ $(\frac{2}{3})^2 = \underline{\quad}$
 $(\frac{1}{2})^3 = \underline{\quad}$ $3^3 = \underline{\quad}$ $5^2 = \underline{\quad}$ $(\frac{2}{3})^3 = \underline{\quad}$

5.) **Write the factor strings for each number.**

72: _____
 81: _____
 100: _____

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

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$-9(-4) = \underline{\quad}$ $7 \times 8 = \underline{\quad}$ $-27 \div -3 = \underline{\quad}$ $4 \times -6 = \underline{\quad}$ $-50 \div -5 = \underline{\quad}$
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5.) **Write the factor strings for each number.**

72: _____
 81: _____
 100: _____

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) **MULTIPLY or DIVIDE.**

$-9(-4) = \underline{36}$ $7 \times 8 = \underline{56}$ $-27 \div -3 = \underline{9}$ $4 \times -6 = \underline{-24}$ $-50 \div -5 = \underline{10}$
 $-9 \times 3 = \underline{-27}$ $(-7) \times (-9) = \underline{63}$ $64 \div -8 = \underline{-8}$ $-40 \div (4) = \underline{-10}$ $8 \times 4 = \underline{32}$

2.) Beth collected coins. She collected 9 nickels for every 2 dimes. If she has 18 dimes, and the ratio of nickels and dimes remains the same, how many nickels does she have?

$\frac{9}{2} = \frac{\boxed{81}}{18}$ Nickels: 81

3.) **Circle all the Prime Numbers.**

4 8 1 **19** **11**
2 **3** 10 **5** **13**
 21 **7** **17** 25 12

1 is NOT prime or composite

4.) **Multiplying using Exponents.**

$2^3 = \underline{8}$ $(\frac{1}{7})^2 = \underline{\frac{1}{49}}$ $(\frac{1}{8})^2 = \underline{\frac{1}{64}}$ $(\frac{2}{3})^2 = \underline{\frac{4}{9}}$
 $(\frac{1}{2})^3 = \underline{\frac{1}{8}}$ $3^3 = \underline{27}$ $5^2 = \underline{25}$ $(\frac{2}{3})^3 = \underline{\frac{8}{27}}$

5.) **Write the factor strings for each number.**

72: {1, 2, 3, 8, 9, 24, 36, 72}
 81: {1, 3, 9, 27, 81}
 100: {1, 2, 4, 5, 10, 25, 50, 100}

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

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72: {1, 2, 3, 8, 9, 24, 36, 72}
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Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) **MULTIPLY or DIVIDE.**

$-9(2) = \underline{\quad}$ $-7 \times 8 = \underline{\quad}$ $-36 \div -3 = \underline{\quad}$ $4 \times -6 = \underline{\quad}$ $-60 \div -5 = \underline{\quad}$
 $-9 \times -3 = \underline{\quad}$ $(-6) \times (6) = \underline{\quad}$ $56 \div 8 = \underline{\quad}$ $-36 \div (-4) = \underline{\quad}$ $3 \times 5 = \underline{\quad}$

2.) If the ratio for boys to girls at the sixth-grade dance is 7 to 5, how many boys are at the dance if there are 45 girls?

Boys: _____

3.) **Circle all the Prime Numbers.**

1 17 19 4 11
13 21 10 5 2
3 7 25 8 12

4.) **Multiply exponents or compute the missing exponent.**

$4 \square = 16$ $(\frac{1}{8})^2 = \underline{\quad}$ $(\frac{1}{3})^3 = \underline{\quad}$ $(\frac{6}{9})^2 = \underline{\quad}$
 $(\frac{1}{2})^4 = \underline{\quad}$ $2 \square = 8$ $12^2 = \underline{\quad}$ $(\frac{4}{5})^2 = \underline{\quad}$

5.) **Write the factor strings for each number.**

72: _____
 81: _____
 100: _____

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

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$\frac{7}{5} = \frac{\boxed{63}}{45}$ Boys: 63

3.) **Circle all the Prime Numbers.**

1 is NOT prime or composite

1	17	19	4	11
13	21	10	5	2
3	7	25	8	12

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$4^{\boxed{2}} = 16$ $(\frac{1}{8})^2 = \frac{1}{64}$ $(\frac{1}{3})^3 = \frac{1}{27}$ $(\frac{6}{9})^2 = \frac{36}{81}$
 $(\frac{1}{2})^4 = \frac{1}{16}$ $2^{\boxed{3}} = 8$ $12^2 = 144$ $(\frac{4}{5})^2 = \frac{16}{25}$

5.) **Write the factor strings for each number.**

72: {1, 2, 3, 8, 9, 24, 36, 72}
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Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Convert decimals to percents. Move decimal twice.

0.25 = ____% 0.18 = ____% 0.2 = ____%

0.51 = ____% 0.246 = ____% 1.25 = ____%

0.91 = ____% 0.4 = ____% 0.40 = ____%

3.) John is counting cars to trucks. He calculated a ratio of 4 cars for every 7 trucks. If he totaled 28 cars, how many trucks were there?

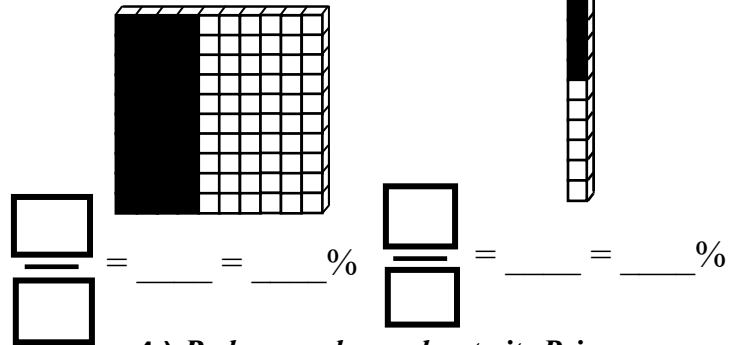
Trucks: _____

5.) Multiply exponents or compute the missing exponent.

$2^{\square} = 8$ $(-\frac{1}{8})^2 = \underline{\hspace{1cm}}$ $(-\frac{1}{3})^3 = \underline{\hspace{1cm}}$ $(\frac{2}{6})^2 = \underline{\hspace{1cm}}$

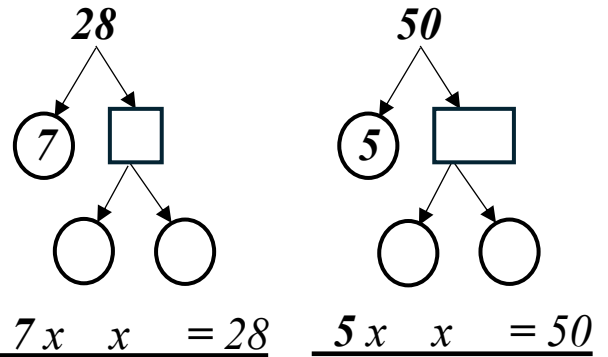
$(\frac{1}{2})^3 = \underline{\hspace{1cm}}$ $2^{\square} = 16$ $-12^2 = \underline{\hspace{1cm}}$ $(-\frac{4}{5})^2 = \underline{\hspace{1cm}}$

2.) Write the fraction, decimal and percent.



4.) Reduce each number to its Primes.

Prime Factorization.



Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

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0.25 = ____% 0.18 = ____% 0.2 = ____%

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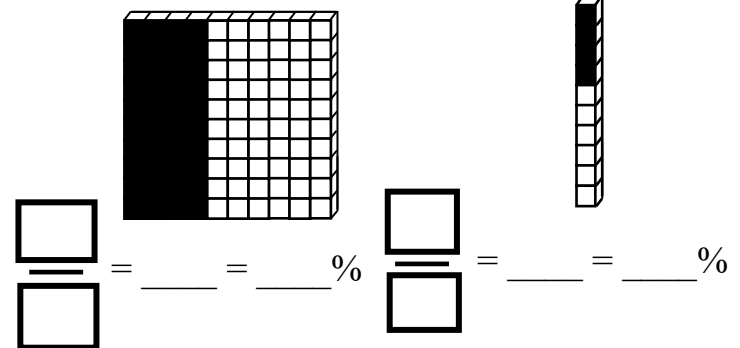
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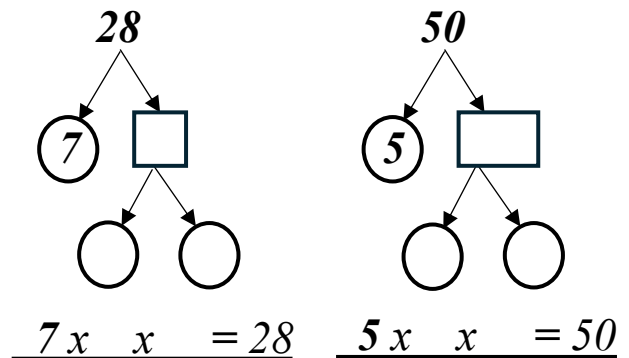
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2.) Write the fraction, decimal and percent.



4.) Reduce each number to its Primes.

Prime Factorization.



Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

Percent means PER 100 – literally! Repeat mantra until mastered.

- 1.) Convert decimals to percents. Move decimal twice. 2.) Write the fraction, decimal and percent.

0.25 = 25 % 0.18 = 18 % 0.2 = 20 %

0.51 = 51 % 0.246 = 24.6 % 1.25 = 125 %

0.91 = 91 % 0.4 = 40 % 0.40 = 40 %

- 3.) John is counting cars to trucks. He calculated a ratio of 4 cars for every 7 trucks. If he totaled 28 cars, how many trucks were there?

$\frac{4}{7} = \frac{28}{\boxed{49}}$

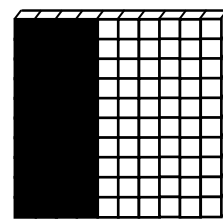
Trucks: 49 *Circle primes, so it is easy to write out final equation.*

- 5.) Multiply exponents or compute the missing exponent.

$2^{\boxed{3}} = 8$ $(-\frac{1}{8})^2 = \frac{1}{\boxed{64}}$ $(-\frac{1}{3})^3 = -\frac{1}{\boxed{27}}$ $(\frac{2}{6})^2 = \frac{4}{\boxed{36}}$

$(\frac{1}{2})^3 = \frac{1}{\boxed{8}}$ $2^{\boxed{4}} = 16$ $-12^2 = \boxed{144}$ $(-\frac{4}{5})^2 = \frac{16}{\boxed{25}}$

Practice with negative bases until mastered.



40 pennies out of 100 = 4 dimes out of 10

And/or

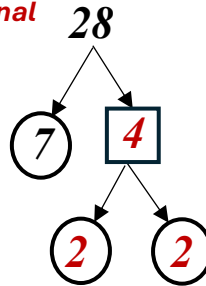
$40/100 = 4/10$



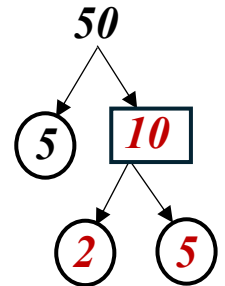
$\frac{\boxed{40}}{\boxed{100}} = 0.40 = 40\%$ $\frac{\boxed{4}}{\boxed{10}} = 0.4 = 40\%$

- 4.) Reduce each number to its Primes.

Prime Factorization.



$7 \times 2 \times 2 = 28$



$5 \times 2 \times 5 = 50$

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

- 1.) Convert decimals to percents. Move decimal twice. 2.) Write the fraction, decimal and percent.

0.25 = 25 % 0.18 = 18 % 0.2 = 20 %

0.51 = 51 % 0.246 = 24.6 % 1.25 = 125 %

0.91 = 91 % 0.4 = 40 % 0.40 = 40 %

Percent means PER 100 – literally! Repeat mantra until mastered.

- 3.) John is counting cars to trucks. He calculated a ratio of 4 cars for every 7 trucks. If he totaled 28 cars, how many trucks were there?

$\frac{4}{7} = \frac{28}{\boxed{49}}$

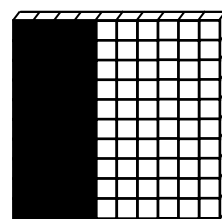
Trucks: 49 *Circle primes, so it is easy to write out final equation.*

- 5.) Multiply exponents or compute the missing exponent.

$2^{\boxed{3}} = 8$ $(-\frac{1}{8})^2 = \frac{1}{\boxed{64}}$ $(-\frac{1}{3})^3 = -\frac{1}{\boxed{27}}$ $(\frac{2}{6})^2 = \frac{4}{\boxed{36}}$

$(\frac{1}{2})^3 = \frac{1}{\boxed{8}}$ $2^{\boxed{4}} = 16$ $-12^2 = \boxed{144}$ $(-\frac{4}{5})^2 = \frac{16}{\boxed{25}}$

Practice with negative bases until mastered.



40 pennies out of 100 = 4 dimes out of 10

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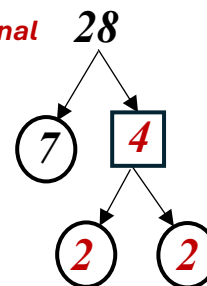
$40/100 = 4/10$



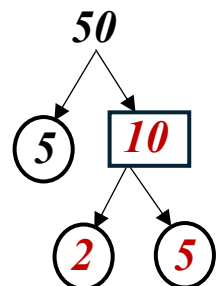
$\frac{\boxed{40}}{\boxed{100}} = 0.40 = 40\%$ $\frac{\boxed{4}}{\boxed{10}} = 0.4 = 40\%$

- 4.) Reduce each number to its Primes.

Prime Factorization.



$7 \times 2 \times 2 = 28$



$5 \times 2 \times 5 = 50$

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Convert decimals to percents. Move decimal twice.

0.02 = ____% 0.071 = ____% 0.8 = ____%

2.21 = ____% 0.039 = ____% 1.02 = ____%

1.91 = ____% 0.2 = ____% 0.60 = ____%

3.) If there are 3 feet in 1 yard, how many feet are in 18 yards? Use a **ratio** to compute the equivalent feet.

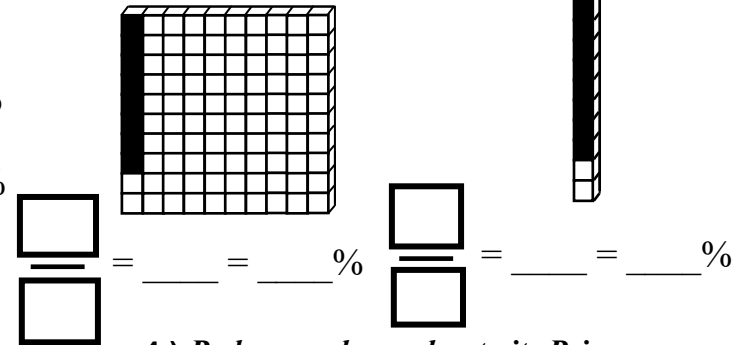
Feet: _____

5.) Multiply exponents or compute the missing exponent.

$4^{\square} = 1$ $(-\frac{1}{8})^2 = \underline{\quad}$ $4^{\square} = 4$ $(\frac{2}{6})^2 = \underline{\quad}$

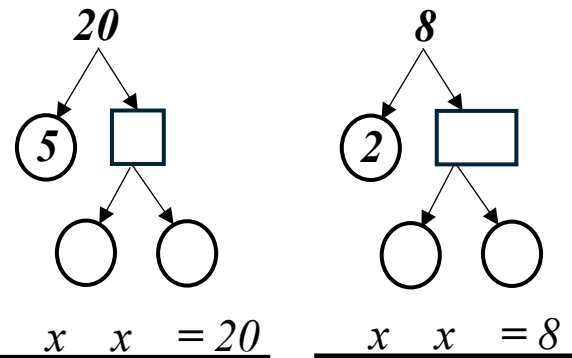
$(-\frac{1}{2})^3 = \underline{\quad}$ $-2^{\square} = -8$ $-3^3 = \underline{\quad}$ $(-\frac{4}{5})^2 = \underline{\quad}$

2.) Write the fraction, decimal and percent.



4.) Reduce each number to its Primes.

Prime Factorization.



Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Convert decimals to percents. Move decimal twice.

0.02 = ____% 0.071 = ____% 0.8 = ____%

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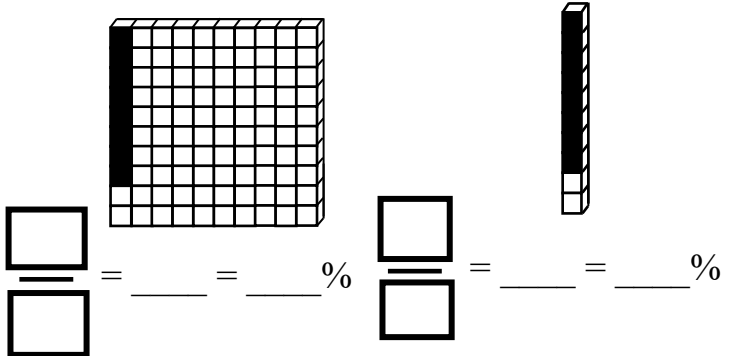
Feet: _____

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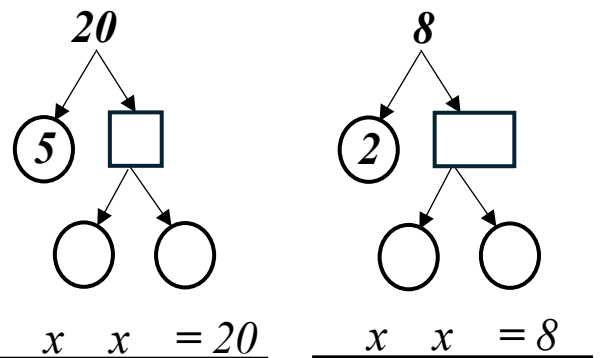
$(-\frac{1}{2})^3 = \underline{\quad}$ $-2^{\square} = -8$ $-3^3 = \underline{\quad}$ $(-\frac{4}{5})^2 = \underline{\quad}$

2.) Write the fraction, decimal and percent.



4.) Reduce each number to its Primes.

Prime Factorization.



Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

Percent means PER 100 – literally! Repeat mantra until mastered.

- 1.) Convert decimals to percents. Move decimal twice. 2.) Write the fraction, decimal and percent.

0.02 = 2 % 0.071 = 7.1 % 0.8 = 80 %

2.21 = 221 % 0.039 = 3.9 % 1.02 = 102 %

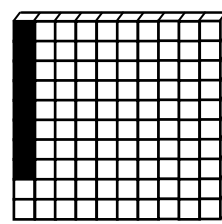
1.91 = 191 % 0.2 = 20 % 0.60 = 60 %

- 3.) If there are 3 feet in 1 yard, how many feet are in 18 yards? Use a **ratio** to compute the equivalent feet.

$$\frac{1}{3} = \frac{18}{\boxed{54}}$$

Feet: 54

Circle primes, so it is easy to write out final equation.



80 pennies out of 100 = 8 dimes out of 10

And/or →

80/100 = 8/10

$$\frac{\boxed{8}}{\boxed{100}} = 0.08 = \underline{8} \%$$

$$\frac{\boxed{8}}{\boxed{10}} = 0.8 = \underline{80} \%$$

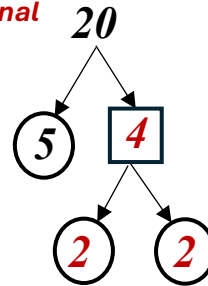
- 5.) Multiply exponents or compute the missing exponent.

4 ^{$\boxed{0}$} = 1 $(-\frac{1}{8})^2 = \frac{1}{\boxed{64}}$ 4 ^{$\boxed{1}$} = 4 $(\frac{2}{6})^2 = \frac{4}{\boxed{36}}$

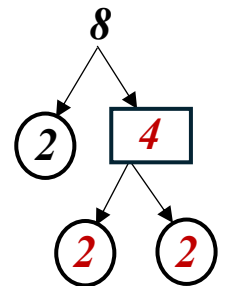
$(-\frac{1}{2})^3 = -\frac{1}{\boxed{8}}$ -2 ^{$\boxed{3}$} = -8 -3³ = -27 $(-\frac{4}{5})^2 = \frac{16}{\boxed{25}}$

Practice with negative bases until mastered.

- 4.) Reduce each number to its Primes. Prime Factorization.



5 x 2 x 2 = 20



2 x 2 x 2 = 8

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

- 1.) Convert decimals to percents. Move decimal twice. 2.) Write the fraction, decimal and percent.

0.02 = 2 % 0.071 = 7.1 % 0.8 = 80 %

2.21 = 221 % 0.039 = 3.9 % 1.02 = 102 %

1.91 = 191 % 0.2 = 20 % 0.60 = 60 %

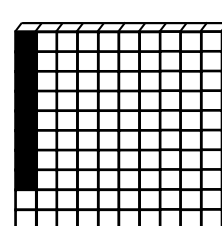
Percent means PER 100 – literally! Repeat mantra until mastered.

- 3.) If there are 3 feet in 1 yard, how many feet are in 18 yards? Use a **ratio** to compute the equivalent feet.

$$\frac{1}{3} = \frac{18}{\boxed{54}}$$

Feet: 54

Circle primes, so it is easy to write out final equation.



80 pennies out of 100 = 8 dimes out of 10

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$$\frac{\boxed{8}}{\boxed{100}} = 0.08 = \underline{8} \%$$

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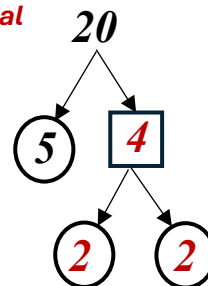
- 5.) Multiply exponents or compute the missing exponent.

4 ^{$\boxed{0}$} = 1 $(-\frac{1}{8})^2 = \frac{1}{\boxed{64}}$ 4 ^{$\boxed{1}$} = 4 $(\frac{2}{6})^2 = \frac{4}{\boxed{36}}$

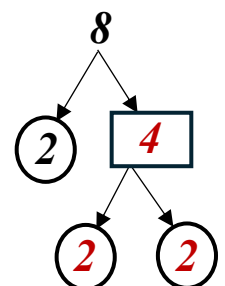
$(-\frac{1}{2})^3 = -\frac{1}{\boxed{8}}$ -2 ^{$\boxed{3}$} = -8 -3³ = -27 $(-\frac{4}{5})^2 = \frac{16}{\boxed{25}}$

Practice with negative bases until mastered.

- 4.) Reduce each number to its Primes. Prime Factorization.



5 x 2 x 2 = 20



2 x 2 x 2 = 8

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Convert decimals to percents. Move decimal twice.

0.01 = ____% 0.146 = ____% 0.3 = ____%

4.44 = ____% 0.055 = ____% 3.02 = ____%

1.09 = ____% 0.1 = ____% 0.78 = ____%

3.) If there are 2,000 pounds in 1 ton, how many pounds are in 7 tons? Use a **ratio** to compute the equivalent pounds.

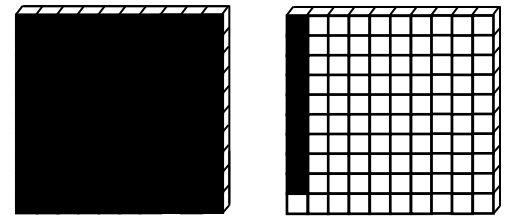
pounds: _____

5.) Multiply exponents or compute the missing exponent.

$6^{\square} = 1$ $(-\frac{1}{3})^{\square} = -\frac{1}{27}$ $-2^5 = \underline{\hspace{2cm}}$ $(\frac{5}{7})^2 = \underline{\hspace{2cm}}$

$(-\frac{1}{2})^4 = \underline{\hspace{2cm}}$ $-2^{\square} = -8$ $7^{\square} = 7$ $(-\frac{5}{7})^2 = \underline{\hspace{2cm}}$

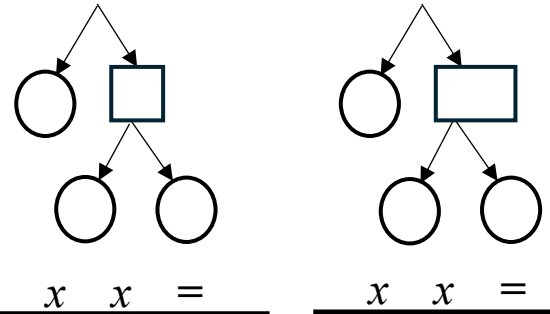
2.) Write the fraction, decimal and percent.



$\frac{\square}{\square} = \underline{\hspace{2cm}} = \underline{\hspace{2cm}}\%$

4.) Reduce each number to its Primes.

30 Prime Factorization. 12



Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Convert decimals to percents. Move decimal twice.

0.01 = ____% 0.146 = ____% 0.3 = ____%

4.44 = ____% 0.055 = ____% 3.02 = ____%

1.09 = ____% 0.1 = ____% 0.78 = ____%

3.) If there are 2,000 pounds in 1 ton, how many pounds are in 7 tons? Use a **ratio** to compute the equivalent pounds.

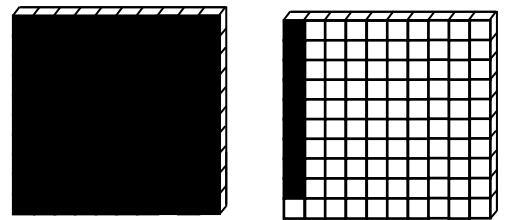
pounds: _____

5.) Multiply exponents or compute the missing exponent.

$6^{\square} = 1$ $(-\frac{1}{3})^{\square} = -\frac{1}{27}$ $-2^5 = \underline{\hspace{2cm}}$ $(\frac{5}{7})^2 = \underline{\hspace{2cm}}$

$(-\frac{1}{2})^4 = \underline{\hspace{2cm}}$ $-2^{\square} = -8$ $7^{\square} = 7$ $(-\frac{5}{7})^2 = \underline{\hspace{2cm}}$

2.) Write the fraction, decimal and percent.

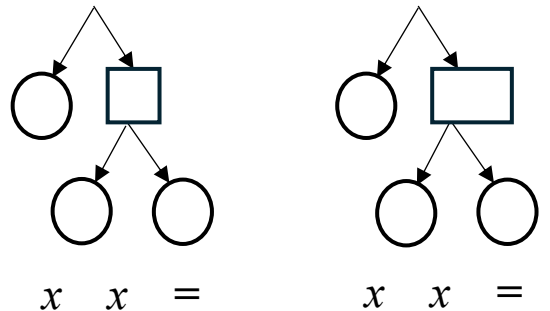


$\frac{\square}{\square} = \underline{\hspace{2cm}} = \underline{\hspace{2cm}}\%$

4.) Reduce each number to its Primes.

Prime Factorization.

30 12



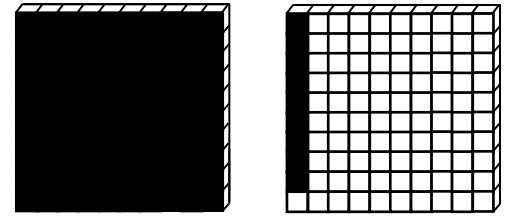
Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

Percent means PER 100 – literally! Repeat mantra until mastered.

1.) Convert decimals to percents. Move decimal twice.

0.01 = 1 % 0.146 = 14.6 % 0.3 = 30 %
 4.44 = 444 % 0.055 = 5.5 % 3.02 = 302 %
 1.09 = 109 % 0.1 = 10 % 0.78 = 78 %

2.) Write the fraction, decimal and percent.



$\frac{109}{100} = 1.09 = 109\%$

3.) If there are 2,000 pounds in 1 ton, how many pounds are in 7 tons? Use a **ratio** to compute the equivalent pounds.

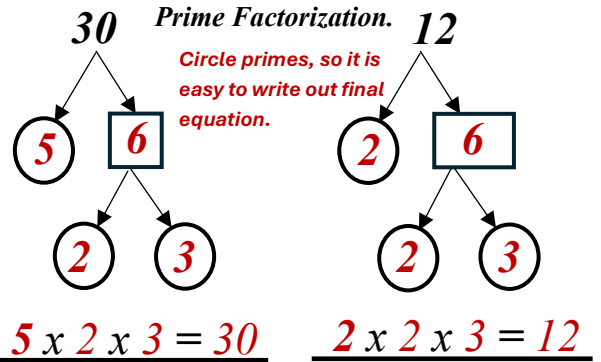
$\frac{1}{2,000} = \frac{7}{14,000}$ pounds: 14,000

5.) Multiply exponents or compute the missing exponent.

$6^{\boxed{0}} = 1$ $(-\frac{1}{3})^{\boxed{3}} = -\frac{1}{27}$ $-2^5 = \underline{-32}$ $(\frac{5}{7})^2 = \frac{25}{49}$
 $(-\frac{1}{2})^4 = \frac{1}{16}$ $-2^{\boxed{3}} = -8$ $7^{\boxed{1}} = 7$ $(-\frac{5}{7})^2 = \frac{25}{49}$

Practice with negative bases until mastered.

4.) Reduce each number to its Primes.



Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Convert decimals to percents. Move decimal twice.

0.01 = 1 % 0.146 = 14.6 % 0.3 = 30 %
 4.44 = 444 % 0.055 = 5.5 % 3.02 = 302 %
 1.09 = 109 % 0.1 = 10 % 0.78 = 78 %

Percent means PER 100 – literally! Repeat mantra until mastered.

3.) If there are 2,000 pounds in 1 ton, how many pounds are in 7 tons? Use a **ratio** to compute the equivalent pounds.

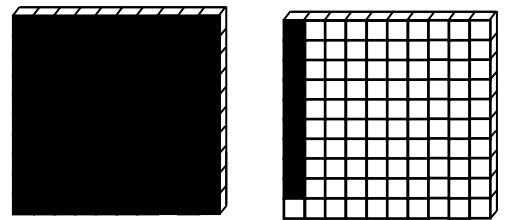
$\frac{1}{2,000} = \frac{7}{14,000}$ pounds: 14,000

5.) Multiply exponents or compute the missing exponent.

$6^{\boxed{0}} = 1$ $(-\frac{1}{3})^{\boxed{3}} = -\frac{1}{27}$ $-2^5 = \underline{-32}$ $(\frac{5}{7})^2 = \frac{25}{49}$
 $(-\frac{1}{2})^4 = \frac{1}{16}$ $-2^{\boxed{3}} = -8$ $7^{\boxed{1}} = 7$ $(-\frac{5}{7})^2 = \frac{25}{49}$

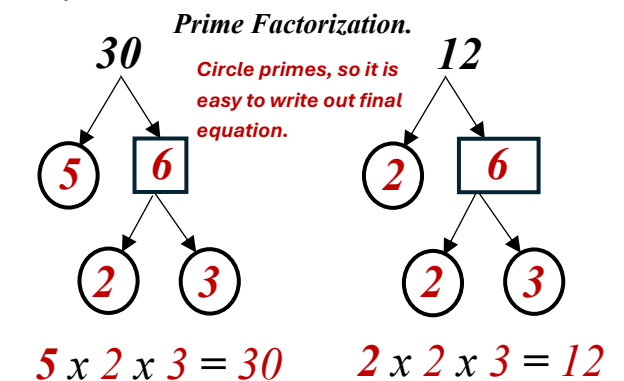
Practice with negative bases until mastered.

2.) Write the fraction, decimal and percent.



$\frac{109}{100} = 1.09 = 109\%$

4.) Reduce each number to its Primes.



Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Convert the fractions to decimals to percents.

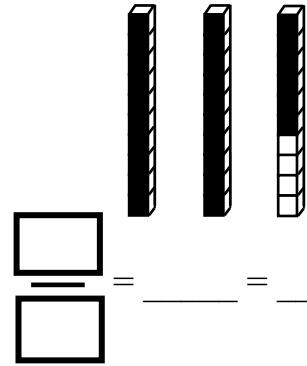
$$\frac{1}{4} = \underline{0.25} = \underline{25} \% \quad \frac{1}{2} = \underline{\quad} = \underline{\quad} \%$$

$$\frac{3}{4} = \underline{\quad} = \underline{\quad} \% \quad \frac{3}{10} = \underline{\quad} = \underline{\quad} \%$$

3.) If there are 5,280 feet in 1 mile, how many feet are in 3 miles? Use a **ratio** to compute the equivalent feet.

Feet: _____

2.) Write the fraction, decimal and percent.



4.) Reduce each number to its Primes.

24 *Prime Factorization.* 15

5.) Multiply exponents or compute the missing exponent.

$$3^{\square} = 1 \quad \left(-\frac{1}{3}\right)^{\square} = -\frac{1}{27} \quad -12^2 = \underline{\quad} \quad \left(\frac{1}{2}\right)^2 = \underline{\quad}$$

$$\left(-\frac{1}{3}\right)^3 = \underline{\quad} \quad -2^{\square} = 16 \quad 2^{\square} = 2 \quad \left(-\frac{3}{4}\right)^2 = \underline{\quad}$$

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Convert the fractions to decimals to percents.

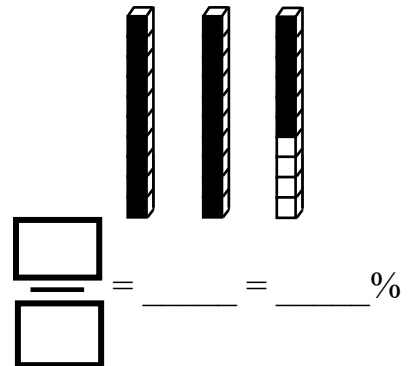
$$\frac{1}{4} = \underline{0.25} = \underline{25} \% \quad \frac{1}{2} = \underline{\quad} = \underline{\quad} \%$$

$$\frac{3}{4} = \underline{\quad} = \underline{\quad} \% \quad \frac{3}{10} = \underline{\quad} = \underline{\quad} \%$$

3.) If there are 5,280 feet in 1 mile, how many feet are in 3 miles? Use a **ratio** to compute the equivalent feet.

Feet: _____

2.) Write the fraction, decimal and percent.



4.) Reduce each number to its Primes.

24 *Prime Factorization.* 15

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$$3^{\square} = 1 \quad \left(-\frac{1}{3}\right)^{\square} = -\frac{1}{27} \quad -12^2 = \underline{\quad} \quad \left(\frac{1}{2}\right)^2 = \underline{\quad}$$

$$\left(-\frac{1}{3}\right)^3 = \underline{\quad} \quad -2^{\square} = 16 \quad 2^{\square} = 2 \quad \left(-\frac{3}{4}\right)^2 = \underline{\quad}$$

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

Percent means PER 100 – literally! Repeat mantra until mastered.

1.) Convert the fractions to decimals to percents.

$$\frac{1}{4} = \underline{0.25} = \underline{25} \% \quad \frac{1}{2} = \underline{0.50} = \underline{50} \%$$

$$\frac{3}{4} = \underline{0.75} = \underline{75} \% \quad \frac{3}{10} = \underline{0.3} = \underline{30} \%$$

3.) If there are 5,280 feet in 1 mile, how many feet are in 3 miles? Use a **ratio** to compute the equivalent feet.

$$\frac{1}{5,280} = \frac{3}{\boxed{15,840}} \quad \text{Feet: } \underline{15,840}$$

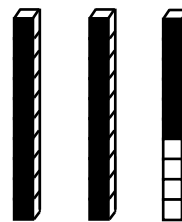
5.) Multiply exponents or compute the missing exponent.

$$3^{\boxed{0}} = 1 \quad \left(-\frac{1}{3}\right)^{\boxed{3}} = -\frac{1}{27} \quad -12^2 = \underline{144} \quad \left(\frac{1}{2}\right)^2 = \underline{\frac{1}{4}}$$

$$\left(-\frac{1}{3}\right)^3 = \underline{-\frac{1}{27}} \quad -2^{\boxed{4}} = 16 \quad 2^{\boxed{1}} = 2 \quad \left(-\frac{3}{4}\right)^2 = \underline{\frac{9}{16}}$$

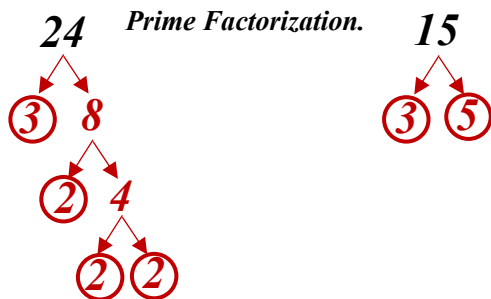
Practice with negative bases until mastered.

2.) Write the fraction, decimal and percent.



$$\frac{\boxed{26}}{\boxed{10}} = \underline{2.6} = \underline{260} \%$$

4.) Reduce each number to its Primes.



$$\underline{2 \times 2 \times 2 \times 3 = 24}$$

$$\underline{5 \times 3 = 15}$$

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Convert the fractions to decimals to percents.

$$\frac{1}{4} = \underline{0.25} = \underline{25} \% \quad \frac{1}{2} = \underline{0.50} = \underline{50} \%$$

$$\frac{3}{4} = \underline{0.75} = \underline{75} \% \quad \frac{3}{10} = \underline{0.3} = \underline{30} \%$$

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3.) If there are 5,280 feet in 1 mile, how many feet are in 3 miles? Use a **ratio** to compute the equivalent feet.

$$\frac{1}{5,280} = \frac{3}{\boxed{15,840}} \quad \text{Feet: } \underline{15,840}$$

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$$3^{\boxed{0}} = 1 \quad \left(-\frac{1}{3}\right)^{\boxed{3}} = -\frac{1}{27} \quad -12^2 = \underline{144} \quad \left(\frac{1}{2}\right)^2 = \underline{\frac{1}{4}}$$

$$\left(-\frac{1}{3}\right)^3 = \underline{-\frac{1}{27}} \quad -2^{\boxed{4}} = 16 \quad 2^{\boxed{1}} = 2 \quad \left(-\frac{3}{4}\right)^2 = \underline{\frac{9}{16}}$$

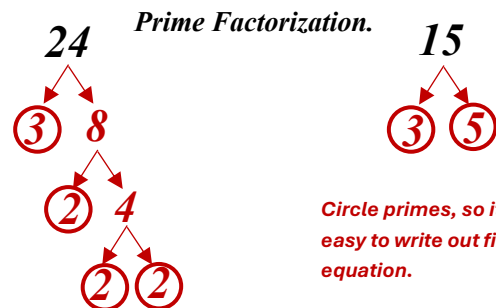
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$$\frac{\boxed{26}}{\boxed{10}} = \underline{2.6} = \underline{260} \%$$

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Circle primes, so it is easy to write out final equation.

$$\underline{2 \times 2 \times 2 \times 3 = 24}$$

$$\underline{5 \times 3 = 15}$$

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) *Convert the fractions to decimals to percents.*

$$\frac{1}{4} = \underline{\quad} = \underline{\quad}\% \quad \frac{1}{2} = \underline{\quad} = \underline{\quad}\%$$

$$\frac{3}{20} = \underline{\quad} = \underline{\quad}\% \quad \frac{7}{50} = \underline{\quad} = \underline{\quad}\%$$

3.) Jasper answered 15 out of 20 questions correctly on the pop quiz in mathematics. What percentage grade did the teacher write on his paper?

Grade: _____%

5.) Solve the string of operations (PEMDAS).

$$-4 \times 10 \div (5 - 3)^2 = \underline{\quad} \quad (2 \times 1)^3 \div 2 = \underline{\quad}$$

2.) In a science experiment, Betty used a 5:2 ratio of water to oil. Complete the table using that ratio.

Liquid	Ratio 1	Ratio 2	Ratio 3
Water	5		20
Oil	2		

4.) *Reduce each number to its Primes.*
Prime Factorization.

36

18

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) *Convert the fractions to decimals to percents.*

$$\frac{1}{4} = \underline{\quad} = \underline{\quad}\% \quad \frac{1}{2} = \underline{\quad} = \underline{\quad}\%$$

$$\frac{3}{20} = \underline{\quad} = \underline{\quad}\% \quad \frac{7}{50} = \underline{\quad} = \underline{\quad}\%$$

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4.) *Reduce each number to its Primes.*
Prime Factorization.

36

18

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Convert the fractions to decimals to percents.

$$\frac{1}{4} \stackrel{\times 25}{\underset{\times 25}{=}} \underline{0.25} = \underline{25} \% \quad \frac{1}{2} \stackrel{\times 50}{\underset{\times 50}{=}} \underline{0.50} = \underline{50} \%$$

$$\frac{3}{20} \stackrel{\times 5}{\underset{\times 5}{=}} \underline{0.15} = \underline{15} \% \quad \frac{7}{50} \stackrel{\times 2}{\underset{\times 2}{=}} \underline{0.14} = \underline{14} \%$$

Percent means PER 100 – literally! Repeat mantra until mastered.

3.) Jasper answered 15 out of 20 questions correctly on the pop quiz in mathematics. What percentage grade did the teacher write on his paper?

$$\frac{15}{20} \stackrel{\times 5}{\underset{\times 5}{=}} \frac{75}{100} \quad \text{Grade: } \underline{75} \%$$

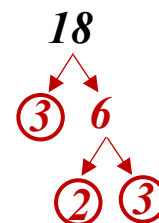
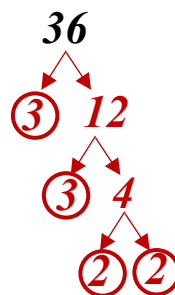
5.) Solve the string of operations (PEMDAS).

$$\begin{aligned} -4 \times 10 \div (5 - 3)^2 &= \underline{-10} & (2 \times 1)^3 \div 2 &= \underline{4} \\ -4 \times 10 \div (2)^2 &= \underline{\quad} & (2)^3 \div 2 &= \underline{\quad} \\ -4 \times 10 \div 4 &= \underline{\quad} & 8 \div 2 &= \underline{4} \\ -40 \div 4 &= \underline{-10} \end{aligned}$$

2.) In a science experiment, Betty used a 5:2 ratio of water to oil. Complete the table using that ratio.

Liquid	Ratio 1	Ratio 2	Ratio 3
Water	5	10 or 15	20
Oil	2	4 or 6	8

4.) Reduce each number to its Primes.
Prime Factorization.



$$\underline{3 \times 3 \times 2 \times 2 = 36} \quad \underline{2 \times 3 \times 3 = 18}$$

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Convert the fractions to decimals to percents.

$$\frac{1}{4} \stackrel{\times 25}{\underset{\times 25}{=}} \underline{0.25} = \underline{25} \% \quad \frac{1}{2} \stackrel{\times 50}{\underset{\times 50}{=}} \underline{0.50} = \underline{50} \%$$

$$\frac{3}{20} \stackrel{\times 5}{\underset{\times 5}{=}} \underline{0.15} = \underline{15} \% \quad \frac{7}{50} \stackrel{\times 2}{\underset{\times 2}{=}} \underline{0.14} = \underline{14} \%$$

Percent means PER 100 – literally! Repeat mantra until mastered.

3.) Jasper answered 15 out of 20 questions correctly on the pop quiz in mathematics. What percentage grade did the teacher write on his paper?

$$\frac{15}{20} \stackrel{\times 5}{\underset{\times 5}{=}} \frac{75}{100} \quad \text{Grade: } \underline{75} \%$$

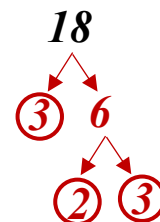
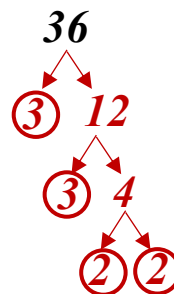
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2.) In a science experiment, Betty used a 5:2 ratio of water to oil. Complete the table using that ratio.

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Oil	2	4 or 6	8

4.) Reduce each number to its Primes.
Prime Factorization.



$$\underline{3 \times 3 \times 2 \times 2 = 36} \quad \underline{2 \times 3 \times 3 = 18}$$

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Convert the fractions to decimals to percents.

$$\frac{1}{5} = \underline{\quad} = \underline{\quad}\% \quad \frac{1}{3} = \underline{\quad} = \underline{\quad}\%$$

$$\frac{13}{20} = \underline{\quad} = \underline{\quad}\% \quad \frac{11}{50} = \underline{\quad} = \underline{\quad}\%$$

3.) Sandra rode her bike 17 miles. If her trip is 50 miles, what percentage of bike riding does she have left until she completes her journey?

Percent left: _____%

5.) Solve the string of operations (PEMDAS).

$$3^3 - 10 + (9 - 3)^2 = \underline{\quad} \quad (-2 \times 1)^3 \div -4 = \underline{\quad}$$

2.) Blaine purchased cereal to milk at the store at a 4:1 ratio. Complete the table using that ratio.

Item	Ratio 1	Ratio 2	Ratio 3
Cheerios	16 gms.		32 gms.
Milk		5oz.	

4.) Reduce each number to its Primes.

Prime Factorization.

48

72

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Convert the fractions to decimals to percents.

$$\frac{1}{5} = \underline{\quad} = \underline{\quad}\% \quad \frac{1}{3} = \underline{\quad} = \underline{\quad}\%$$

$$\frac{13}{20} = \underline{\quad} = \underline{\quad}\% \quad \frac{11}{50} = \underline{\quad} = \underline{\quad}\%$$

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4.) Reduce each number to its Primes.

Prime Factorization.

48

72

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

- 1.) Convert the fractions to decimals to percents. $33\frac{1}{3}\%$

$$\frac{1}{5} \stackrel{\times 20}{=} \underline{0.20} = \underline{20}\% \quad \frac{1}{3} \stackrel{\times 33}{=} \underline{0.\overline{33}} = \underline{33\%}$$

(33.33%)

Percent means PER 100 – literally! Repeat mantra until mastered.

$$\frac{13}{20} \stackrel{\times 5}{=} \underline{0.65} = \underline{65}\% \quad \frac{11}{50} \stackrel{\times 2}{=} \underline{0.22} = \underline{22}\%$$

- 3.) Sandra rode her bike 17 miles. If her trip is 50 miles, what percentage of bike riding does she have left until she completes her journey?

Subtract 50 – 17 = 33 – alternative method

$$\left[\frac{13}{50} \stackrel{\times 2}{=} \frac{34}{100} - \frac{100}{66} \right] \quad \frac{33}{50} \stackrel{\times 2}{=} \frac{66}{100}$$

Percent left: 66%

- 5.) Solve the string of operations (PEMDAS).

$$3^3 - 10 + (9 - 3)^2 = \underline{53} \quad (-2 \times 1)^3 \div -4 = \underline{2}$$

$$3^3 - 10 + (6)^2 = \underline{\quad\quad\quad} \quad (-2)^3 \div -4 = \underline{\quad\quad\quad}$$

$$27 - 10 + 36 = \underline{\quad\quad\quad} \quad (-8) \div -4 = \underline{2}$$

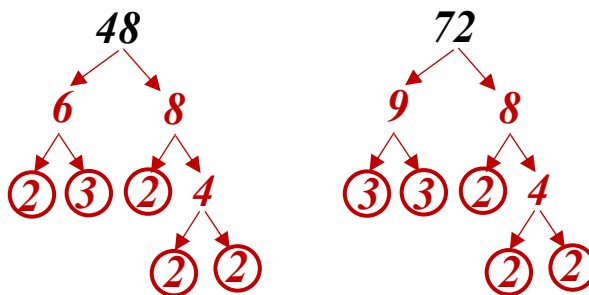
$$17 + 36 = \underline{53}$$

- 2.) Blaine purchased cereal to milk at the store at a 4:1 ratio. Complete the table using that ratio.

Item	Ratio 1	Ratio 2	Ratio 3
Cheerios	16 gms.	20 gms.	32 gms.
Milk	4 oz.	5oz.	8 oz.

- 4.) Reduce each number to its Primes.

Prime Factorization.



$$\underline{3 \times 2 \times 2 \times 2 \times 2 = 48}$$

$$\underline{3 \times 3 \times 2 \times 2 \times 2 = 72}$$

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

- 1.) Convert the fractions to decimals to percents. $33\frac{1}{3}\%$

$$\frac{1}{5} \stackrel{\times 20}{=} \underline{0.20} = \underline{20}\% \quad \frac{1}{3} \stackrel{\times 33}{=} \underline{0.\overline{33}} = \underline{33\%}$$

(33.33%)

Percent means PER 100 – literally! Repeat mantra until mastered.

$$\frac{13}{20} \stackrel{\times 5}{=} \underline{0.65} = \underline{65}\% \quad \frac{11}{50} \stackrel{\times 2}{=} \underline{0.22} = \underline{22}\%$$

- 3.) Sandra rode her bike 17 miles. If her trip is 50 miles, what percentage of bike riding does she have left until she completes her journey? *Subtract 50 – 17 = 33 – alternative method*

$$\left[\frac{13}{50} \stackrel{\times 2}{=} \frac{34}{100} - \frac{100}{66} \right] \quad \frac{33}{50} \stackrel{\times 2}{=} \frac{66}{100}$$

Percent left: 66%

- 5.) Solve the string of operations (PEMDAS).

$$3^3 - 10 + (9 - 3)^2 = \underline{53} \quad (-2 \times 1)^3 \div -4 = \underline{2}$$

$$3^3 - 10 + (6)^2 = \underline{\quad\quad\quad} \quad (-2)^3 \div -4 = \underline{\quad\quad\quad}$$

$$27 - 10 + 36 = \underline{\quad\quad\quad} \quad (-8) \div -4 = \underline{2}$$

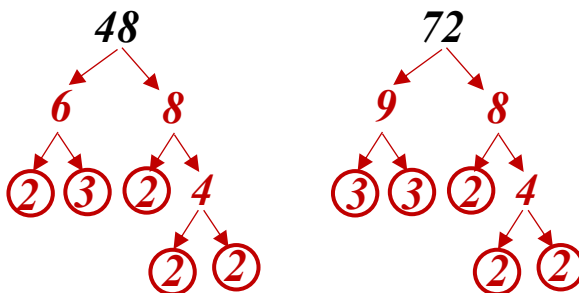
$$17 + 36 = \underline{53}$$

- 2.) Blaine purchased cereal to milk at the store at a 4:1 ratio. Complete the table using that ratio.

Item	Ratio 1	Ratio 2	Ratio 3
Cheerios	16 gms.	20 gms.	32 gms.
Milk	4 oz.	5oz.	8 oz.

- 4.) Reduce each number to its Primes.

Prime Factorization.



$$\underline{3 \times 2 \times 2 \times 2 \times 2 = 48}$$

$$\underline{3 \times 3 \times 2 \times 2 \times 2 = 72}$$

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

- 1.) Compute the unknown value – decimal exponents. 2.) What is the **unit price** for a family size of pancake syrup?

$$0.6 \square = 0.36 \quad - 0.5^2 = \underline{\quad}$$

$$4 \square = 4 \quad 4 \square = 1$$

Syrup Size	Ounces	Price	Unit Price
Economy	20	\$ 4.20	\$ 0.21
<i>Family</i>	40	\$ 6.80	

- 3.) Joe scored 17 out of 20, and Sally scored 43 out of 50 on the science test. Who made the higher percentage?

_____ scored higher on the test by a difference of %.

- 6.) Reduce 120 to its Primes.

120

- 4.) Solve the string of operations (PEMDAS). $2^5 - 20 + (-3 + 3)^7 = \underline{\quad}$

- 5.) Write the expression mathematically.

s times 8 --- _____

15 minus L --- _____

102 added to r --- _____

21 divided by n --- _____

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

- 1.) Compute the unknown value – decimal exponents. 2.) What is the **unit price** for a family size of pancake syrup?

$$0.6 \square = 0.36 \quad - 0.5^2 = \underline{\quad}$$

$$4 \square = 4 \quad 4 \square = 1$$

Syrup Size	Ounces	Price	Unit Price
Economy	20	\$ 4.20	\$ 0.21
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- 6.) Reduce 120 to its Primes.

120

- 4.) Solve the string of operations (PEMDAS). $2^5 - 20 + (-3 + 3)^7 = \underline{\quad}$

- 5.) Write the expression mathematically.

s times 8 --- _____

15 minus L --- _____

102 added to r --- _____

21 divided by n --- _____

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

- 1.) Compute the unknown value – decimal exponents. 2.) What is the **unit price** for a family size of pancake syrup?

$$0.6 \boxed{2} = 0.36 \quad -0.5^2 = \underline{0.25}$$

$$4 \boxed{1} = 4 \quad 4 \boxed{0} = 1$$

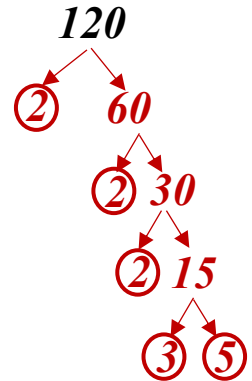
Syrup Size	Ounces	Price	Unit Price
Economy	20	\$ 4.20	\$ 0.21
Family	40	\$ 6.80	\$ 0.17

- 3.) Joe scored 17 out of 20, and Sally scored 43 out of 50 on the science test. Who made the higher percentage?

$$\frac{40}{\$6.80} \div 40 = \frac{1}{\$0.17}$$

$$\frac{17}{20} \times 5 = \frac{85}{100} \quad \frac{43}{50} \times 2 = \frac{86}{100} \quad \text{Sally scored higher on the test by a difference of } \underline{1\%}.$$

- 6.) Reduce 120 to its Primes.



$$\underline{2 \times 2 \times 2 \times 3 \times 5 = 120}$$

- 4.) Solve the string of operations (PEMDAS). $2^5 - 20 + (-3 + 3)^7 = \underline{12}$

$$2^5 - 20 + (0)^2 = \underline{\quad}$$

$$32 - 20 + 0 = \underline{\quad}$$

$$32 - 20 = \underline{12}$$

- 5.) Write the expression mathematically.

s times 8 --- (8)s or 8s

15 minus L --- 15 - L

102 added to r --- r + 102

21 divided by n --- $\frac{21}{n}$

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

- 1.) Compute the unknown value – decimal exponents. 2.) What is the **unit price** for a family size of pancake syrup?

$$0.6 \boxed{2} = 0.36 \quad -0.5^2 = \underline{0.25}$$

$$4 \boxed{1} = 4 \quad 4 \boxed{0} = 1$$

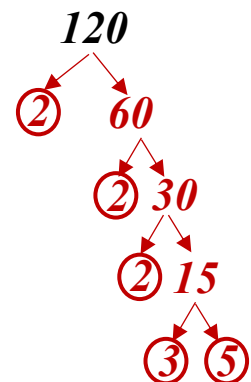
Syrup Size	Ounces	Price	Unit Price
Economy	20	\$ 4.20	\$ 0.21
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- 3.) Joe scored 17 out of 20, and Sally scored 43 out of 50 on the science test. Who made the higher percentage?

$$\frac{40}{\$6.80} \div 40 = \frac{1}{\$0.17}$$

$$\frac{17}{20} \times 5 = \frac{85}{100} \quad \frac{43}{50} \times 2 = \frac{86}{100} \quad \text{Sally scored higher on the test by a difference of } \underline{1\%}.$$

- 6.) Reduce 120 to its Primes.



$$\underline{2 \times 2 \times 2 \times 3 \times 5 = 120}$$

- 4.) Solve the string of operations (PEMDAS). $2^5 - 20 + (-3 + 3)^7 = \underline{12}$

$$2^5 - 20 + (0)^2 = \underline{\quad}$$

$$32 - 20 + 0 = \underline{\quad}$$

$$32 - 20 = \underline{12}$$

- 5.) Write the expression mathematically.

s times 8 --- (8)s or 8s

15 minus L --- 15 - L

102 added to r --- r + 102

21 divided by n --- $\frac{21}{n}$

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Compute the unknown value – decimal exponents.

$$-0.2 \square = -0.008 \quad -0.7^2 = \underline{\quad}$$

$$0.99 = 0.99 \quad 0.54 \square = 1$$

3.) The cost of 3 cartons of milk is \$2.85. What is the unit price of milk? The unit price of milk is _____.

4.) Solve (PEMDAS). $2(-7 + 5)^3 = \underline{\quad}$

5.) Write the expression mathematically.

t times t times t --- _____

‘W’ minus a negative 4 --- _____

‘Y’ divided by 0.25 --- _____

2.) Complete the table using ratios.

Wheaties – Breakfast of Champs	
Grams	Price (\$)
25	\$ 4.50
5	
1	

What is Wheaties’ unit price? _____

6.) Is the relationship additive or multiplicative in the table? _____

Tickets Sold (TS)	4	7	8	12
Attendance (A)	8	11	12	16

Write the mathematical relationship: _____

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Compute the unknown value – decimal exponents.

$$-0.2 \square = -0.008 \quad -0.7^2 = \underline{\quad}$$

$$0.99 = 0.99 \quad 0.54 \square = 1$$

3.) The cost of 3 cartons of milk is \$2.85. What is the unit price of milk? The unit price of milk is _____.

4.) Solve (PEMDAS). $2(-7 + 5)^3 = \underline{\quad}$

5.) Write the expression mathematically.

t times t times t --- _____

‘W’ minus a negative 4 --- _____

‘Y’ divided by 0.25 --- _____

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Wheaties – Breakfast of Champs	
Grams	Price (\$)
25	\$ 4.50
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What is Wheaties’ unit price? _____

6.) Is the relationship additive or multiplicative in the table? _____

Tickets Sold (TS)	4	7	8	12
Attendance (A)	8	11	12	16

Write the mathematical relationship: _____

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Compute the unknown value – decimal exponents.

$$-0.2^{\boxed{3}} = -0.008 \quad -0.7^2 = \underline{0.49}$$

$$0.99^{\boxed{1}} = \underline{0.99} \quad 0.54^{\boxed{0}} = \underline{1}$$

3.) The cost of 3 cartons of milk is \$2.85. What is the unit price of milk?

The unit price of milk is \$ 0.95.

$$\frac{2.85}{3} = \frac{0.95}{1}$$

4.) Solve (PEMDAS). $2(-7 + 5)^3 = \underline{-16}$
 $2(-2)^3 = \underline{\quad}$
 $2(-8) = \underline{-16}$

5.) Write the expression mathematically.

t times t times t --- t^3

‘W’ minus a negative 4 --- $W - (-4) = W + 4$

‘Y’ divided by 0.25 --- $\frac{Y}{0.25}$

2.) Complete the table using ratios.

Wheaties – Breakfast of Champs	
Grams	Price (\$)
25	\$ 4.50
5	\$ 0.90
1	\$ 0.18

What is Wheaties’ unit price? \$ 0.18

$$\frac{25}{\$4.50} \div 5 = \frac{5}{\$0.90} \quad \frac{25}{\$4.50} \div 25 = \frac{1}{\$0.18}$$

6.) Is the relationship additive or multiplicative in the table? additive

Tickets Sold (TS)	4	7	8	12
Attendance (A)	8	11	12	16

Write the mathematical relationship: $TS + 4 = A$

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Compute the unknown value – decimal exponents.

$$-0.2^{\boxed{3}} = -0.008 \quad -0.7^2 = \underline{0.49}$$

$$0.99^{\boxed{1}} = \underline{0.99} \quad 0.54^{\boxed{0}} = \underline{1}$$

3.) The cost of 3 cartons of milk is \$2.85. What is the unit price of milk?

The unit price of milk is \$ 0.95.

$$\frac{2.85}{3} = \frac{0.95}{1}$$

4.) Solve (PEMDAS). $2(-7 + 5)^3 = \underline{-16}$
 $2(-2)^3 = \underline{\quad}$
 $2(-8) = \underline{-16}$

5.) Write the expression mathematically.

t times t times t --- t^3

‘W’ minus a negative 4 --- $W - (-4) = W + 4$

‘Y’ divided by 0.25 --- $\frac{Y}{0.25}$

2.) Complete the table using ratios.

Wheaties – Breakfast of Champs	
Grams	Price (\$)
25	\$ 4.50
5	\$ 0.90
1	\$ 0.18

What is Wheaties’ unit price? \$ 0.18

$$\frac{25}{\$4.50} \div 5 = \frac{5}{\$0.90} \quad \frac{25}{\$4.50} \div 25 = \frac{1}{\$0.18}$$

6.) Is the relationship additive or multiplicative in the table? additive

Tickets Sold (TS)	4	7	8	12
Attendance (A)	8	11	12	16

Write the mathematical relationship: $TS + 4 = A$

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Compute the unknown value – decimal exponents.

$$-0.5 \square = 0.25$$

$$0.03 \square = 0.03$$

$$-0.8^2 = \underline{\hspace{2cm}}$$

$$0.1 \square = 1$$

3.) Willy Wonka drove 45 miles in 3 hours. What was his rate of travel in miles per hour (mph)?

Willy's (mph) rate of speed was _____.

4.) Solve (PEMDAS). $-2^3(-7 + -3) = \underline{\hspace{2cm}}$

5.) Write the expression mathematically.

-C times -C times -C --- _____

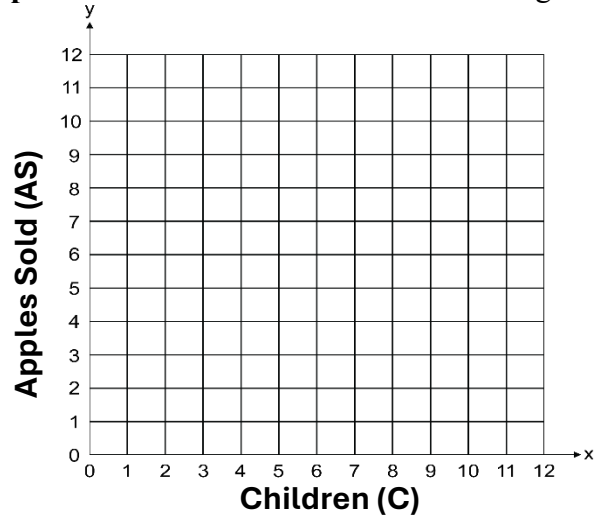
0.5 times 'Y' minus 6 squared --- _____

2.) Is the relationship additive or multiplicative in the table? _____

Children (C)	2	4	5	6
Apples Sold (AS)	4	8	10	12

Write the mathematical relationship: _____

Graph the table coordinates on the cartesian grid.



Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Compute the unknown value – decimal exponents.

$$-0.5 \square = 0.25$$

$$0.03 \square = 0.03$$

$$-0.8^2 = \underline{\hspace{2cm}}$$

$$0.1 \square = 1$$

3.) Willy Wonka drove 45 miles in 3 hours. What was his rate of travel in miles per hour (mph)?

Willy's (mph) rate of speed was _____.

4.) Solve (PEMDAS). $-2^3(-7 + -3) = \underline{\hspace{2cm}}$

5.) Write the expression mathematically.

-C times -C times -C --- _____

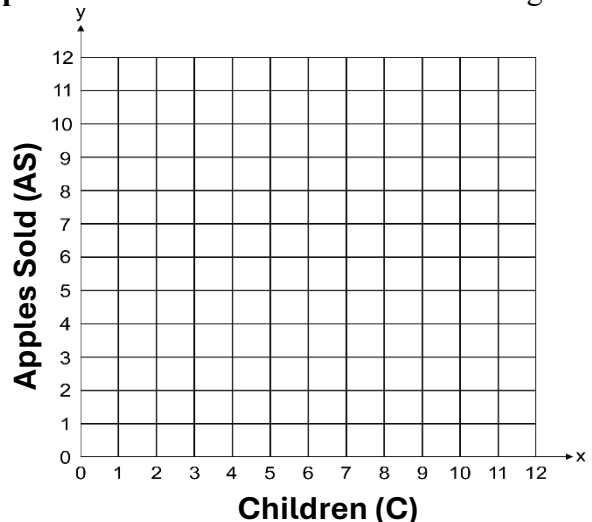
0.5 times 'Y' minus 6 squared --- _____

2.) Is the relationship additive or multiplicative in the table? _____

Children (C)	2	4	5	6
Apples Sold (AS)	4	8	10	12

Write the mathematical relationship: _____

Graph the table coordinates on the cartesian grid.



Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Compute the unknown value – decimal exponents.

$$-0.5^{\boxed{2}} = 0.25$$

$$0.03^{\boxed{1}} = 0.03$$

$$-0.8^2 = \underline{0.64}$$

$$0.1^{\boxed{0}} = 1$$

3.) Willy Wonka drove 45 miles in 3 hours. What was his rate of travel in miles per hour (mph)?

$$\frac{45}{3} \stackrel{\div 3}{=} \frac{15}{1}$$

Willy's (mph) rate of speed was 15 mph.

4.) Solve (PEMDAS). $-2^3(-7 + -3) = \underline{80}$

$$-2^3(-10) = \underline{\quad}$$

$$-8(-10) = \underline{80}$$

5.) Write the expression mathematically.

$$-C \text{ times } -C \text{ times } -C \text{ --- } \underline{-C^3}$$

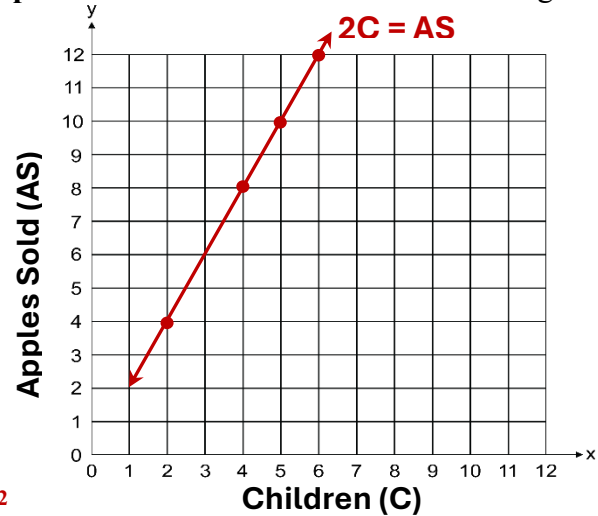
$$0.5 \text{ times 'Y' minus 6 squared --- } \underline{0.5 \times Y - 6^2} \quad \underline{0.5Y - 6^2}$$

2.) Is the relationship additive or multiplicative in the table? multiplicative

Children (C)	2	4	5	6
Apples Sold (AS)	4	8	10	12

Write the mathematical relationship: $C \times 2 = AS$

Graph the table coordinates on the cartesian grid.



Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Compute the unknown value – decimal exponents.

$$-0.5^{\boxed{2}} = 0.25$$

$$0.03^{\boxed{1}} = 0.03$$

$$-0.8^2 = \underline{0.64}$$

$$0.1^{\boxed{0}} = 1$$

3.) Willy Wonka drove 45 miles in 3 hours. What was his rate of travel in miles per hour (mph)?

$$\frac{45}{3} \stackrel{\div 3}{=} \frac{15}{1}$$

Willy's (mph) rate of speed was 15 mph.

4.) Solve (PEMDAS). $-2^3(-7 + -3) = \underline{80}$

$$-2^3(-10) = \underline{\quad}$$

$$-8(-10) = \underline{80}$$

5.) Write the expression mathematically.

$$-C \text{ times } -C \text{ times } -C \text{ --- } \underline{-C^3}$$

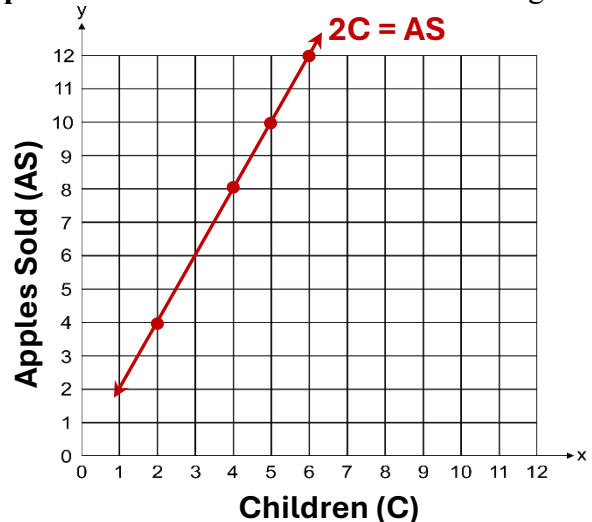
$$0.5 \text{ times 'Y' minus 6 squared --- } \underline{0.5 \times Y - 6^2} \quad \underline{0.5Y - 6^2}$$

2.) Is the relationship additive or multiplicative in the table? multiplicative

Children (C)	2	4	5	6
Apples Sold (AS)	4	8	10	12

Write the mathematical relationship: $C \times 2 = AS$

Graph the table coordinates on the cartesian grid.



Teaching Tip Number 14

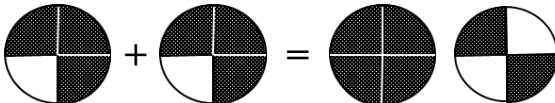
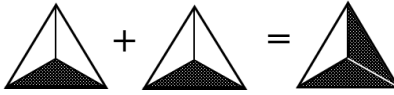
Revisit Adding and Subtracting Fractions

At this stage of the school year, it is highly advantageous for students to revisit adding and subtracting fractions with both like and unlike denominators. While the sixth-grade curriculum assumes mastery of these skills from the previous year, many students have likely not retained that knowledge and require targeted review. *To ensure long-term retention, integrate one or two daily examples into your spaced repetition practice.* Starting the pedagogy with fractions that possess like denominators allows students to conceptually grasp the necessity of finding a common denominator before moving on to unlike fractions.

It is important for the classroom teacher to recognize that student proficiency in simplifying to lowest terms and converting mixed numbers is a primary driver of success. Ideally, these two skill competencies, along with finding least common denominators (LCDs) and calculating equivalent fractions, should have been mastered over the last few months. When these foundational skills firmly in place, that are very few steps are required to tie the entire process together.

Example 1: Like Fractions – proper fraction addition

Note: Show students side-by-side fraction models not just computations of fractions.

$$\frac{3}{4} + \frac{3}{4} = \frac{6}{4} = 1 \frac{1}{2} \text{ LT}$$

$$\frac{1}{3} + \frac{1}{3} = \frac{2}{3} \text{ LT}$$


Example 2: Unlike Fractions – proper fraction subtraction

$$\frac{2}{6} - \frac{1}{4} = ? \quad \text{LCD} = 12 \quad \frac{4}{12} - \frac{3}{12} = \frac{1}{12} \text{ LT}$$

Example 3: Unlike Fractions – mixed number subtraction

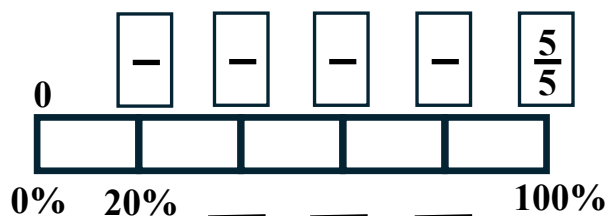
Note: Convert all mixed numbers to improper fractions since it eliminates regrouping.

$$2 \frac{1}{5} - 1 \frac{3}{4} = ? \quad \frac{11}{5} - \frac{7}{4} = ? \quad \text{LCD} = 20 \quad \frac{44}{20} - \frac{35}{20} = \frac{9}{20} \text{ LT}$$

By practicing just one or two problems daily, students can master this skill with the same fluency they bring to fraction and decimal multiplication and division. When I taught fifth grade, I emphasized via constant repetition, that unlike multiplication and division, adding and subtracting fractions strictly requires common denominators. In effect, true mastery demands both computational speed and a conceptual, physical understanding of the arithmetic process. This is the reason why (as teachers) we use visual models since drawing fractions helps students see that they are combining fractional pieces of equal size.

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Label the fractions and percents on the bar.



3.) Jill score 40 percent on a fifty-question exam.
How many questions did she correctly answer?

Questions correct were _____.

Questions incorrect were _____.

4.) Evaluate and solve each expression.

$T - 4$; $T = 7$; $7 - 4 = 3$

$B + 4$; $B = 5$; _____

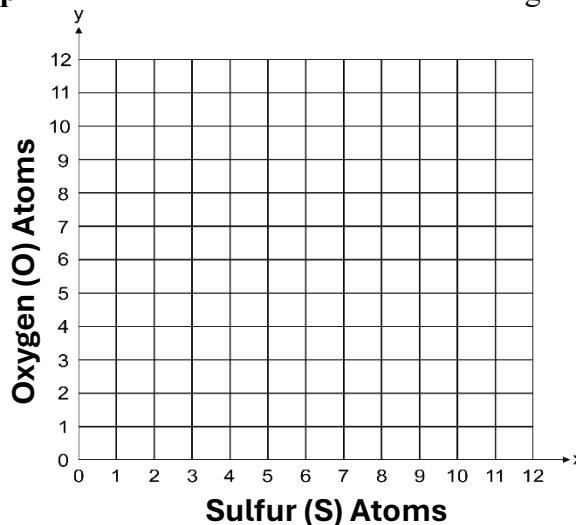
$D \times 4$; $D = 3$; _____

2.) Is the relationship of the molecule H_2SO_4 additive or multiplicative in the table? _____

Sulfur (S) Atoms	1	2	3	6
Oxygen (O) Atoms	4	8	12	24

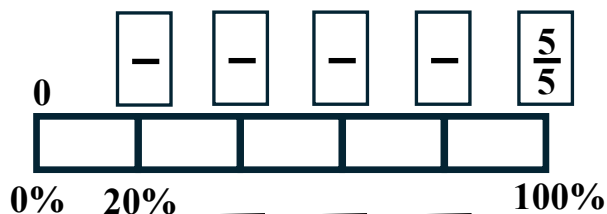
Write the mathematical relationship: _____

Graph the table coordinates on the cartesian grid.



Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Label the fractions and percents on the bar.



3.) Jill score 40 percent on a fifty-question exam.
How many questions did she correctly answer?

Questions correct were _____.

Questions incorrect were _____.

4.) Evaluate and solve each expression.

$T - 4$; $T = 7$; $7 - 4 = 3$

$B + 4$; $B = 5$; _____

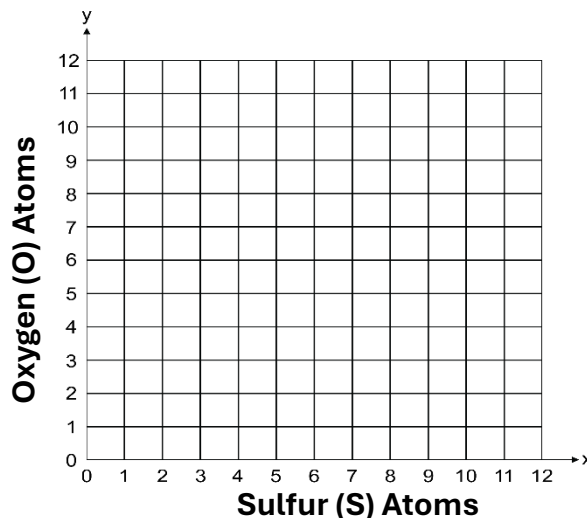
$D \times 4$; $D = 3$; _____

2.) Is the relationship of the molecule H_2SO_4 additive or multiplicative in the table? _____

Sulfur (S) Atoms	1	2	3	6
Oxygen (O) Atoms	4	8	12	24

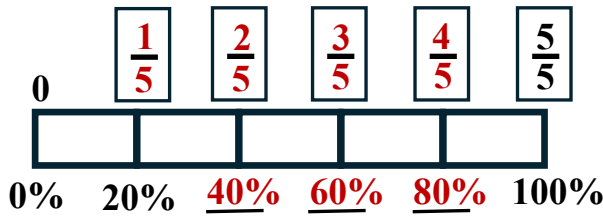
Write the mathematical relationship: _____

Graph the table coordinates on the cartesian grid.



Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Label the fractions and percents on the bar.



3.) Jill score 40 percent on a fifty-question exam. How many questions did she correctly answer?

$$\begin{array}{r} 0.40 \\ \times 50 \\ \hline 20 \end{array}$$

40 % Questions correct were 20.
60 % Questions incorrect were 30.
20 + 30 = 50 questions

4.) Evaluate and solve each expression.

T - 4; T = 7; 7 - 4 = 3

B + 4; B = 5; 5 + 4 = 9

D x 4; D = 3; 3 x 4 = 12

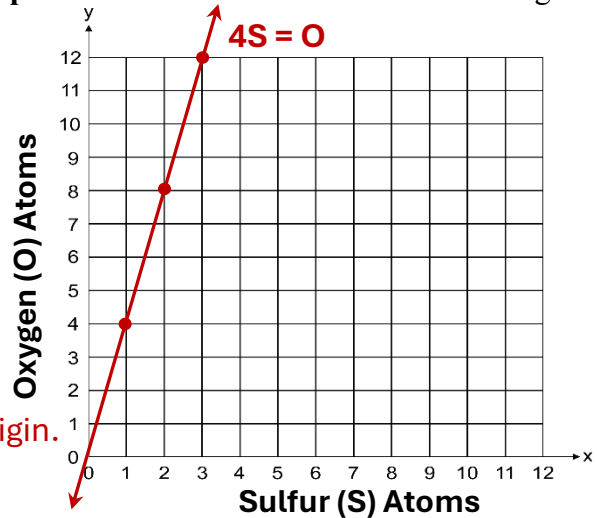
Line MUST go through the origin.
Why? $4(0) = 0$

2.) Is the relationship of the molecule H_2SO_4 additive or multiplicative in the table? multiplicative

Sulfur (S) Atoms	1	2	3	6
Oxygen (O) Atoms	4	8	12	24

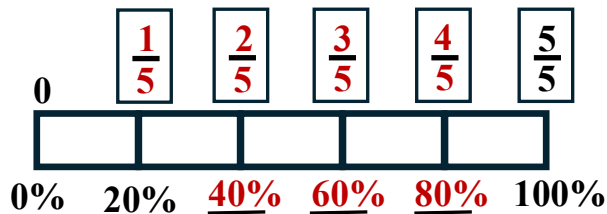
Write the mathematical relationship: $S \times 4 = O$

Graph the table coordinates on the cartesian grid.



Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Label the fractions and percents on the bar.



3.) Jill score 40 percent on a fifty-question exam. How many questions did she correctly answer?

$$\begin{array}{r} 0.40 \\ \times 50 \\ \hline 20 \end{array}$$

40 %
60 % Questions incorrect were 30.
20 + 30 = 50 questions

4.) Evaluate and solve each expression.

T - 4; T = 7; 7 - 4 = 3

B + 4; B = 5; 5 + 4 = 9

D x 4; D = 3; 3 x 4 = 12

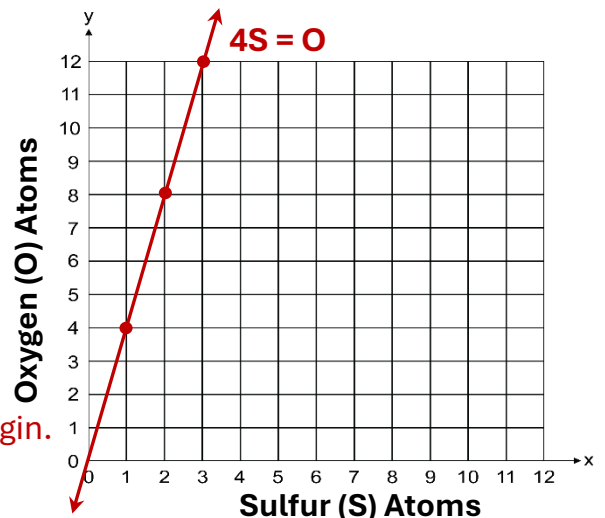
Line MUST go through the origin.
Why? $4(0) = 0$

2.) Is the relationship of the molecule H_2SO_4 additive or multiplicative in the table? multiplicative

Sulfur (S) Atoms	1	2	3	6
Oxygen (O) Atoms	4	8	12	24

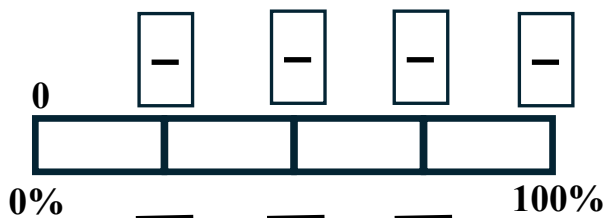
Write the mathematical relationship: $S \times 4 = O$

Graph the table coordinates on the cartesian grid.



Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Label the fractions and percents on the bar.

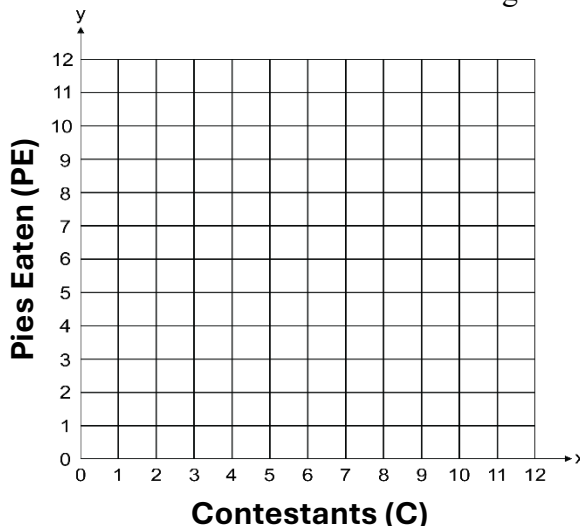


2.) Is the relationship of the pie eating contest in the table additive or multiplicative? _____

Contestants (C)	3	5	6	12
Pies Eaten (PE)	0	2	3	9

Write the mathematical relationship: _____

Graph the table coordinates on the cartesian grid.



3.) 300 people went to the carnival. If only 45% paid, how many people did **and** did not pay to attend?

Paying customers totaled _____.

Nonpaying customers totaled _____.

4.) Evaluate and solve each expression.

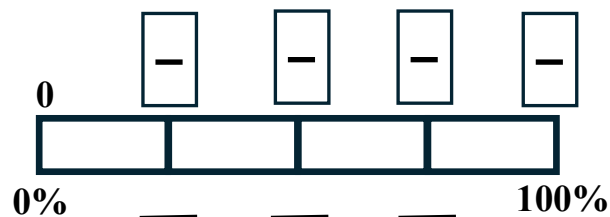
$R^2 - R$; $R = 5$; _____

$2B \div 4$; $B = 10$; _____

$4(F - 7)$; $F = 9$; _____

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Label the fractions and percents on the bar.

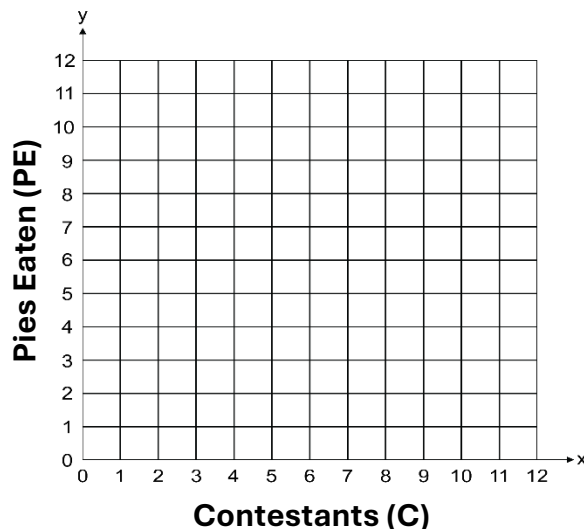


2.) Is the relationship of the pie eating contest in the table additive or multiplicative? _____

Contestants (C)	3	5	6	12
Pies Eaten (PE)	0	2	3	9

Write the mathematical relationship: _____

Graph the table coordinates on the cartesian grid.



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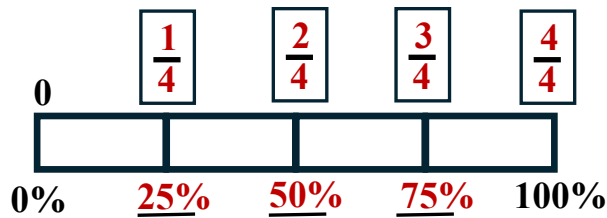
$R^2 - R$; $R = 5$; _____

$2B \div 4$; $B = 10$; _____

$4(F - 7)$; $F = 9$; _____

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Label the fractions and percents on the bar.

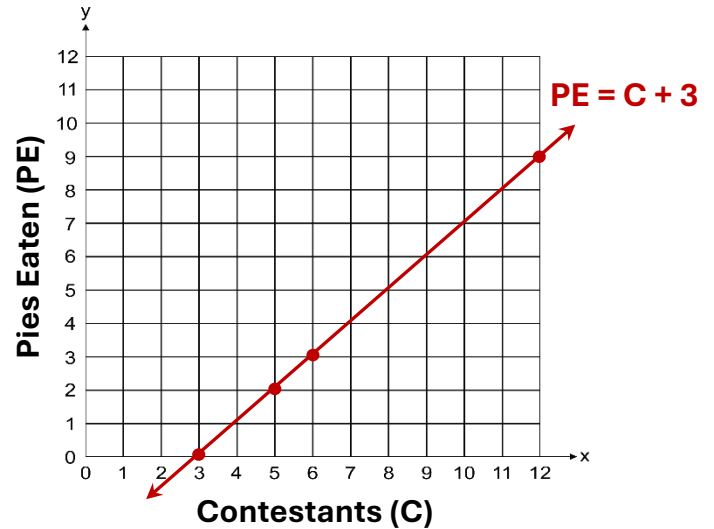


2.) Is the relationship of the pie eating contest in the table additive or multiplicative? additive

Contestants (C)	3	5	6	12
Pies Eaten (PE)	0	2	3	9

Write the mathematical relationship: PE = C + 3

Graph the table coordinates on the cartesian grid.



3.) 300 people went to the carnival. If only 45% paid, how many people did **and** did not pay to attend?

$$\begin{array}{r} 300 \\ \times 0.45 \\ \hline 135 \end{array} \quad + \quad \begin{array}{l} 45\% \text{ Paying customers was } \underline{135} \\ 55\% \text{ Nonpaying customers was } \underline{165} \\ 100\% \quad 300 - 135 = 165 \end{array}$$

4.) Evaluate and solve each expression.

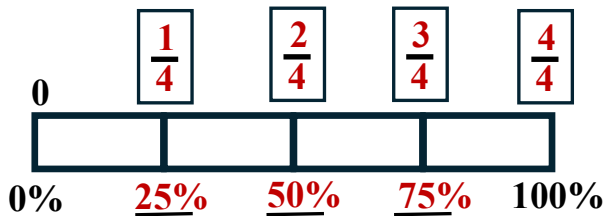
$R^2 - R; R = 5; \underline{25 - 5 = 20}$

$2B \div 4; B = 10; \underline{20 \div 4 = 5}$

$4(F - 7); F = 9; \underline{4(2) = 8}$

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Label the fractions and percents on the bar.

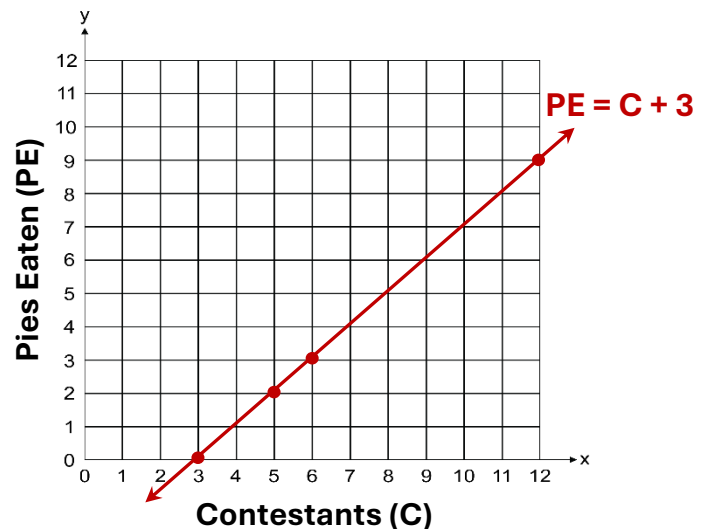


2.) Is the relationship of the pie eating contest in the table additive or multiplicative? additive

Contestants (C)	3	5	6	12
Pies Eaten (PE)	0	2	3	9

Write the mathematical relationship: PE = C + 3

Graph the table coordinates on the cartesian grid.



3.) 300 people went to the carnival. If only 45% paid, how many people did **and** did not pay to attend?

$$\begin{array}{r} 300 \\ \times 0.45 \\ \hline 135 \end{array} \quad + \quad \begin{array}{l} 45\% \text{ Paying customers was } \underline{135} \\ 55\% \text{ Nonpaying customers was } \underline{165} \\ 100\% \quad 300 - 135 = 165 \end{array}$$

4.) Evaluate and solve each expression.

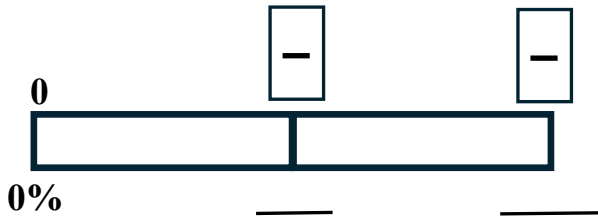
$R^2 - R; R = 5; \underline{25 - 5 = 20}$

$2B \div 4; B = 10; \underline{20 \div 4 = 5}$

$4(F - 7); F = 9; \underline{4(2) = 8}$

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Label the fractions and percents on the bar.



3.) Evaluate and solve each expression.

$x^3 - y$; $x = 2, y = 3$; _____

$-2(w + 1)$; $w = 9$; _____

$8m \div 8$; $m = 10$; _____

$-2(K - 7)$; $K = 7$; _____

2.) 120 dogs were for sale. If 30 were sold, what was the percentage of dogs sold **and** NOT sold?

Dogs sold was _____.

Dogs NOT sold was _____.

4.) The cost of 6 ounces of peanuts is \$1.20. What is the cost of 2 dozen ounces of peanuts? Note: 1 dozen equals _____.

2 dozen peanuts costs _____.

5.) Write an algebraic equation for the word sentence.

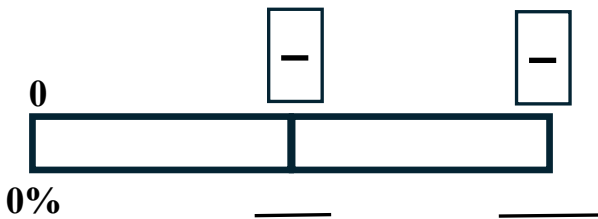
A number 'N' increased by 4.6 is 9.1. _____

51 is three times a number 'U'. _____

The quotient (Q) of a number and 6 is 9. _____

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Label the fractions and percents on the bar.



3.) Evaluate and solve each expression.

$x^3 - y$; $x = 2, y = 3$; _____

$-2(w + 1)$; $w = 9$; _____

$8m \div 8$; $m = 10$; _____

$-2(K - 7)$; $K = 7$; _____

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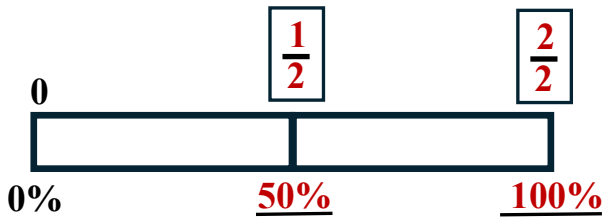
A number 'N' increased by 4.6 is 9.1. _____

51 is three times a number 'U'. _____

The quotient (Q) of a number and 6 is 9. _____

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Label the fractions and percents on the bar.



3.) Evaluate and solve each expression.

$$x^3 - y; \quad x = 2, y = 3; \quad \frac{(2)^3 - 3 = 20}{8 - 3 = 5}$$

$$-2(w + 1); \quad w = 9; \quad \frac{-2(9+1) = -20}{-2(10) = -20}$$

$$8m \div 8; \quad m = 10; \quad \underline{80 \div 8 = 10}$$

$$-2(K - 7); \quad K = 7; \quad \frac{-2(7-7) = 0}{-2(0) = 0}$$

2.) 120 dogs were for sale. If 30 were sold, what was the percentage of dogs sold **and** NOT sold?

$$\frac{30 \div 30}{120 \div 30} = \frac{1}{4} = 0.25 \quad + \quad \begin{array}{l} 25\% \text{ Dogs sold was } \underline{25\%}. \\ 75\% \text{ Dogs NOT sold was } \underline{75\%}. \\ 100\% \quad 30 + 90 = 120 \end{array}$$

4.) The cost of 6 ounces of peanuts is \$1.20. What is the cost of 2 dozen ounces of peanuts? Note: 1 dozen equals 12.

$$\frac{\$1.20}{6} \times 4 = \frac{\$4.80}{24} \quad \text{2 dozen peanuts costs } \underline{\$4.80}.$$

5.) Write an algebraic equation for the word sentence.

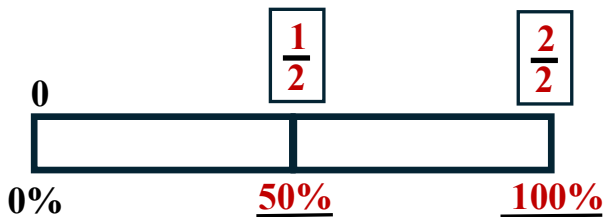
A number 'N' increased by 4.6 is 9.1. $N + 4.6 = 9.1$

51 is three times a number 'U'. $3U = 51$

The quotient (Q) of a number and 6 is 9. $Q \div 6 = 9$

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Label the fractions and percents on the bar.



3.) Evaluate and solve each expression.

$$x^3 - y; \quad x = 2, y = 3; \quad \frac{(2)^3 - 3 = 20}{8 - 3 = 5}$$

$$-2(w + 1); \quad w = 9; \quad \frac{-2(9+1) = -20}{-2(10) = -20}$$

$$8m \div 8; \quad m = 10; \quad \underline{80 \div 8 = 10}$$

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5.) Write an algebraic equation for the word sentence.

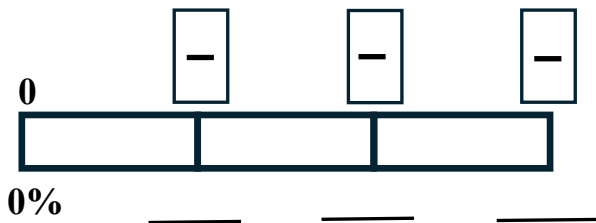
A number 'N' increased by 4.6 is 9.1. $N + 4.6 = 9.1$

51 is three times a number 'U'. $3U = 51$

The quotient (Q) of a number and 6 is 9. $Q \div 6 = 9$

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Label the fractions and percents on the bar.



3.) Evaluate and solve each expression.

$w^3 - y$; $x = -2, y = 3$; _____

$-2(a - 1)$; $a = 3$; _____

$8 \div 2m$; $m = 4$; _____

$\frac{9K}{3}$; $K = 4$; _____

2.) John is 3 times older than Bill. Write an equation that shows this relationship. _____

If Bill is 11 years old, how old is John? _____

4.) Add or subtract the following fractions (lowest terms).

$\frac{1}{6} + \frac{2}{3} = \boxed{\quad}$ LCD = _____ $\frac{4}{7} - \frac{1}{2} = \boxed{\quad}$ LCD = _____

5.) Write an algebraic equation for the word sentence.

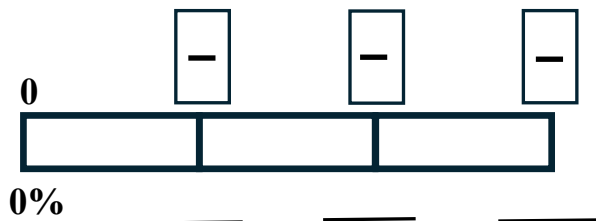
The sum of a number 'r' and 6.1 is 12. _____

The difference between 25 and 't' is 11.. _____

3 is the quotient (L) of a number and 12. _____

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Label the fractions and percents on the bar.



3.) Evaluate and solve each expression.

$w^3 - y$; $x = -2, y = 3$; _____

$-2(a - 1)$; $a = 3$; _____

$8 \div 2m$; $m = 4$; _____

$\frac{9K}{3}$; $K = 4$; _____

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$\frac{1}{6} + \frac{2}{3} = \boxed{\quad}$ LCD = _____ $\frac{4}{7} - \frac{1}{2} = \boxed{\quad}$ LCD = _____

5.) Write an algebraic equation for the word sentence.

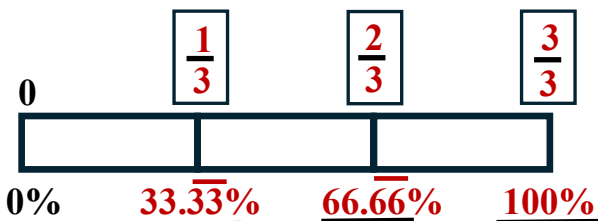
The sum of a number 'r' and 6.1 is 12. _____

The difference between 25 and 't' is 11.. _____

3 is the quotient (L) of a number and 12. _____

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Label the fractions and percents on the bar.



3.) Evaluate and solve each expression.

$$w^3 - y; x = -2, y = 3; \underline{(-2)^3 - 3 = -11}$$

$$\underline{-8 - 3 = -11}$$

$$-2(a - 1); a = 3; \underline{-2(3 - 1) = -8}$$

$$\underline{-2(4) = -8}$$

$$8 \div 2m; m = 4; \underline{8 \div 2 \times 4 = 16}$$

$$\underline{4 \times 4 = 16}$$

$$\frac{9K}{3}; K = 4; \underline{9 \times 4 \div 3 = 12}$$

$$\underline{36/3 = 12}$$

2.) John is 3 times older than Bill. Write an equation that shows this relationship. J = 3B

If Bill is 11 years old, how old is John? J = 3(11) = 33

4.) Add or subtract the following fractions (lowest terms).

$$\frac{1}{6} + \frac{2}{3} = \frac{5}{6} \quad \frac{4}{7} - \frac{1}{2} = \frac{1}{14}$$

$$\frac{1}{6} + \frac{4}{6} = \frac{5}{6} \quad \text{LCD} = \underline{6} \quad \frac{8}{14} - \frac{7}{14} = \frac{1}{14} \quad \text{LCD} = \underline{14}$$

5.) Write an algebraic equation for the word sentence.

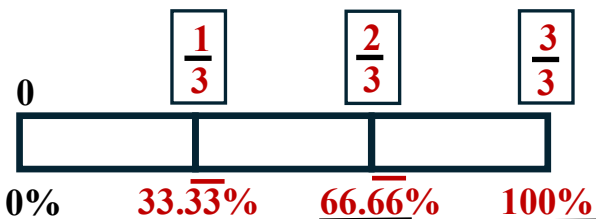
The sum of a number 'r' and 6.1 is 12. r + 6.1 = 12

The difference between 25 and 't' is 11.. 25 - t = 11

3 is the quotient (L) of a number and 12. L \div 12 = 3

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Label the fractions and percents on the bar.



3.) Evaluate and solve each expression.

$$w^3 - y; x = -2, y = 3; \underline{(-2)^3 - 3 = -11}$$

$$\underline{-8 - 3 = -11}$$

$$-2(a - 1); a = 3; \underline{-2(3 - 1) = -8}$$

$$\underline{-2(4) = -8}$$

$$8 \div 2m; m = 4; \underline{8 \div 2 \times 4 = 16}$$

$$\underline{4 \times 4 = 16}$$

$$\frac{9K}{3}; K = 4; \underline{9 \times 4 \div 3 = 12}$$

$$\underline{36/3 = 12}$$

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$$\frac{1}{6} + \frac{2}{3} = \frac{5}{6} \quad \frac{4}{7} - \frac{1}{2} = \frac{1}{14}$$

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5.) Write an algebraic equation for the word sentence.

The sum of a number 'r' and 6.1 is 12. r + 6.1 = 12

The difference between 25 and 't' is 11.. 25 - t = 11

3 is the quotient (L) of a number and 12. L \div 12 = 3

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

- 1.) Determine whether the given value is a solution of the equation.

$x + 6 = 13$; $x = 8$ Yes or No

$8b = 40$; $b = 5$ Yes or No

- 4.) Evaluate and solve each expression.

$s^2 - u$; $s = -4$, $u = 10$; _____

$-4(d - 5)$; $d = -2$; _____

- 2.) Andy is $\frac{1}{4}$ as old as Joan. Write an equation that shows this relationship.

If Andy is 20, how old is Joan? _____

- 3.) Add or subtract the following fractions (lowest terms).

$\frac{3}{4} + \frac{2}{3} = \boxed{\quad - \quad}$ LCD = _____ $\frac{6}{9} - \frac{1}{3} = \boxed{\quad - \quad}$ LCD = _____

- 5.) Write an algebraic equation for the word sentence.

The product of a number 'p' and 4.2 is 14.1. _____

The difference between 7 and 't' is -11.2.. _____

The quotient (Z) of a number and 2 is 4. _____

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

- 1.) Determine whether the given value is a solution of the equation.

$x + 6 = 13$; $x = 8$ Yes or No

$8b = 40$; $b = 5$ Yes or No

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- 5.) Write an algebraic equation for the word sentence.

The product of a number 'p' and 4.2 is 14.1. _____

The difference between 7 and 't' is -11.2.. _____

The quotient (Z) of a number and 2 is 4. _____

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

- 1.) Determine whether the given value is a solution of the equation.

$x + 6 = 13$; $x = 8$ Yes or **No**

$8 + 6 = 13$

$14 \neq 13$ Both Sides are Not Equal

$8b = 40$; $b = 5$ **Yes** or No

$8(5) = 40$

$40 = 40$ Both Sides are Equal

- 4.) Evaluate and solve each expression.

$s^2 - u$; $s = -4$, $u = 10$; $\frac{(-4)^2 - 10 = 6}{16 - 10 = 6}$

$-4(d - 5)$; $d = -2$; $\frac{-4(-2 - 5) = -12}{-4(3) = -12}$

- 2.) Andy is $\frac{1}{4}$ as old as Joan. Write an equation that shows this relationship. $A = \frac{1}{4}(J)$ or $4A = J$ $20 = \frac{1}{4}J$
(4) $20 = \frac{1}{4}J$ (4)

If Andy is 20, how old is Joan? $80 = Joan$

- 3.) Add or subtract the following fractions (lowest terms).

$\frac{3}{4} + \frac{2}{3} = \boxed{1 \frac{5}{12}}$ LCD = 12 $\frac{6}{9} - \frac{1}{3} = \boxed{\frac{1}{3}}$ LCD = 9

$\frac{9}{12} + \frac{8}{12} = \boxed{\frac{17}{12}}$ $\frac{6}{9} - \frac{3}{9} = \boxed{\frac{3}{9}}$

- 5.) Write an algebraic equation for the word sentence.

The product of a number 'p' and 4.2 is 14.1. $4.2p = 14.1$

The difference between 7 and 't' is -11.2.. $7 - t = 11.2$

The quotient (Z) of a number and 2 is 4. $Z \div 2 = 4$

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

- 1.) Determine whether the given value is a solution of the equation.

$x + 6 = 13$; $x = 8$ Yes or **No**

$8 + 6 = 13$

$14 \neq 13$ Both Sides are Not Equal

$8b = 40$; $b = 5$ **Yes** or No

$8(5) = 40$

$40 = 40$ Both Sides are Equal

- 4.) Evaluate and solve each expression.

$s^2 - u$; $s = -4$, $u = 10$; $\frac{(-4)^2 - 10 = 6}{16 - 10 = 6}$

$-4(d - 5)$; $d = -2$; $\frac{-4(-2 - 5) = -12}{-4(3) = -12}$

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If Andy is 20, how old is Joan? $80 = Joan$

- 3.) Add or subtract the following fractions (lowest terms).

$\frac{3}{4} + \frac{2}{3} = \boxed{1 \frac{5}{12}}$ LCD = 12 $\frac{6}{9} - \frac{1}{3} = \boxed{\frac{1}{3}}$ LCD = 9

$\frac{9}{12} + \frac{8}{12} = \boxed{\frac{17}{12}}$ $\frac{6}{9} - \frac{3}{9} = \boxed{\frac{3}{9}}$

- 5.) Write an algebraic equation for the word sentence.

The product of a number 'p' and 4.2 is 14.1. $4.2p = 14.1$

The difference between 7 and 't' is -11.2.. $7 - t = 11.2$

The quotient (Z) of a number and 2 is 4. $Z \div 2 = 4$

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

- 1.) Determine whether the given value is a solution of the equation.

$17 - x = 12;$ $x = 4$ Yes or No

$56 = 8m;$ $m = 7$ Yes or No

$S^2 - 9 = 16;$ $S = 5$ Yes or No

- 2.) Combine the like terms – simplify the expression.

$y + 11x - 5x + 2y =$ _____

$-5t + 11x + x + 2t =$ _____

$r + r - 3r + 2r =$ _____

$y^2 + 5x - 5x - 2y =$ _____

- 3.) Add the following mixed numbers (lowest terms).

$2\frac{1}{4} + 1\frac{2}{3} =$ LCD = ____

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

- 1.) Determine whether the given value is a solution of the equation.

$17 - x = 12;$ $x = 4$ Yes or No

$56 = 8m;$ $m = 7$ Yes or No

$S^2 - 9 = 16;$ $S = 5$ Yes or No

- 2.) Combine the like terms – simplify the expression.

$y + 11x - 5x + 2y =$ _____

$-5t + 11x + x + 2t =$ _____

$r + r - 3r + 2r =$ _____

$y^2 + 5x - 5x - 2y =$ _____

- 3.) Add the following mixed numbers (lowest terms).

$2\frac{1}{4} + 1\frac{2}{3} =$ LCD = ____

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

- 1.) Determine whether the given value is a solution of the equation.

$17 - x = 12$; $x = 4$ Yes or **No**

$17 - 4 = 12$

$13 \neq 12$ Both Sides are Not Equal

$56 = 8m$; $m = 7$ **Yes** or No

$56 = 8(7)$

$56 = 56$ Both Sides are Equal

$S^2 - 9 = 16$; $S = 5$ **Yes** or No

$(5)^2 - 9 = 16$

$25 - 9 = 16$

$16 = 16$ Both Sides are Equal

- 2.) Combine the like terms – simplify the expression.

$y + 11x - 5x + 2y =$ $3y + 6x$

$-5t + -11x + x + 2t =$ $-3t - 10x$

$r + r - 3r + 2r =$ r

$y^2 + 5x - 5x - 2y =$ $y^2 - 2y$

- 3.) Add the following mixed numbers (lowest terms).

$2\frac{1}{4} + 1\frac{2}{3} =$ **$3\frac{11}{12}$** LCD = 12

$\frac{9}{4} + \frac{5}{3} =$

$\frac{27}{12} + \frac{20}{12} =$ **$\frac{47}{12}$**

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

- 1.) Determine whether the given value is a solution of the equation.

$17 - x = 12$; $x = 4$ Yes or **No**

$17 - 4 = 12$

$13 \neq 12$ Both Sides are Not Equal

$56 = 8m$; $m = 7$ **Yes** or No

$56 = 8(7)$

$56 = 56$ Both Sides are Equal

$S^2 - 9 = 16$; $S = 5$ **Yes** or No

$(5)^2 - 9 = 16$

$25 - 9 = 16$

$16 = 16$ Both Sides are Equal

- 2.) Combine the like terms – simplify the expression.

$y + 11x - 5x + 2y =$ $3y + 6x$

$-5t + -11x + x + 2t =$ $-3t - 10x$

$r + r - 3r + 2r =$ r

$y^2 + 5x - 5x - 2y =$ $y^2 - 2y$

- 3.) Add the following mixed numbers (lowest terms).

$2\frac{1}{4} + 1\frac{2}{3} =$ **$3\frac{11}{12}$** LCD = 12

$\frac{9}{4} + \frac{5}{3} =$

$\frac{27}{12} + \frac{20}{12} =$ **$\frac{47}{12}$**

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

- 1.) Determine whether the given value is a solution of the equation.

$6x = 24;$ $x = 4$ Yes or No

$54 \div 9 = 6m;$ $m = 2$ Yes or No

$S^3 + (-1) = 7;$ $S = 2$ Yes or No

- 2.) Combine the like terms – simplify the expression.

$k^3 - 3p - 2k^3 =$ _____

$5t^2 + -2t^2 + t^2 - 2t =$ _____

$3y - y + y - 3y + 2y =$ _____

$2y^2 + 5x - 7x - 2y =$ _____

- 3.) Subtract the following mixed numbers (lowest terms).

$2\frac{2}{4} - 1\frac{2}{3} =$ LCD = ____

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

- 1.) Determine whether the given value is a solution of the equation.

$6x = 24;$ $x = 4$ Yes or No

$54 \div 9 = 6m;$ $m = 2$ Yes or No

$S^3 + (-1) = 7;$ $S = 2$ Yes or No

- 2.) Combine the like terms – simplify the expression.

$k^3 - 3p - 2k^3 =$ _____

$5t^2 + -2t^2 + t^2 - 2t =$ _____

$3y - y + y - 3y + 2y =$ _____

$2y^2 + 5x - 7x - 2y =$ _____

- 3.) Subtract the following mixed numbers (lowest terms).

$2\frac{2}{4} - 1\frac{2}{3} =$ LCD = ____

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

- 1.) Determine whether the given value is a solution of the equation.

$6x = 24; \quad x = 4$ **Yes** or No
 $6(4) = 24$
 $24 = 24$ Both Sides are Equal

$54 \div 9 = 6m; \quad m = 2$ Yes or **No**
 $6 = 6(2)$
 $6 \neq 12$ Both Sides are Not Equal

$S^3 + (-1) = 7; \quad S = 2$ **Yes** or No
 $(2)^3 + -1 = 7$
 $8 + -1 = 7$
 $7 = 7$ Both Sides are Equal

- 2.) Combine the like terms – simplify the expression.

$k^3 - 3p - 2k^3 = \underline{k^3 - 3p + (-2k^3) = -k^3 - 3p}$

$5t^2 + -2t^2 + t^2 - 2t = \underline{4t^2 - 2t}$

$3y - y + y - 3y + 2y = \underline{2y}$

$2y^2 + 5x - 7x - 2y = \underline{2y^2 - 2x - 2y}$

- 3.) Subtract the following mixed numbers (lowest terms).

$2\frac{2}{4} - 1\frac{2}{3} = \boxed{\frac{5}{6}}$ LCD = 12

$\frac{10}{4} - \frac{5}{3} = \boxed{}$

$\frac{30}{12} - \frac{20}{12} = \boxed{\frac{10}{12}}$

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

- 1.) Determine whether the given value is a solution of the equation.

$6x = 24; \quad x = 4$ **Yes** or No
 $6(4) = 24$
 $24 = 24$ Both Sides are Equal

$54 \div 9 = 6m; \quad m = 2$ Yes or **No**
 $6 = 6(2)$
 $6 \neq 12$ Both Sides are Not Equal

$S^3 + (-1) = 7; \quad S = 2$ **Yes** or No
 $(2)^3 + -1 = 7$
 $8 + -1 = 7$
 $7 = 7$ Both Sides are Equal

- 2.) Combine the like terms – simplify the expression.

$k^3 - 3p - 2k^3 = \underline{k^3 - 3p + (-2k^3) = -k^3 - 3p}$

$5t^2 + -2t^2 + t^2 - 2t = \underline{4t^2 - 2t}$

$3y - y + y - 3y + 2y = \underline{2y}$

$2y^2 + 5x - 7x - 2y = \underline{2y^2 - 2x - 2y}$

- 3.) Subtract the following mixed numbers (lowest terms).

$2\frac{2}{4} - 1\frac{2}{3} = \boxed{\frac{5}{6}}$ LCD = 12

$\frac{10}{4} - \frac{5}{3} = \boxed{}$

$\frac{30}{12} - \frac{20}{12} = \boxed{\frac{10}{12}}$

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

- 1.) Determine whether the given value is a solution of the equation.

$8x - 3 = 21$; $x = 3$ Yes or No

- 2.) Combine the like terms – simplify the expression.

$n^2 + 6p - 5n^2 =$ _____

$5t + 6t^2 + 6t^2 - 2t =$ _____

$2w - 2w + 2w - 3w + 2y =$ _____

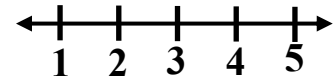
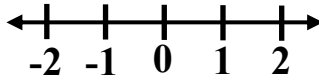
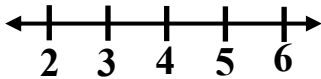
$m^2 + 6m^2 - 5m^4 =$ _____

- 3.) Solve the equations below and graph the solution.

$y + 5 = 9$

$11 - n = 9$

$12p = 36$



Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

- 1.) Determine whether the given value is a solution of the equation.

$8x - 3 = 21$; $x = 3$ Yes or No

- 2.) Combine the like terms – simplify the expression.

$n^2 + 6p - 5n^2 =$ _____

$5t + 6t^2 + 6t^2 - 2t =$ _____

$2w - 2w + 2w - 3w + 2y =$ _____

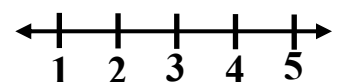
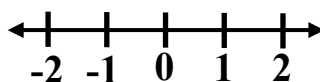
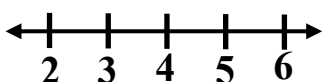
$m^2 + 6m^2 - 5m^4 =$ _____

- 3.) Solve the equations below and graph the solution.

$y + 5 = 9$

$11 - n = 9$

$12p = 36$



Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

- 1.) Determine whether the given value is a solution of the equation.

$8x - 3 = 21$; $x = 3$ **Yes** or No

$8(3) - 3 = 21$

$24 - 3 = 21$

$21 = 21$ Both Sides are Equal

- 2.) Combine the like terms – simplify the expression.

$n^2 + 6p - 5n^2 =$ $6p - 4n^2$

$5t + 6t^2 + 6t^2 - 2t =$ $3t$

$2w - 2w + 2w - 3w + 2y =$ $2y - w$

$m^2 + 6m^2 - 5m^4 =$ $7m^2 - 5m^4$

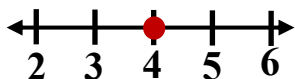
- 3.) Solve the equations below and graph the solution.

$y + 5 = 9$

$-5 = -5$

$y + 0 = 4$

$y = 4$



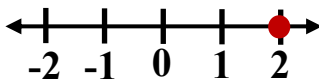
$11 - n = 9$

$+n = +n$

$11 = n + 9$

$-9 = -9$

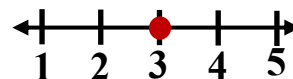
$2 = n$



$\frac{12p}{12} = \frac{36}{12}$

$1p = 3$

$p = 3$



Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

- 1.) Determine whether the given value is a solution of the equation.

$8x - 3 = 21$; $x = 3$ **Yes** or No

$8(3) - 3 = 21$

$24 - 3 = 21$

$21 = 21$ Both Sides are Equal

- 2.) Combine the like terms – simplify the expression.

$n^2 + 6p - 5n^2 =$ $6p - 4n^2$

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$2w - 2w + 2w - 3w + 2y =$ $2y - w$

$m^2 + 6m^2 - 5m^4 =$ $7m^2 - 5m^4$

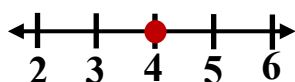
- 3.) Solve the equations below and graph the solution.

$y + 5 = 9$

$-5 = -5$

$y + 0 = 4$

$y = 4$



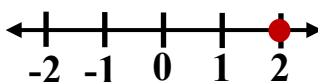
$11 - n = 9$

$+n = +n$

$11 = n + 9$

$-9 = -9$

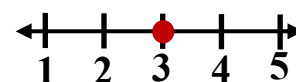
$2 = n$



$\frac{12p}{12} = \frac{36}{12}$

$1p = 3$

$p = 3$

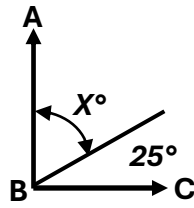


Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

- 1.) Determine whether the given value is a solution of the equation.

$15 = 25 - 3y$; $y = 3$ Yes or No

- 2.) **Write** an equation for the right-angle ABC right angle shown below. **Find** angle X° . *A right angle measures 90° .*



Equation: _____

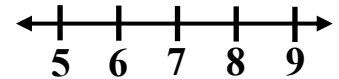
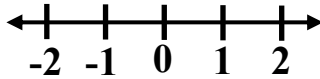
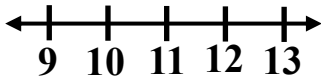
$x^\circ =$ _____

- 3.) Solve the equations below and graph the solution.

$7 = x - 5$

$-11n = 22$

$\frac{y}{4} = 2$

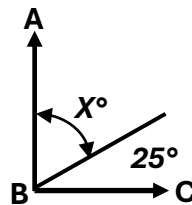


Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

- 1.) Determine whether the given value is a solution of the equation.

$15 = 25 - 3y$; $y = 3$ Yes or No

- 2.) **Write** an equation for the right-angle ABC right angle shown below. **Find** angle X° . *A right angle measures 90° .*



Equation: _____

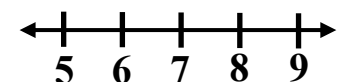
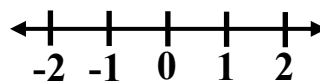
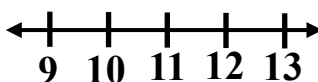
$x^\circ =$ _____

- 3.) Solve the equations below and graph the solution.

$7 = x - 5$

$-11n = 22$

$\frac{y}{4} = 2$



Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

- 1.) Determine whether the given value is a solution of the equation.

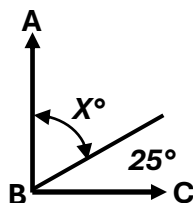
$15 = 25 - 3y$; $y = 3$ Yes or **No**

$15 = 25 - 3(3)$

$15 = 25 - 9$

$15 \neq 16$ Both Sides are NOT Equal

- 2.) **Write** an equation for the right-angle ABC right angle shown below. **Find** angle X° . A right angle measures 90° .



Equation: $x + 25 = 90$

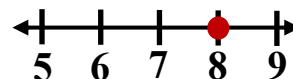
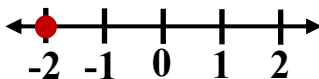
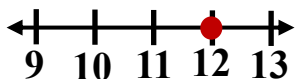
$$\begin{aligned} x^\circ &= \underline{65^\circ} & x + 25 &= 90 \\ & & -25 &= -25 \\ x + 0 &= 65 \\ x &= 65 \end{aligned}$$

- 3.) Solve the equations below and graph the solution.

$$\begin{aligned} 7 &= x - 5 \\ +5 &= +5 \\ 7 + 5 &= x \\ 12 &= x \end{aligned}$$

$$\begin{aligned} -11n &= 22 \\ \underline{-11} &= \underline{-11} \\ 1n &= -2 \\ n &= -2 \end{aligned}$$

$$\begin{aligned} 4x \frac{y}{4} &= 2x4 \\ 1y &= 8 \\ y &= 8 \end{aligned}$$



Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

- 1.) Determine whether the given value is a solution of the equation.

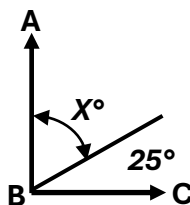
$15 = 25 - 3y$; $y = 3$ Yes or **No**

$15 = 25 - 3(3)$

$15 = 25 - 9$

$15 \neq 16$ Both Sides are NOT Equal

- 2.) **Write** an equation for the right-angle ABC right angle shown below. **Find** angle X° . A right angle measures 90° .



Equation: $x + 25 = 90$

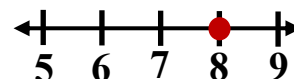
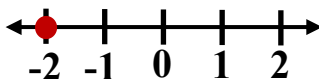
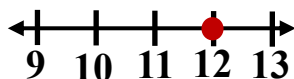
$$\begin{aligned} x^\circ &= \underline{65^\circ} & x + 25 &= 90 \\ & & -25 &= -25 \\ x + 0 &= 65 \\ x &= 65 \end{aligned}$$

- 3.) Solve the equations below and graph the solution.

$$\begin{aligned} 7 &= x - 5 \\ +5 &= +5 \\ 7 + 5 &= x \\ 12 &= x \end{aligned}$$

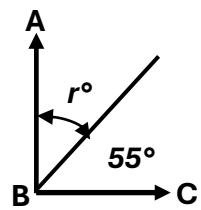
$$\begin{aligned} -11n &= 22 \\ \underline{-11} &= \underline{-11} \\ 1n &= -2 \\ n &= -2 \end{aligned}$$

$$\begin{aligned} 4x \frac{y}{4} &= 2x4 \\ 1y &= 8 \\ y &= 8 \end{aligned}$$



Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

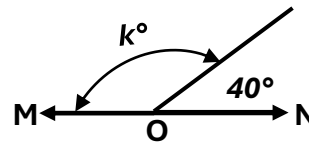
- 1.) **Write** an equation for the right-angle ABC right angle shown below. **Find** angle r° . A right angle measures 90° .



Equation: _____

$r^\circ =$ _____

- 2.) **Write** an equation for the straight-angle angle MON shown below. **Find** angle k° . A straight angle measures 180° .



Equation: _____

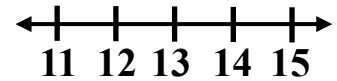
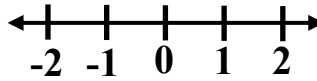
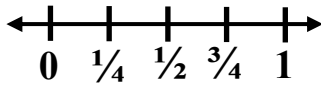
$k^\circ =$ _____

- 3.) Solve the equations below and graph the solution.

$b - \frac{1}{4} = \frac{1}{2}$

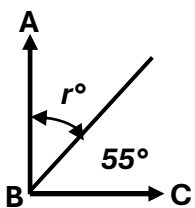
$6j = -12$

$\frac{z}{6} = 2$



Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

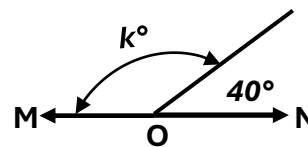
- 1.) **Write** an equation for the right-angle ABC right angle shown below. **Find** angle r° . A right angle measures 90° .



Equation: _____

$r^\circ =$ _____

- 2.) **Write** an equation for the straight-angle angle MON shown below. **Find** angle k° . A straight angle measures 180° .



Equation: _____

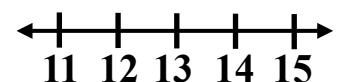
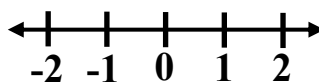
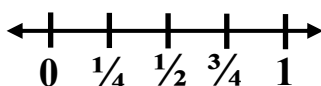
$k^\circ =$ _____

- 3.) Solve the equations below and graph the solution.

$b - \frac{1}{4} = \frac{1}{2}$

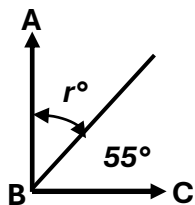
$6j = -12$

$\frac{z}{6} = 2$



Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

- 1.) **Write** an equation for the right-angle ABC right angle shown below. **Find** angle r° . A right angle measures 90° .



Equation: $r + 55 = 90$

$$\begin{aligned} r^\circ &= \underline{35^\circ} & x + 55 &= 90 \\ & & - 55 &= - 55 \\ & & x + 0 &= 35 \\ & & x &= 35 \end{aligned}$$

- 3.) Solve the equations below and graph the solution.

$$b - \frac{1}{4} = \frac{1}{2}$$

$$+ \frac{1}{4} \quad + \frac{1}{4}$$

$$b - 0 = \frac{1}{2} + \frac{1}{4}$$

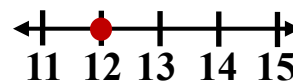
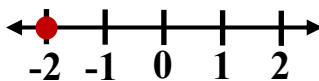
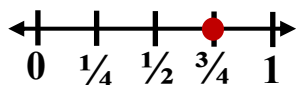
$$b = \frac{1}{2} + \frac{1}{4} = \frac{2}{4} + \frac{1}{4}$$

$$b = \frac{3}{4}$$

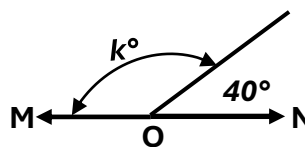
$$\frac{6j}{6} = \frac{-12}{6}$$

$$1j = -2$$

$$j = -2$$



- 2.) **Write** an equation for the straight-angle angle MON shown below. **Find** angle k° . A straight angle measures 180° .



Equation: $k + 40 = 180$

$$k^\circ = \underline{140^\circ}$$

$$k + 40 = 180$$

$$- 40 = - 40$$

$$k + 0 = 140$$

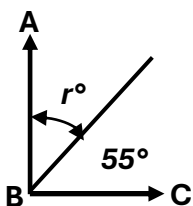
$$6x \frac{z}{6} = 2 \times 6 \quad k = 140$$

$$1z = 12$$

$$z = 12$$

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

- 1.) **Write** an equation for the right-angle ABC right angle shown below. **Find** angle r° . A right angle measures 90° .



Equation: $r + 55 = 90$

$$\begin{aligned} r^\circ &= \underline{35^\circ} & x + 55 &= 90 \\ & & - 55 &= - 55 \\ & & x + 0 &= 35 \\ & & x &= 35 \end{aligned}$$

- 3.) Solve the equations below and graph the solution.

$$b - \frac{1}{4} = \frac{1}{2}$$

$$+ \frac{1}{4} \quad + \frac{1}{4}$$

$$b - 0 = \frac{1}{2} + \frac{1}{4}$$

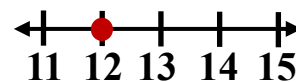
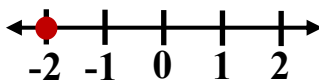
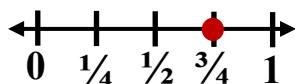
$$b = \frac{1}{2} + \frac{1}{4} = \frac{2}{4} + \frac{1}{4}$$

$$b = \frac{3}{4}$$

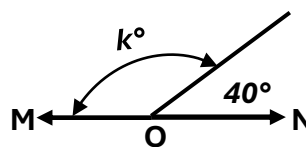
$$\frac{6j}{6} = \frac{-12}{6}$$

$$1j = -2$$

$$j = -2$$



- 2.) **Write** an equation for the straight-angle angle MON shown below. **Find** angle k° . A straight angle measures 180° .



Equation: $k + 40 = 180$

$$k^\circ = \underline{140^\circ}$$

$$k + 40 = 180$$

$$- 40 = - 40$$

$$k + 0 = 140$$

$$k = 140$$

$$6x \frac{z}{6} = 2 \times 6$$

$$1z = 12$$

$$z = 12$$

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

- 1.) Jeffery cleaned swimming pools. If he cleans 5 pools (P) in 4 hours (H), **write an equation** for the time (T) it takes to clean 1 pool in terms of H and P.

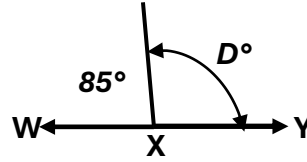
Equation: _____

What is the **unit** Time-T (in hours/pool) to for Jeffery to clean 1 pool? _____

- 2.) **Write** an equation for the straight-angle angle WXY shown below. **Find** angle D° . A straight angle measures 180° .

Equation: _____

$D^\circ =$ _____

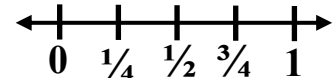
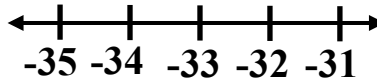
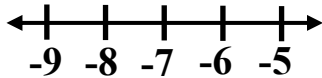


- 3.) Solve the equations below and graph the solution.

$$-2a = 18$$

$$\frac{k}{7} = -5$$

$$c + \frac{1}{4} = \frac{3}{4}$$



Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

- 1.) Jeffery cleaned swimming pools. If he cleans 5 pools (P) in 4 hours (H), **write an equation** for the time (T) it takes to clean 1 pool in terms of H and P.

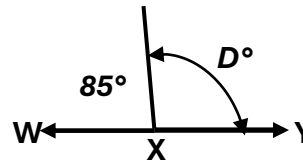
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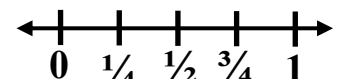
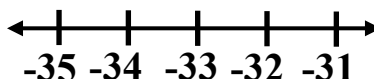
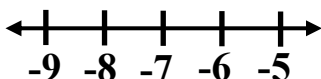


- 3.) Solve the equations below and graph the solution.

$$-2a = 18$$

$$\frac{k}{7} = -5$$

$$c + \frac{1}{4} = \frac{3}{4}$$



Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

- 1.) Jeffery cleaned swimming pools. If he cleans 5 pools (P) in 4 hours (H), what was the time (T) in hours he spent on 1 pool?

Equation: $T = \frac{H}{P}$ $T = \frac{4}{5}$ hour per pool

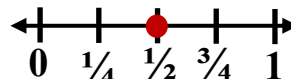
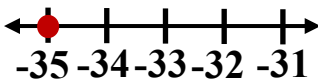
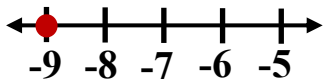
Jeffery cleans 1 pool every $\frac{4}{5}$ of an hour or every 48 minutes. **Check:** 48 minutes x 5 pools = 240 minutes or 4 hours. Set a ratio: $\frac{5}{4} = \frac{1}{(4/5)} = 1$ pool every 0.8 hour or 1 pool every 48 minutes. Also, $P(T) = H$ or $5T = 4$ where T is equal to time (hours) per unit pool.

- 3.) Solve the equations below and graph the solution.

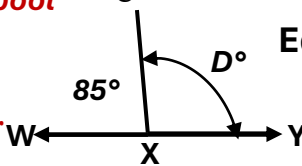
$$\begin{aligned} -2a &= 18 \\ \underline{-2} &= \underline{-2} \\ 1a &= -9 \\ a &= -9 \end{aligned}$$

$$\begin{aligned} 7x \frac{k}{7} &= -5 \times 7 \\ 1k &= -35 \\ k &= -35 \end{aligned}$$

$$\begin{aligned} c + \frac{1}{4} &= \frac{3}{4} \\ -\frac{1}{4} &-\frac{1}{4} \\ c - 0 &= \frac{3}{4} - \frac{1}{4} \\ c &= \frac{3}{4} - \frac{1}{4} = \frac{2}{4} \\ c &= \frac{1}{2} \end{aligned}$$



- 2.) **Write** an equation for the straight-angle angle WXY shown below. **Find** angle D° . A straight angle measures 180° .



Equation: $D + 85 = 180$

$D^\circ = 95^\circ$

$$D + 85 = 180$$

$$-85 = -85$$

$$D + 0 = 95$$

$$D = 95$$

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

- 1.) Jeffery cleaned swimming pools. If he cleans 5 pools (P) in 4 hours (H), what was the time (T) in hours he spent on 1 pool?

Equation: $T = \frac{H}{P}$ $T = \frac{4}{5}$ hour per pool

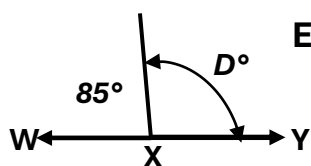
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- 3.) Solve the equations below and graph the solution.

$$\begin{aligned} -2a &= 18 \\ \underline{-2} &= \underline{-2} \\ 1a &= -9 \\ a &= -9 \end{aligned}$$

$$\begin{aligned} 7x \frac{k}{7} &= -5 \times 7 \\ 1k &= -35 \\ k &= -35 \end{aligned}$$

$$\begin{aligned} c + \frac{1}{4} &= \frac{3}{4} \\ -\frac{1}{4} &-\frac{1}{4} \\ c - 0 &= \frac{3}{4} - \frac{1}{4} \\ c &= \frac{3}{4} - \frac{1}{4} = \frac{2}{4} \\ c &= \frac{1}{2} \end{aligned}$$



Equation: $D + 85 = 180$

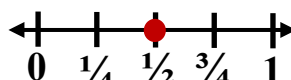
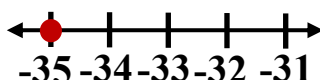
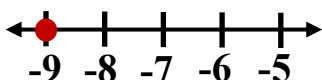
$D^\circ = 95^\circ$

$$D + 85 = 180$$

$$-85 = -85$$

$$D + 0 = 95$$

$$D = 95$$



Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

- 1.) Shawn drove 294 miles (M) and used 21 gallons (G) of gas. What was his car's miles per gallon (MPG)?

Equation: _____
 mpg = _____

- 2.) Chuck (C) ran 5 miles less than Bettina (B). If Bettina ran 21 miles, how far did Chuck run.

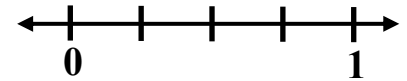
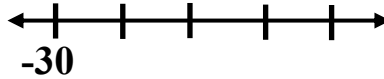
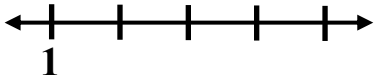
Equation: _____
 Chuck = _____ miles

- 3.) Solve the equations below and graph the solution.

$$-7a = -28$$

$$\frac{u}{9} = -3$$

$$d + \frac{1}{4} = \frac{1}{4}$$



Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

- 1.) Shawn drove 294 miles (M) and used 21 gallons (G) of gas. What was his car's miles per gallon (MPG)?

Equation: _____
 mpg = _____

- 2.) Chuck (C) ran 5 miles less than Bettina (B). If Bettina ran 21 miles, how far did Chuck run.

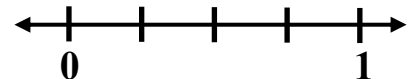
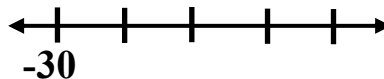
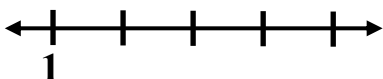
Equation: _____
 Chuck = _____ miles

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$$\frac{u}{9} = -3$$

$$d + \frac{1}{4} = \frac{1}{4}$$



Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

- 1.) Shawn drove 294 miles (M) and used 21 gallons (G) of gas. What was his car's miles per gallon (MPG)?

Equation: $(MPG) = \frac{M}{G}$

$$\begin{array}{r} 14 \\ 21 \overline{)294} \\ \underline{21} \\ 84 \\ \underline{84} \\ 0 \end{array}$$

mpg = 14

- 2.) Chuck (C) ran 5 miles less than Bettina (B). If Bettina ran 21 miles, how far did Chuck run.

Equation: $B - 5 = C$

$$\begin{aligned} B - 5 &= C \\ 21 - 5 &= C \\ 16 &= C \end{aligned}$$

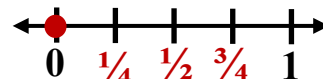
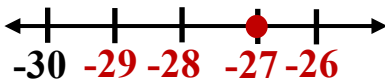
Chuck = 16 miles

- 3.) Solve the equations below and graph the solution.

$$\begin{aligned} -7a &= -28 \\ \frac{-7a}{-7} &= \frac{-28}{-7} \\ 1a &= 4 \\ a &= 4 \end{aligned}$$

$$\begin{aligned} 9x \frac{u}{9} &= -3 \times 9 \\ 1u &= -27 \\ u &= -27 \end{aligned}$$

$$\begin{aligned} d + \frac{1}{4} &= \frac{1}{4} \\ -\frac{1}{4} \quad -\frac{1}{4} \\ d - 0 &= 0 \\ d &= 0 \end{aligned}$$



Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

- 1.) Shawn drove 294 miles (M) and used 21 gallons (G) of gas. What was his car's miles per gallon (MPG)?

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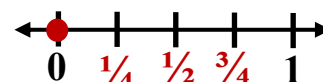
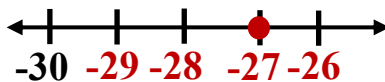
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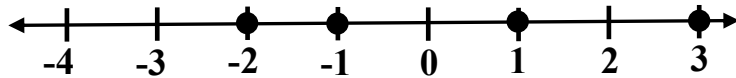
$$\begin{aligned} 9x \frac{u}{9} &= -3 \times 9 \\ 1u &= -27 \\ u &= -27 \end{aligned}$$

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Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Which equation matches the data shown on the number line?



- (A) $x < -2$ (C) $x \geq -2$
 (B) $x \leq -2$ (D) $x > -2$

2.) **Write** the mathematical equation on the line that matches words in the sentence.

The sum of y and 3 is less than 8.

The difference of 4 and w is more than 7.

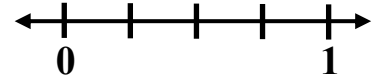
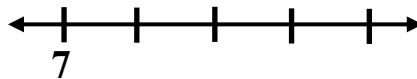
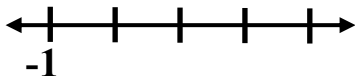
The product of -2 and k is equal to -14.

3.) Solve the inequalities below and graph the solution.

$4 + x < 5$

$u - 4 \geq 6$

$n + \frac{1}{4} \geq \frac{1}{4}$



Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

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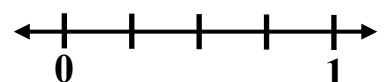
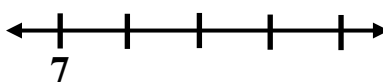
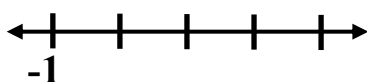
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$4 + x < 5$

$u - 4 \geq 6$

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2.) **Write** the mathematical equation on the line that matches words in the sentence.

The sum of y and 3 is less than 8.

$y + 3 < 8$

The difference of 4 and w is more than 7.

$4 - w > 7$

The product of -2 and k is equal to -14 .

$-2k = -14$

3.) Solve the inequalities below and graph the solution.

$4 + x < 5$

$-4 \quad -4$

$0 + x < 1$

$x < 1$

$u - 4 \geq 6$

$+4 \quad +4$

$u + 0 \geq 10$

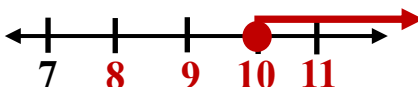
$u \geq 10$

$n + \frac{1}{4} \geq \frac{1}{4}$

$-\frac{1}{4} \quad -\frac{1}{4}$

$n - 0 \geq 0$

$n \geq 0$



Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Which equation matches the data shown on the number line?



- (A) $x < -2$ (C) $x \geq -2$
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2.) **Write** the mathematical equation on the line that matches words in the sentence.

The sum of y and 3 is less than 8.

$y + 3 < 8$

The difference of 4 and w is more than 7.

$4 - w > 7$

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$-4 \quad -4$

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$x < 1$

$u - 4 \geq 6$

$+4 \quad +4$

$u + 0 \geq 10$

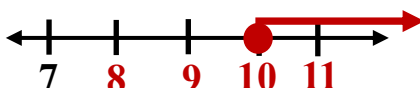
$u \geq 10$

$n + \frac{1}{4} \geq \frac{1}{4}$

$-\frac{1}{4} \quad -\frac{1}{4}$

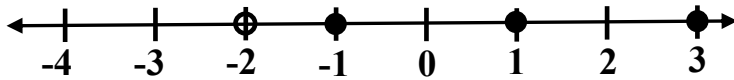
$n - 0 \geq 0$

$n \geq 0$



Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Which equation matches the data shown on the number line?



- (A) $x < -2$ (C) $x > -2$
 (B) $x \leq -2$ (D) $x > -3$

2.) **Write** the mathematical equation on the line that matches words in the sentence.

The quotient of a number k and 4 is less than 2. _____

Three is greater than or equal to the difference of 8 and p . _____

Negative 5 is less than the product of -3 and m . _____

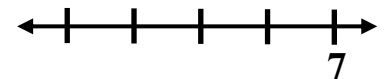
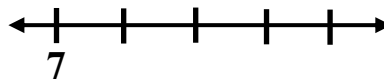
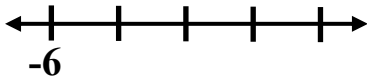
3.) Solve the inequalities below and graph the solution.

$-k < 5$

Hint:
Solve for positive k .

$g - 2 \leq 6$

$n - (-2) < 7$



Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Which equation matches the data shown on the number line?



- (A) $x < -2$ (C) $x > -2$
 (B) $x \leq -2$ (D) $x > -3$

2.) **Write** the mathematical equation on the line that matches words in the sentence.

The quotient of a number k and 4 is less than 2. _____

Three is greater than equal to the difference of 8 and p . _____

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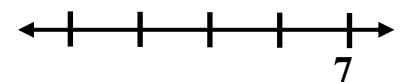
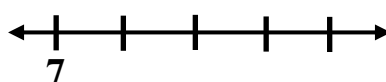
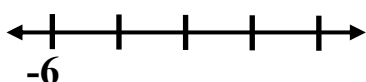
3.) Solve the inequalities below and graph the solution.

$-k < 5$

Hint:
Solve for positive k .

$g - 2 \leq 6$

$n - (-2) < 7$



Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Which equation matches the data shown on the number line?



- (A) $x < -2$ (C) $x > -2$
 (B) $x \leq -2$ (D) $x > -3$

3.) Solve the inequalities below and graph the solution.

$$\frac{-k}{-1} < \frac{5}{-1}$$

$$k > -5$$

Hint:
Solve for
positive k.

$$g - 2 \leq 6$$

$$+2 \quad +2$$

$$g + 0 \leq 8$$

$$g \leq 8$$

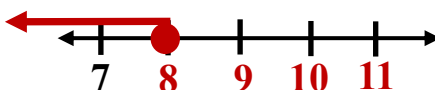
$$n - (-2) < 7$$

$$n + 2 < 7$$

$$-2 \quad -2$$

$$n + 0 < 5$$

$$n < 5$$



Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Which equation matches the data shown on the number line?



- (A) $x < -2$ (C) $x > -2$
 (B) $x \leq -2$ (D) $x > -3$

2.) **Write** the mathematical equation on the line that matches words in the sentence.

The quotient of a number k and 4 is less than 2. $\frac{k}{4} < 2$

Three is greater than equal to the difference of 8 and p . $3 \geq 8 - p$

Negative 5 is less than the product of -3 and m . $-5 < -3m$ or $-3m > -5$

3.) Solve the inequalities below and graph the solution.

$$\frac{-k}{-1} < \frac{5}{-1}$$

$$k > -5$$

Hint:
Solve for
positive k.

$$g - 2 \leq 6$$

$$+2 \quad +2$$

$$g + 0 \leq 8$$

$$g \leq 8$$

$$n - (-2) < 7$$

$$n + 2 < 7$$

$$-2 \quad -2$$

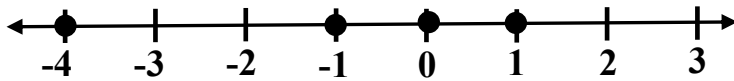
$$n + 0 < 5$$

$$n < 5$$



Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Which equation matches the data shown on the number line?



- (A) $n < -4$ (C) $n > -3$
 (B) $n \leq 1$ (D) $n \geq 1$

3.) Solve the equations and graph the solution.

$$\frac{-r}{10} < 2$$

Hint:
Solve for
negative r.

$$2n - 2 \leq 6$$

- (A) -2 (B) 0 (C) -1 (D) 1

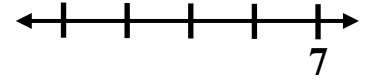
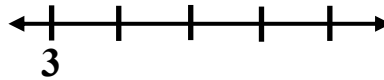
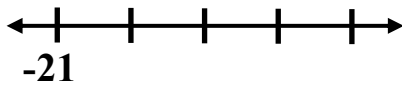
$$t - (-6) = 9$$

2.) **Write** the mathematical equation on the line that matches words in the sentence.

3 is less than the quotient of a number m and 7. _____

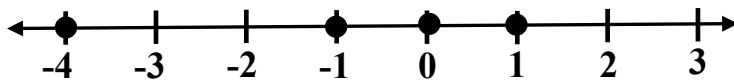
Five is less than or equal to the sum of 12 and r . _____

What **integer** is in front of the variable $-k$?



Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Which equation matches the data shown on the number line?



- (A) $n < -4$ (C) $n > -3$
 (B) $n \leq 1$ (D) $n \geq 1$

3.) Solve the equations and graph the solution.

$$\frac{-r}{10} < 2$$

Hint:
Solve for
negative r.

$$2n - 2 \leq 6$$

2.) **Write** the mathematical equation on the line that matches words in the sentence.

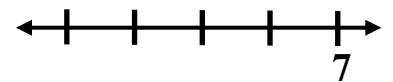
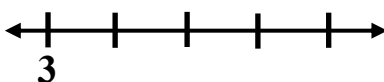
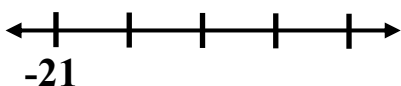
3 is less than the quotient of a number m and 7. _____

Five is less than or equal to the sum of 12 and r . _____

What **integer** is in front of the variable $-k$?

- (A) -2 (B) 0 (C) -1 (D) 1

$$t - (-6) = 9$$



Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Which equation matches the data shown on the number line?



- (A) $n < -4$ (C) $n > -3$
 (B) $n \leq 1$ (D) $n \geq 1$

3.) Solve the equations and graph the solution.

$$\begin{aligned}
 10 \times \frac{-r}{10} &< 2 \times 10 \\
 -r &< 20 \\
 -1 \quad -1 \\
 r &> -20
 \end{aligned}$$

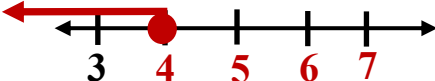
Hint:
Solve for
negative r.

$$\begin{aligned}
 2n - 2 &\leq 6 \\
 +2 \quad +2 \\
 2n + 0 &\leq 8 \\
 \underline{2n} &\leq \underline{8} \\
 +2 \quad +2 \\
 n &\leq 4
 \end{aligned}$$

Note: 1 or -1 is

always in front of a $t - (-6) = 9$
variable (x, y, k etc.), $t + 6 = 9$ *rewrite*
if it is a lone variable. $-6 \quad -6$
 $t + 0 = 3$
 $t = 3$

- (A) -2 (B) 0 (C) -1 (D) 1



Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Which equation matches the data shown on the number line?



- (A) $n < -4$ (C) $n > -3$
 (B) $n \leq 1$ (D) $n \geq 1$

3.) Solve the equations and graph the solution.

$$\begin{aligned}
 10 \times \frac{-r}{10} &< 2 \times 10 \\
 -r &< 20 \\
 -1 \quad -1 \\
 r &> -20
 \end{aligned}$$

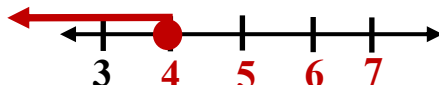
Hint:
Solve for
negative r.

$$\begin{aligned}
 2n - 2 &\leq 6 \\
 +2 \quad +2 \\
 2n + 0 &\leq 8 \\
 \underline{2n} &\leq \underline{8} \\
 +2 \quad +2 \\
 n &\leq 4
 \end{aligned}$$

Note: 1 or -1 is

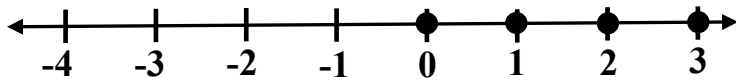
always in front of a $t - (-6) = 9$
variable (x, y, k etc.), $t + 6 = 9$ *rewrite*
if it is a lone variable. $-6 \quad -6$
 $t + 0 = 3$
 $t = 3$

- (A) -2 (B) 0 (C) -1 (D) 1



Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Which equation matches the data shown on the number line?



- (A) $m < -1$ (C) $m > -3$
 (B) $0 \leq m \leq 3$ (D) $0 < m \leq 3$

2.) Think: Use $>$ or $<$ to complete.

If $a < b$ and $c > 0$, then, ac bc

Check your answer. If $a=2$, $b=3$ and $c = -2$, then $ac =$ _____ and $bc=$ _____. ac is _____.

Check your answer. If $a=-3$, $b=-2$ and $c = -2$, then $ac =$ _____ and $bc=$ _____. ac is _____.

3.) Solve the equations and graph the solution.

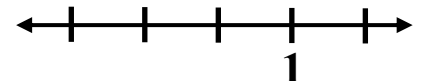
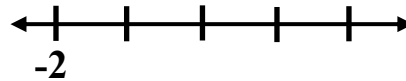
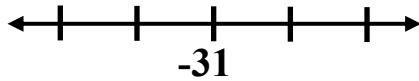
$$5 \geq \frac{p}{-6}$$

$$5f + 1 \leq 6$$

4.) What **integer** is in front of the variable y ?

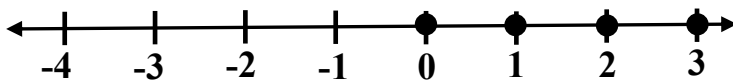
- (A) -1 (B) 0 (C) -2 (D) 1

$$m + (-2) = -4$$



Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Which equation matches the data shown on the number line?



- (A) $m < -1$ (C) $m > -3$
 (B) $0 \leq m \leq 3$ (D) $0 < m \leq 3$

2.) Think: Use $>$ or $<$ to complete.

If $a < b$ and $c > 0$, then, ac bc

Check your answer. If $a=2$, $b=3$ and $c = -2$, then $ac =$ _____ and $bc=$ _____. ac is _____.

Check your answer. If $a=-3$, $b=-2$ and $c = -2$, then $ac =$ _____ and $bc=$ _____. ac is _____.

3.) Solve the equations and graph the solution.

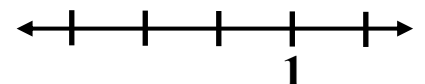
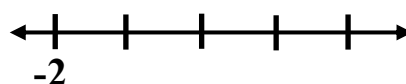
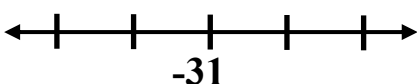
$$5 \geq \frac{p}{-6}$$

$$5f + 1 \leq 6$$

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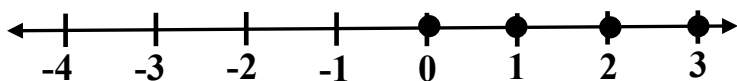
- (A) -1 (B) 0 (C) -2 (D) 1

$$m + (-2) = -4$$



Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

- 1.) Which equation matches the data shown on the number line? 2.) Think: Use > or < to complete.



If $a < b$ and $c > 0$, then, ac $>$ bc

- (A) $m < -1$ (C) $m > -3$
 (B) $0 \leq m \leq 3$ (D) $0 < m \leq 3$

Note: check both positive and negative numbers.
 Check your answer. If $a=2, b=3$ and $c = -2$, then $ac = -4$ and $bc = -6$. ac is bigger.
 Check your answer. If $a=-3, b=-2$ and $c = -2$, then $ac = 6$ and $bc = 4$. ac is bigger.

- 3.) Solve the equations and graph the solution.

$$-6 \leq \frac{p}{-6} - 6$$

$$-30 \leq p$$

$$p \geq -30 \text{ Easier to read.}$$

$$5f + 1 \leq 6$$

$$\underline{-1} \quad \underline{-1}$$

$$5f + 0 \leq 5$$

$$\underline{5f} \leq \underline{5}$$

$$\underline{+5} \quad \underline{+5}$$

$$f \leq 1$$

- 4.) What integer is in front of the variable y?

- (A) -1 (B) 0 (C) -2 (D) 1

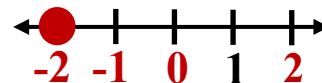
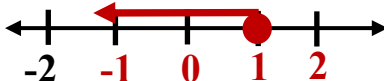
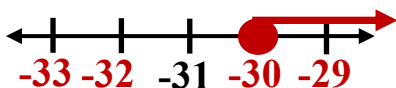
$$m + (-2) = -4$$

$$m - 2 = -4 \text{ rewrite}$$

$$\underline{+2} \quad \underline{+2}$$

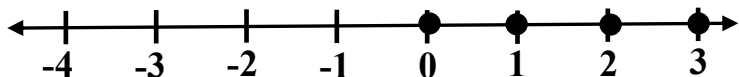
$$m + 0 = -2$$

$$m = -2$$



Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

- 1.) Which equation matches the data shown on the number line? 2.) Think: Use > or < to complete.



If $a < b$ and $c > 0$, then, ac $>$ bc

- (A) $m < -1$ (C) $m > -3$
 (B) $0 \leq m \leq 3$ (D) $0 < m \leq 3$

Note: check both positive and negative numbers.
 Check your answer. If $a=2, b=3$ and $c = -2$, then $ac = -4$ and $bc = -6$. ac is bigger.
 Check your answer. If $a=-3, b=-2$ and $c = -2$, then $ac = 6$ and $bc = 4$. ac is bigger.

- 3.) Solve the equations and graph the solution.

$$-6 \leq \frac{p}{-6} - 6$$

$$-30 \leq p$$

$$p \geq -30 \text{ Easier to read.}$$

$$5f + 1 \leq 6$$

$$\underline{-1} \quad \underline{-1}$$

$$5f + 0 \leq 5$$

$$\underline{5f} \leq \underline{5}$$

$$\underline{+5} \quad \underline{+5}$$

$$f \leq 1$$

- 4.) What integer is in front of the variable y?

- (A) -1 (B) 0 (C) -2 (D) 1

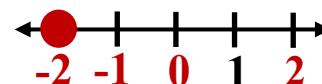
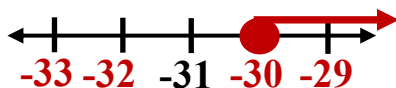
$$m + (-2) = -4$$

$$m - 2 = -4 \text{ rewrite}$$

$$\underline{+2} \quad \underline{+2}$$

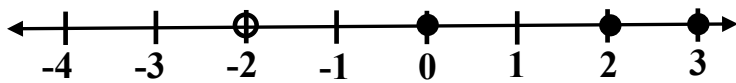
$$m + 0 = -2$$

$$m = -2$$



Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

- 1.) Which interval matches the data shown on the number line? 2.) Think: Use $>$ or $<$ to complete.



- (A) $-2 \leq r < 3$ (C) $-2 < r \leq 3$
 (B) $-2 \leq r \leq 3$ (D) $-2 < r < 3$

If $r < s$ and $t > 0$, then, rt st

Check your answer. If $r=2$, $s=3$ and $t = 2$, then $rt =$ _____ and $st=$ _____. rt is _____.

Check your answer. If $r=-3$, $s=-2$ and $t = 2$, then $rt =$ _____ and $st=$ _____. rt is _____.

- 3.) Solve the equations and graph the solution.

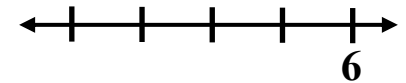
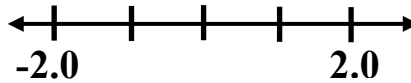
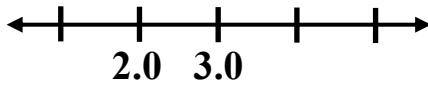
$0.2x = 1.0$

$y - 0.8 < 1.2$

$3d - (-2) \geq 14$

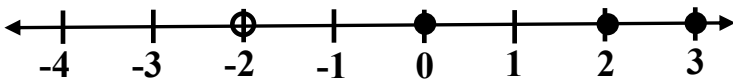
- 4.) What is the coefficient of each variable?

-t: _____ k: _____ -4s: _____ $\frac{1}{2}p$: _____



Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

- 1.) Which interval matches the data shown on the number line? 2.) Think: Use $>$ or $<$ to complete.



- (A) $-2 \leq r < 3$ (C) $-2 < r \leq 3$
 (B) $-2 \leq r \leq 3$ (D) $-2 < r < 3$

- 4.) What is the coefficient of each variable?

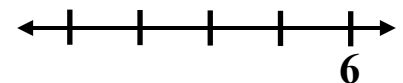
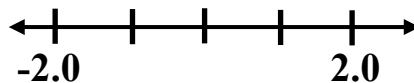
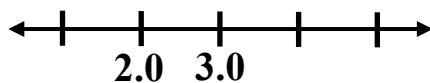
-t: _____ k: _____ -4s: _____ $\frac{1}{2}p$: _____

- 3.) Solve the equations and graph the solution.

$0.2x = 1.0$

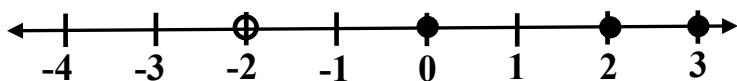
$y - 0.8 < 1.2$

$3d - (-2) \geq 14$



Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

- 1.) Which interval matches the data shown on the number line? 2.) Think: Use > or < to complete.



- (A) $-2 \leq r < 3$ (B) $-2 < r \leq 3$
 (C) $-2 \leq r \leq 3$ (D) $-2 < r < 3$

If $r < s$ and $t > 0$, then, rt $\textcircled{<}$ st

Check your answer. If $r=2$, $s=3$ and $t = 2$, then $rt = 4$ and $st= 6$. rt is smaller.

Check your answer. If $r=-3$, $s=-2$ and $t = 2$, then $rt = -6$ and $st= -4$. rt is smaller.

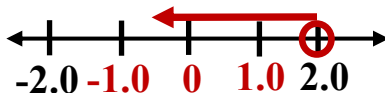
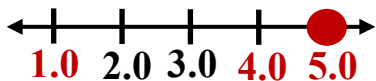
- 3.) Solve the equations and graph the solution.

$$\begin{array}{r} 0.2x = 1.0 \\ \underline{0.2} \quad \underline{0.2} \\ x = 5 \end{array}$$

$$\begin{array}{r} y - 0.8 < 1.2 \\ \quad +0.8 \quad +0.8 \\ y - 0 < 2.0 \\ y < 2.0 \end{array}$$

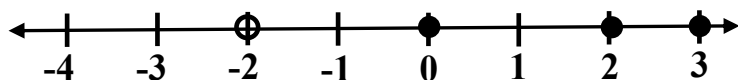
$$3d - (-2) \geq 14$$

$$\begin{array}{r} 3d + 2 \geq 14 \text{ rewrite} \\ \quad -2 \quad -2 \\ 3d \geq 12 \\ \underline{3} \quad \underline{3} \\ d \geq 4 \end{array}$$



Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

- 1.) Which interval matches the data shown on the number line? 2.) Think: Use > or < to complete.



- (A) $-2 \leq r < 3$ (B) $-2 < r \leq 3$
 (C) $-2 \leq r \leq 3$ (D) $-2 < r < 3$

If $r < s$ and $t > 0$, then, rt $\textcircled{<}$ st

Check your answer. If $r=2$, $s=3$ and $t = 2$, then $rt = 4$ and $st= 6$. rt is smaller.

Check your answer. If $r=-3$, $s=-2$ and $t = 2$, then $rt = -6$ and $st= -4$. rt is smaller.

- 4.) What is the **coefficient** of each variable?

-t: -1 k: 1 -4s: -4 $\frac{1}{2}p$: $\frac{1}{2}$

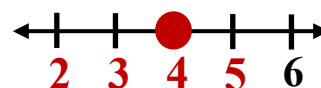
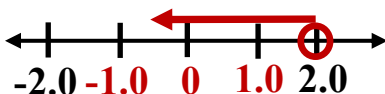
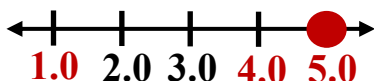
- 3.) Solve the equations and graph the solution.

$$\begin{array}{r} 0.2x = 1.0 \\ \underline{0.2} \quad \underline{0.2} \\ x = 5 \end{array}$$

$$\begin{array}{r} y - 0.8 < 1.2 \\ \quad +0.8 \quad +0.8 \\ y - 0 < 2.0 \\ y < 2.0 \end{array}$$

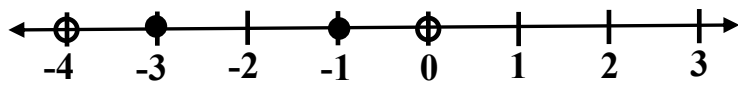
$$3d - (-2) \geq 14$$

$$\begin{array}{r} \text{rewrite } 3d + 2 \geq 14 \\ \quad -2 \quad -2 \\ 3d \geq 12 \\ \underline{3} \quad \underline{3} \\ d \geq 4 \end{array}$$



Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Which interval matches the data shown on the number line?



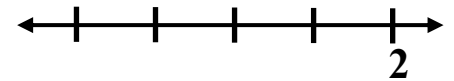
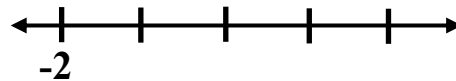
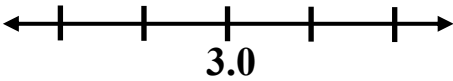
- (A) $-4 < j < 0$ (C) $-4 < j \leq 0$
 (B) $-4 \leq j \leq 0$ (D) $-4 \leq j < 0$

3.) Solve the equations and graph the solution.

$-r \geq -2.0$

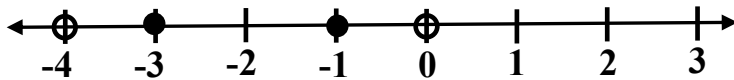
$7x - 2x - 5 > 5$

$2h + (-2) = -4$



Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

1.) Which interval matches the data shown on the number line?



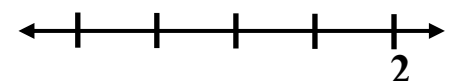
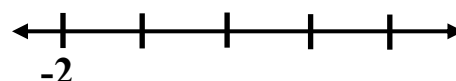
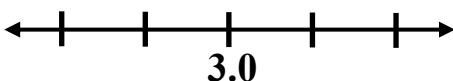
- (A) $-4 < j < 0$ (C) $-4 < j \leq 0$
 (B) $-4 \leq j \leq 0$ (D) $-4 \leq j < 0$

3.) Solve the equations and graph the solution.

$-r \geq -2.0$

$7x - 2x - 5 > 5$

$2h + (-2) = -4$



2.) Think: Use $>$ or $<$ to complete.

If $m > n$ and $p < 0$, then, mp np

Check your answer. If $n=2$, $m=3$ and $p = -2$, then $mp =$ _____ and $np =$ _____. mp is _____.

Check your answer. If $m=-2$, $n = -3$ and $p = -2$, then $mp =$ _____ and $np =$ _____. mp is _____.

4.) What is the coefficient of each variable?

$-3t$: _____ j : _____ $-1w$: _____ $\frac{1}{4}a$: _____

Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

- 1.) Which interval matches the data shown on the number line? 2.) Think: Use $>$ or $<$ to complete.



- $-4 < j < 0$ $-4 < j \leq 0$
 $-4 \leq j \leq 0$ $-4 \leq j < 0$

- 3.) Solve the equations and graph the solution.

$$-r \geq -2.0$$

$$\frac{-r}{-1} \geq \frac{-2.0}{-1}$$

$$r \leq 2.0$$

$$7x - 2x - 5 > 5$$

$$5x - 5 > 5$$

$$\frac{5x}{5} > \frac{10}{5}$$

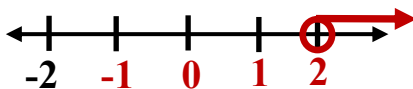
$$x > 2$$

$$2h + (-2) = -4$$

$$2h - 2 = -4 \text{ rewrite}$$

$$\frac{2h}{2} = \frac{-2}{2}$$

$$h = -1$$



Directions: Correctly complete in the time allotted by your teacher. Read quietly when finished.

- 1.) Which interval matches the data shown on the number line? 2.) Think: Use $>$ or $<$ to complete.



- $-4 < j < 0$ $-4 < j \leq 0$
 $-4 \leq j \leq 0$ $-4 \leq j < 0$

- 3.) Solve the equations and graph the solution.

$$-r \geq -2.0$$

$$\frac{-r}{-1} \geq \frac{-2.0}{-1}$$

$$r \leq 2.0$$

$$7x - 2x - 5 > 5$$

$$5x - 5 > 5$$

$$\frac{5x}{5} > \frac{10}{5}$$

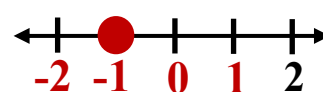
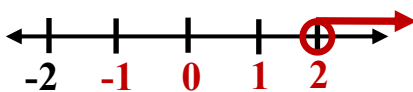
$$x > 2$$

$$2h + (-2) = -4$$

$$\text{rewrite } 2h - 2 = -4$$

$$\frac{2h}{2} = \frac{-2}{2}$$

$$h = -1$$



Appendix

Curricular Resources

Note: More resources in the ‘Additional Reference Literature’ Section’ at the end of the white papers.

Appendix ---Table of Contents

Resource Name	Page Number
Multiples (1-12) – one (1) per page – <i>5 minutes to finish</i>	A1-A2
Multiples (1-12) – two (2) per page	A3
Multiples (10-90) – one (1) per page – <i>5 minutes to finish</i>	A4-A5
Making 10 – Level 1 – <i>5 minutes to finish</i>	A6-A7
Making 100 – Level 1 – <i>5 minutes to finish</i>	A8-A9
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Divisibility Rules Practice Sheets	A16-A21
Making 10 – Level 2 – <i>5 minutes to finish</i>	A22-A23
Making 100 – Level 2 and Level 3 – <i>5 minutes to finish</i>	A24-A27
Making 1 Whole – Level 1, Level 2 and Level 3 – <i>5 minutes to finish</i>	A28-A33
Doubles – Small and Large Numbers (<i>Use at beg. of school year</i>) <i>1 minute to finish</i>	A34-A35
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Compression Method to Finding Factor Strings - Pedagogy	A38 a, b, c
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Cartesian Coordinate - Teacher Model Use – Quadrant 1	A41
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Additive or Multiplicative Tables – Student Practice	A55-A58
Negative Positive Integer Number Line (-12 to +12) Student Aid – 11 x 17 Paper	<i>Free Download</i>
(Makes 5 student resource number line aids per sheet)	<i>Website Address</i>
	<i>In Footer –</i>
	<i>Under ‘Expertise</i>
	<i>Resources’ Tab</i>

Multiples (1 – 12)

Directions: Fill in the table with the correct multiples by skip counting downward.

1	2	3	4	5	6	7	8	9	10	11	12
0	0	0	0								
1	2	3									
2	4										
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											

Multiples (1 – 12)

Answer Key

Directions: Fill in the table with the correct multiples by skip counting downward.

1	2	3	4	5	6	7	8	9	10	11	12
0	0	0	0	0	0	0	0	0	0	0	0
1	2	3	4	5	6	7	8	9	10	11	12
2	4	6	8	10	12	14	16	18	20	22	24
3	6	9	12	15	18	21	24	27	30	33	36
4	8	12	16	20	24	28	32	36	40	44	48
5	10	15	20	25	30	35	40	45	50	55	60
6	12	18	24	30	36	42	48	54	60	66	72
7	14	21	28	35	42	49	56	63	70	77	84
8	16	24	32	40	48	56	64	72	80	88	96
9	18	27	36	45	54	63	72	81	90	99	108
10	20	30	40	50	60	70	80	90	100	110	120
11	22	33	44	55	66	77	88	99	110	121	132
12	24	36	48	60	72	84	96	108	120	132	144

MULTIPLES 1-12

Name _____

1	2	3	4	5	6	7	8	9	10	11	12
0	0	0	0	0	0	0					
1	2	3	4	5							
2	4	6									
3	6										
4											
5											
6											
7											
8											
9											
10											
11											
12											

MULTIPLES 1-12

Name _____

1	2	3	4	5	6	7	8	9	10	11	12
0	0	0	0	0	0	0					
1	2	3	4	5							
2	4	6									
3	6										
4											
5											
6											
7											
8											
9											
10											
11											
12											

Multiples – Level 2 – (10 through 90)

Building Numeracy Skills

Directions: In 5 minutes, fill in the table with the correct multiples by skip counting downward.

(Hint 1: Think about counting by 1's, 2's, 3's, 4's, 5's, 6's, 7's, 8's, and 9's. Then add a zero.)

Example: 2, 4, 6, 8... Then, add a zero to get - 20, 40, 60, 80...

(Hint 2: Practice the 25's and 75's in small segments until you can do them all in order.

Example: 0, 25, 50 Then, 0, 25, 50, 75... adding a number, and you will be fast.

10	15	20	25	30	40	50	60	70	75	80	90
<i>0</i>	<i>0</i>										
<i>10</i>											
<i>20</i>											

Multiples – Level 2 – (10 through 90)

Answer Key

Directions: In 5 minutes, fill in the table with the correct multiples by skip counting downward.

(Hint 1: Think about counting by 1's, 2's, 3's, 4's, 5's 6's, 7's, 8's, and 9's. Then add a zero.)

Example: 2, 4, 6, 8... Then, add a zero to get - 20, 40, 60, 80...

(Hint 2: Practice the 25's and 75's in small segments until you can do them all in order.

Example: 0, 25, 50 Then, 0, 25, 50, 75... adding a number, and you will be fast.

10	15	20	25	30	40	50	60	70	75	80	90
0	0	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
10	<u>15</u>	<u>20</u>	<u>25</u>	<u>30</u>	<u>40</u>	<u>50</u>	<u>60</u>	<u>70</u>	<u>75</u>	<u>80</u>	<u>90</u>
20	<u>30</u>	<u>40</u>	<u>50</u>	<u>60</u>	<u>80</u>	<u>100</u>	<u>120</u>	<u>140</u>	<u>150</u>	<u>160</u>	<u>180</u>
<u>30</u>	<u>45</u>	<u>60</u>	<u>75</u>	<u>90</u>	<u>120</u>	<u>150</u>	<u>180</u>	<u>210</u>	<u>225</u>	<u>240</u>	<u>270</u>
<u>40</u>	<u>60</u>	<u>80</u>	<u>100</u>	<u>120</u>	<u>160</u>	<u>200</u>	<u>240</u>	<u>280</u>	<u>300</u>	<u>320</u>	<u>360</u>
<u>50</u>	<u>75</u>	<u>100</u>	<u>125</u>	<u>150</u>	<u>200</u>	<u>250</u>	<u>300</u>	<u>350</u>	<u>375</u>	<u>400</u>	<u>450</u>
<u>60</u>	<u>90</u>	<u>120</u>	<u>150</u>	<u>180</u>	<u>240</u>	<u>300</u>	<u>360</u>	<u>420</u>	<u>450</u>	<u>480</u>	<u>540</u>
<u>70</u>	<u>105</u>	<u>140</u>	<u>175</u>	<u>210</u>	<u>280</u>	<u>350</u>	<u>420</u>	<u>490</u>	<u>525</u>	<u>560</u>	<u>630</u>
<u>80</u>	<u>120</u>	<u>160</u>	<u>200</u>	<u>240</u>	<u>320</u>	<u>400</u>	<u>480</u>	<u>560</u>	<u>600</u>	<u>640</u>	<u>720</u>
<u>90</u>	<u>135</u>	<u>180</u>	<u>225</u>	<u>270</u>	<u>360</u>	<u>450</u>	<u>540</u>	<u>630</u>	<u>675</u>	<u>720</u>	<u>810</u>
<u>100</u>	<u>150</u>	<u>200</u>	<u>250</u>	<u>300</u>	<u>400</u>	<u>500</u>	<u>600</u>	<u>700</u>	<u>750</u>	<u>800</u>	<u>900</u>

Making 10 – Numeracy Practice

Building Numeracy Skills

Directions: Fill in each box so the two numbers SUM to 10.

10	0
5	5
8	2
4	
7	
2	
4	
3	
8	
1	
0	
3	
6	
9	
1	
5	
8	
2	
1	
5	
0	
2	
4	
7	

8	
4	
3	
5	
2	
1	
9	
3	
7	
4	
5	
2	
6	
8	
0	
2	
7	
3	
1	
9	
4	
5	
6	
9	

7	
6	
8	
2	
5	
1	
8	
2	
0	
3	
5	
7	
6	
4	
8	
1	
0	
5	
3	
7	
2	
6	
4	
8	

6	
7	
1	
4	
10	
9	
2	
6	
3	
8	
1	
7	
5	
2	
0	
8	
2	
5	
1	
7	
2	
9	
2	
4	

Making 10 – Numeracy Practice

Answer Key

Directions: Fill in each box so the two numbers SUM to 10.

10	0
5	5
8	2
4	6
7	3
2	8
4	6
3	7
8	2
1	9
0	10
3	7
6	4
9	1
1	9
5	5
8	2
2	8
1	9
5	5
0	10
2	8
4	6
7	3

8	2
4	6
3	7
5	5
2	8
1	9
9	1
3	7
7	3
4	6
5	5
2	8
6	4
8	2
0	10
2	8
7	3
3	7
1	9
9	1
4	6
5	5
6	4
9	1

7	3
6	4
8	2
2	8
5	5
1	9
8	2
2	8
0	10
3	7
5	5
7	3
6	4
4	6
8	2
1	9
0	10
5	5
3	7
7	3
2	8
6	4
4	6
8	2

6	4
7	3
1	9
4	6
10	0
9	1
2	8
6	4
3	7
8	2
1	9
7	3
5	5
2	8
0	10
8	2
2	8
5	5
1	9
7	3
2	8
9	1
2	8
4	6

Making 100 – Level 1

Building Numeracy Skills

Directions: Fill in each box so the two numbers SUM to a total of 100.

100	0
80	20
10	90
70	
60	
10	
40	
50	
20	
70	
0	
30	
60	
90	
10	
50	
80	
20	
10	
50	
0	
20	
40	
70	

80	
40	
30	
50	
20	
10	
90	
30	
70	
40	
50	
20	
60	
80	
0	
20	
70	
30	
10	
90	
40	
50	
60	
90	

70	
60	
80	
20	
50	
10	
80	
20	
0	
30	
50	
70	
60	
40	
80	
10	
0	
50	
30	
70	
20	
60	
40	
80	

60	
70	
10	
40	
100	
90	
20	
60	
30	
80	
10	
70	
50	
20	
0	
80	
20	
50	
10	
70	
20	
90	
20	
40	

Making 100 – Level 1

Answer Key

Directions: Fill in each box so the two numbers SUM to a total of 100.

100	0
80	20
10	90
70	30
60	40
10	90
40	60
50	50
20	80
70	30
0	100
30	70
60	40
90	10
10	90
50	50
80	20
20	80
10	90
50	50
0	100
20	80
40	60
70	30

80	20
40	60
30	70
50	50
20	80
10	90
90	10
30	70
70	30
40	60
50	50
20	80
60	40
80	20
0	100
20	80
70	30
30	70
10	90
90	10
40	60
50	50
60	40
90	10

70	30
60	40
80	20
20	80
50	50
10	90
80	20
20	80
0	100
30	70
50	50
70	30
60	40
40	60
80	20
10	90
0	100
50	50
30	70
70	30
20	80
60	40
40	60
80	20

60	40
70	30
10	90
40	60
100	0
90	10
20	80
60	40
30	70
80	20
10	90
70	30
50	50
20	80
0	100
80	20
20	80
50	50
10	90
70	30
20	80
90	10
20	80
40	60

Divisibility Rules Practice – V1

Directions: Determine the divisibility of each number and write on the line if divisible by the following.

Rules:

- A number is divisible by 2 – IF the *one's digit* is even number (0, 2, 4, 6, 8).
- A number is divisible by 5 – IF the *one's digit* is a '5' or a '0'.
- A number is divisible by 10 – IF the *one's digit* is a '0'.

1.	30	<u>Divisible by 2, 5, and 10</u>	2.	25	_____
3.	40	_____	4.	18	_____
5.	45	_____	6.	80	_____
7.	98	_____	8.	105	_____
9.	64	_____	10.	125	_____
11.	256	_____	12.	250	_____
13.	385	_____	14.	322	_____
15.	438	_____	16.	480	_____
17.	742	_____	18.	625	_____
19.	900	_____	20.	1,326	_____

Divisibility Rules Practice – V1

Answer Key

Directions: Determine the disability of each number and write on the line if divisible by the following.

Rules:

- A number is divisible by 2 – IF the *one's digit* is even number (0, 2, 4, 6, 8).
- A number is divisible by 5 – IF the *one's digit* is a '5' or a '0'.
- A number is divisible by 10 – IF the *one's digit* is a '0'.

- | | | | | | |
|-----|-----|----------------------------------|-----|-------|----------------------------------|
| 1. | 30 | <u>Divisible by 2, 5, and 10</u> | 2. | 25 | <u>Divisible by 5</u> |
| 3. | 40 | <u>Divisible by 2, 5, and 10</u> | 4. | 18 | <u>Divisible by 2</u> |
| 5. | 45 | <u>Divisible by 5</u> | 6. | 80 | <u>Divisible by 2, 5, and 10</u> |
| 7. | 98 | <u>Divisible by 2</u> | 8. | 105 | <u>Divisible by 5</u> |
| 9. | 64 | <u>Divisible by 2</u> | 10. | 125 | <u>Divisible by 5</u> |
| 11. | 256 | <u>Divisible by 2</u> | 12. | 250 | <u>Divisible by 2, 5, and 10</u> |
| 13. | 385 | <u>Divisible by 5</u> | 14. | 322 | <u>Divisible by 2</u> |
| 15. | 438 | <u>Divisible by 2</u> | 16. | 480 | <u>Divisible by 2, 5, and 10</u> |
| 17. | 742 | <u>Divisible by 2</u> | 18. | 625 | <u>Divisible by 5</u> |
| 19. | 900 | <u>Divisible by 2, 5, and 10</u> | 20. | 1,326 | <u>Divisible by 2</u> |

Divisibility Rules Practice – V2

Directions: Determine the disability of each number and write on the line if divisible by the following.

Rules:

- A number is divisible by 2 – IF the one's digit is even number (0, 2, 4, 6, 8).
- A number is divisible by 3 – IF the sum of the digits are evenly **divisible** by 3.
- A number is divisible by 6 – IF the number is divisible by both 2 and 3.
- A number is divisible by 9 – IF the sum of the digits are evenly **divisible** by 9.

1. 234	<u>Divisible by 2, 3, 6 and 9</u>	2. 54	_____
3. 240	_____	4. 141	_____
5. 138	_____	6. 81	_____
7. 51	_____	8. 342	_____
9. 63	_____	10. 222	_____
11. 459	_____	12. 450	_____
13. 594	_____	14. 72	_____
15. 918	_____	16. 480	_____
17. 441	_____	18. 621	_____
19. 903	_____	20. 1,326	_____

Divisibility Rules Practice – V2

Answer Key

Directions: Determine the disability of each number and write on the line if divisible by the following.

Rules:

- A number is divisible by 2 – IF the one's digit is even number (0, 2, 4, 6, 8).
- A number is divisible by 3 – IF the sum of the digits are evenly divisible by 3.
- A number is divisible by 6 – IF the number is divisible by both 2 and 3.
- A number is divisible by 9 – IF the sum of the digits are evenly divisible by 9.

- | | | | |
|---------|-----------------------------------|-----------|-----------------------------------|
| 1. 234 | <u>Divisible by 2, 3, 6 and 9</u> | 2. 54 | <u>Divisible by 2, 3, 6 and 9</u> |
| 3. 240 | <u>Divisible by 2, 3, and 6</u> | 4. 141 | <u>Divisible by 3</u> |
| 5. 138 | <u>Divisible by 2, 3, and 6</u> | 6. 81 | <u>Divisible by 3 and 9</u> |
| 7. 51 | <u>Divisible by 3</u> | 8. 342 | <u>Divisible by 2, 3, 6 and 9</u> |
| 9. 63 | <u>Divisible by 3 and 9</u> | 10. 222 | <u>Divisible by 2, 3, and 6</u> |
| 11. 459 | <u>Divisible by 3 and 9</u> | 12. 450 | <u>Divisible by 2, 3, and 9</u> |
| 13. 594 | <u>Divisible by 2, 3, 6 and 9</u> | 14. 72 | <u>Divisible by 2, 3, 6 and 9</u> |
| 15. 918 | <u>Divisible by 2, 3, 6 and 9</u> | 16. 480 | <u>Divisible by 2, 3, and 6</u> |
| 17. 441 | <u>Divisible by 3 and 9</u> | 18. 621 | <u>Divisible by 3 and 9</u> |
| 19. 903 | <u>Divisible by 3</u> | 20. 1,326 | <u>Divisible by 2, 3 and 6</u> |

Divisibility Rules Practice – V3

Directions: Determine the disability of each number and write on the line if divisible by the following.

Rules:

- A number is divisible by 2 – IF the one's digit is even number (0, 2, 4, 6, 8).
- A number is divisible by 3 – IF the sum of the digits are evenly **divisible** by 3.
- A number is divisible by 5 – IF the one's digit is a '5' or a '0'.
- A number is divisible by 6 – IF the number is divisible by both 2 and 3.
- A number is divisible by 9 – IF the sum of the digits are evenly **divisible** by 9.
- A number is divisible by 10 – IF the one's digit is a '0'.

1. 990	<u>Divisible by 2, 3, 5, 6, 9, 10</u>	2. 54	_____
3. 126	_____	4. 141	_____
5. 150	_____	6. 81	_____
7. 51	_____	8. 405	_____
9. 72	_____	10. 333	_____
11. 549	_____	12. 468	_____
13. 234	_____	14. 72	_____
15. 270	_____	16. 480	_____
17. 255	_____	18. 620	_____
19. 702	_____	20. 3,036	_____

Divisibility Rules Practice – V3

Answer Key

Directions: Determine the disability of each number and write on the line if divisible by the following.

Rules:

- A number is divisible by 2 – IF the one's digit is even number (0, 2, 4, 6, 8).
- A number is divisible by 3 – IF the sum of the digits are evenly **divisible** by 3.
- A number is divisible by 5 – IF the one's digit is a '5' or a '0'.
- A number is divisible by 6 – IF the number is divisible by both 2 and 3.
- A number is divisible by 9 – IF the sum of the digits are evenly **divisible** by 9.
- A number is divisible by 10 – IF the one's digit is a '0'.

- | | | | |
|---------|---------------------------------------|-----------|------------------------------------|
| 1. 990 | <u>Divisible by 2, 3, 5, 6, 9, 10</u> | 2. 54 | <u>Divisible by 2, 3, 6 and 9</u> |
| 3. 126 | <u>Divisible by 2, 3, 6, 9</u> | 4. 141 | <u>Divisible by 3</u> |
| 5. 150 | <u>Divisible by 2, 3, 5, 6, 10</u> | 6. 81 | <u>Divisible by 3 and 9</u> |
| 7. 51 | <u>Divisible by 3</u> | 8. 405 | <u>Divisible by 3, 5 and 9</u> |
| 9. 72 | <u>Divisible by 2, 3, 6, 9</u> | 10. 333 | <u>Divisible by 3 and 9</u> |
| 11. 549 | <u>Divisible by 3 and 9</u> | 12. 468 | <u>Divisible by 2, 3, 6, 9</u> |
| 13. 234 | <u>Divisible by 2, 3, 6, 9</u> | 14. 72 | <u>Divisible by 2, 3, 6, 9</u> |
| 15. 270 | <u>Divisible by 2, 3, 5, 6, 9, 10</u> | 16. 480 | <u>Divisible by 2, 3, 6, 5, 10</u> |
| 17. 255 | <u>Divisible by 3 and 5</u> | 18. 620 | <u>Divisible by 2, 5, 10</u> |
| 19. 702 | <u>Divisible by 2, 3, 6, 9</u> | 20. 3,036 | <u>Divisible by 2, 3 and 6</u> |

Divisibility Rules Practice – V1

Building Numeracy Skills

Directions: Determine the divisibility of each number and write on the line if divisible by the following.

Rules:

- A number is divisible by 2 – IF the *one's digit* is even number (0, 2, 4, 6, 8).
- A number is divisible by 5 – IF the *one's digit* is a '5' or a '0'.
- A number is divisible by 10 – IF the *one's digit* is a '0'.

1.	30	<u>Divisible by 2, 5, and 10</u>	2.	25	_____
3.	40	_____	4.	18	_____
5.	45	_____	6.	80	_____
7.	98	_____	8.	105	_____
9.	64	_____	10.	125	_____
11.	256	_____	12.	250	_____
13.	385	_____	14.	322	_____
15.	438	_____	16.	480	_____
17.	742	_____	18.	625	_____
19.	900	_____	20.	1,326	_____

Divisibility Rules Practice – V1

Answer Key

Directions: Determine the disability of each number and write on the line if divisible by the following.

Rules:

- A number is divisible by 2 – IF the *one's digit* is even number (0, 2, 4, 6, 8).
- A number is divisible by 5 – IF the *one's digit* is a '5' or a '0'.
- A number is divisible by 10 – IF the *one's digit* is a '0'.

- | | | | | | |
|-----|-----|----------------------------------|-----|-------|----------------------------------|
| 1. | 30 | <u>Divisible by 2, 5, and 10</u> | 2. | 25 | <u>Divisible by 5</u> |
| 3. | 40 | <u>Divisible by 2, 5, and 10</u> | 4. | 18 | <u>Divisible by 2</u> |
| 5. | 45 | <u>Divisible by 5</u> | 6. | 80 | <u>Divisible by 2, 5, and 10</u> |
| 7. | 98 | <u>Divisible by 2</u> | 8. | 105 | <u>Divisible by 5</u> |
| 9. | 64 | <u>Divisible by 2</u> | 10. | 125 | <u>Divisible by 5</u> |
| 11. | 256 | <u>Divisible by 2</u> | 12. | 250 | <u>Divisible by 2, 5, and 10</u> |
| 13. | 385 | <u>Divisible by 5</u> | 14. | 322 | <u>Divisible by 2</u> |
| 15. | 438 | <u>Divisible by 2</u> | 16. | 480 | <u>Divisible by 2, 5, and 10</u> |
| 17. | 742 | <u>Divisible by 2</u> | 18. | 625 | <u>Divisible by 5</u> |
| 19. | 900 | <u>Divisible by 2, 5, and 10</u> | 20. | 1,326 | <u>Divisible by 2</u> |

Divisibility Rules Practice – V2

Building Numeracy Skills

Directions: Determine the disability of each number and write on the line if divisible by the following.

Rules:

- A number is divisible by 2 – IF the one's digit is even number (0, 2, 4, 6, 8).
- A number is divisible by 3 – IF the sum of the digits are evenly divisible by 3.
- A number is divisible by 6 – IF the number is divisible by both 2 and 3.
- A number is divisible by 9 – IF the sum of the digits are evenly divisible by 9.

1. 234 Divisible by 2, 3, 6 and 9 2. 54 _____

3. 240 _____ 4. 141 _____

5. 138 _____ 6. 81 _____

7. 51 _____ 8. 342 _____

9. 63 _____ 10. 222 _____

11. 459 _____ 12. 450 _____

13. 594 _____ 14. 72 _____

15. 918 _____ 16. 480 _____

17. 441 _____ 18. 621 _____

19. 903 _____ 20. 1,326 _____

Divisibility Rules Practice – V2

Answer Key

Directions: Determine the disability of each number and write on the line if divisible by the following.

Rules:

- A number is divisible by 2 – IF the one's digit is even number (0, 2, 4, 6, 8).
- A number is divisible by 3 – IF the sum of the digits are evenly divisible by 3.
- A number is divisible by 6 – IF the number is divisible by both 2 and 3.
- A number is divisible by 9 – IF the sum of the digits are evenly divisible by 9.

- | | | | |
|---------|-----------------------------------|-----------|-----------------------------------|
| 1. 234 | <u>Divisible by 2, 3, 6 and 9</u> | 2. 54 | <u>Divisible by 2, 3, 6 and 9</u> |
| 3. 240 | <u>Divisible by 2, 3, and 6</u> | 4. 141 | <u>Divisible by 3</u> |
| 5. 138 | <u>Divisible by 2, 3, and 6</u> | 6. 81 | <u>Divisible by 3 and 9</u> |
| 7. 51 | <u>Divisible by 3</u> | 8. 342 | <u>Divisible by 2, 3, 6 and 9</u> |
| 9. 63 | <u>Divisible by 3 and 9</u> | 10. 222 | <u>Divisible by 2, 3, and 6</u> |
| 11. 459 | <u>Divisible by 3 and 9</u> | 12. 450 | <u>Divisible by 2, 3, and 9</u> |
| 13. 594 | <u>Divisible by 2, 3, 6 and 9</u> | 14. 72 | <u>Divisible by 2, 3, 6 and 9</u> |
| 15. 918 | <u>Divisible by 2, 3, 6 and 9</u> | 16. 480 | <u>Divisible by 2, 3, and 6</u> |
| 17. 441 | <u>Divisible by 3 and 9</u> | 18. 621 | <u>Divisible by 3 and 9</u> |
| 19. 903 | <u>Divisible by 3</u> | 20. 1,326 | <u>Divisible by 2, 3 and 6</u> |

Divisibility Rules Practice – V3

Building Numeracy Skills

Directions: Determine the disability of each number and write on the line if divisible by the following.

Rules:

- A number is divisible by 2 – IF the one's digit is even number (0, 2, 4, 6, 8).
- A number is divisible by 3 – IF the sum of the digits are evenly **divisible** by 3.
- A number is divisible by 5 – IF the one's digit is a '5' or a '0'.
- A number is divisible by 6 – IF the number is divisible by both 2 and 3.
- A number is divisible by 9 – IF the sum of the digits are evenly **divisible** by 9.
- A number is divisible by 10 – IF the one's digit is a '0'.

1.	990	<u>Divisible by 2, 3, 5, 6, 9, 10</u>	2.	54	_____
3.	126	_____	4.	141	_____
5.	150	_____	6.	81	_____
7.	51	_____	8.	405	_____
9.	72	_____	10.	333	_____
11.	549	_____	12.	468	_____
13.	234	_____	14.	72	_____
15.	270	_____	16.	480	_____
17.	255	_____	18.	620	_____
19.	702	_____	20.	3,036	_____

Divisibility Rules Practice – V3

Answer Key

Directions: Determine the disability of each number and write on the line if divisible by the following.

Rules:

- A number is divisible by 2 – IF the one's digit is even number (0, 2, 4, 6, 8).
- A number is divisible by 3 – IF the sum of the digits are evenly **divisible** by 3.
- A number is divisible by 5 – IF the one's digit is a '5' or a '0'.
- A number is divisible by 6 – IF the number is divisible by both 2 and 3.
- A number is divisible by 9 – IF the sum of the digits are evenly **divisible** by 9.
- A number is divisible by 10 – IF the one's digit is a '0'.

- | | | | |
|---------|---------------------------------------|-----------|------------------------------------|
| 1. 990 | <u>Divisible by 2, 3, 5, 6, 9, 10</u> | 2. 54 | <u>Divisible by 2, 3, 6 and 9</u> |
| 3. 126 | <u>Divisible by 2, 3, 6, 9</u> | 4. 141 | <u>Divisible by 3</u> |
| 5. 150 | <u>Divisible by 2, 3, 5, 6, 10</u> | 6. 81 | <u>Divisible by 3 and 9</u> |
| 7. 51 | <u>Divisible by 3</u> | 8. 405 | <u>Divisible by 3, 5 and 9</u> |
| 9. 72 | <u>Divisible by 2, 3, 6, 9</u> | 10. 333 | <u>Divisible by 3 and 9</u> |
| 11. 549 | <u>Divisible by 3 and 9</u> | 12. 468 | <u>Divisible by 2, 3, 6, 9</u> |
| 13. 234 | <u>Divisible by 2, 3, 6, 9</u> | 14. 72 | <u>Divisible by 2, 3, 6, 9</u> |
| 15. 270 | <u>Divisible by 2, 3, 5, 6, 9, 10</u> | 16. 480 | <u>Divisible by 2, 3, 6, 5, 10</u> |
| 17. 255 | <u>Divisible by 3 and 5</u> | 18. 620 | <u>Divisible by 2, 5, 10</u> |
| 19. 702 | <u>Divisible by 2, 3, 6, 9</u> | 20. 3,036 | <u>Divisible by 2, 3 and 6</u> |

Making 10 – Level 2

Building Numeracy Skills

Making 10.0 Directions: Fill in each box so the two numbers SUM to 10.0

Hint: Add up. Example: $6.4 \rightarrow 6.4 \text{ to } 7.0 = \underline{0.6} \rightarrow 7.0 \text{ to } 10.0 = \underline{3.0} \rightarrow \text{Therefore, } \underline{0.6} + \underline{3.0} = \underline{3.6}$

10.0	0
9.4	0.6
8.1	1.9
7.4	2.6
6.9	
5.3	
4.9	
3.5	
2.8	
1.7	
0	
3.4	
6.2	
9.3	
1.0	
0.5	
8.4	
2.6	
1.2	
5.4	
0	
2.3	
4.1	

8.1	
4.7	
3.0	
5.1	
2.7	
1.3	
9.8	
3.2	
7.6	
4.5	
5.2	
2.5	
6.1	
8.6	
0	
2.1	
7.5	
3.2	
1.8	
9.6	
4.1	
5.5	
6.0	

7.0	
6.8	
8.9	
2.1	
5.1	
1.0	
8.5	
2.3	
0	
3.4	
5.2	
7.6	
6.0	
4.5	
8.1	
1.3	
10.0	
5.3	
3.2	
7.9	
2.1	
4.0	
4.5	

6.1	
7.0	
1.5	
4.9	
10.0	
9.1	
9.9	
6.4	
3.4	
8.5	
1.1	
9.9	
5.0	
2.3	
0	
8.1	
2.5	
5.9	
1.3	
7.2	
2.0	
9.7	
2.3	

Making 10 – Level 2

Answer Key

Making 10.0 Directions: Fill in each box so the two numbers SUM to 10.0

Hint: Add up. Example: $6.4 \rightarrow 6.4 \text{ to } 7.0 = \underline{0.6} \rightarrow 7.0 \text{ to } 10.0 = \underline{3.0} \rightarrow \text{Therefore, } \underline{0.6} + \underline{3.0} = \underline{3.6}$

10.0	<u>0</u>
9.4	<u>0.6</u>
8.1	<u>1.9</u>
7.4	<u>2.6</u>
6.9	<u>3.1</u>
5.3	<u>4.7</u>
4.9	<u>5.1</u>
3.5	<u>6.5</u>
2.8	<u>7.2</u>
1.7	<u>8.3</u>
0	<u>10.0</u>
3.4	<u>6.6</u>
6.2	<u>3.8</u>
9.3	<u>0.7</u>
1.0	<u>9.0</u>
0.5	<u>9.5</u>
8.4	<u>1.6</u>
2.6	<u>7.4</u>
1.2	<u>8.8</u>
5.4	<u>4.6</u>
0	<u>10.0</u>
2.3	<u>7.7</u>
4.1	<u>5.9</u>

8.1	<u>1.9</u>
4.7	<u>5.3</u>
3.0	<u>7.0</u>
5.1	<u>4.9</u>
2.7	<u>7.3</u>
1.3	<u>8.7</u>
9.8	<u>0.2</u>
3.2	<u>6.8</u>
7.6	<u>2.4</u>
4.5	<u>5.5</u>
5.2	<u>4.8</u>
2.5	<u>7.5</u>
6.1	<u>3.9</u>
8.6	<u>1.4</u>
0	<u>10.0</u>
2.1	<u>7.9</u>
7.5	<u>2.5</u>
3.2	<u>6.8</u>
1.8	<u>8.2</u>
9.6	<u>0.4</u>
4.1	<u>5.9</u>
5.5	<u>4.5</u>
6.0	<u>4.0</u>

7.0	<u>3.0</u>
6.8	<u>3.2</u>
8.9	<u>1.1</u>
2.1	<u>7.9</u>
5.1	<u>4.9</u>
1.0	<u>9.0</u>
8.5	<u>1.5</u>
2.3	<u>7.7</u>
0	<u>10.0</u>
3.4	<u>6.6</u>
5.2	<u>4.8</u>
7.6	<u>2.4</u>
6.0	<u>4.0</u>
4.5	<u>5.5</u>
8.1	<u>1.9</u>
1.3	<u>8.7</u>
10.0	<u>0</u>
5.3	<u>4.7</u>
3.2	<u>6.8</u>
7.9	<u>2.1</u>
2.1	<u>7.9</u>
4.0	<u>6.0</u>
4.5	<u>5.5</u>

6.1	<u>3.9</u>
7.0	<u>3.0</u>
1.5	<u>8.5</u>
4.9	<u>5.1</u>
10.0	<u>0</u>
9.1	<u>0.9</u>
9.9	<u>0.1</u>
6.4	<u>3.6</u>
3.4	<u>6.6</u>
8.5	<u>1.5</u>
1.1	<u>8.9</u>
9.9	<u>0.1</u>
5.0	<u>5.0</u>
2.3	<u>7.7</u>
0	<u>10.0</u>
8.1	<u>1.9</u>
2.5	<u>7.5</u>
5.9	<u>4.1</u>
1.3	<u>8.7</u>
7.2	<u>2.8</u>
2.0	<u>8.0</u>
9.7	<u>0.3</u>
2.3	<u>7.7</u>

Making 100 – Level 2

Building Numeracy Skills

Directions: Fill in each box so the two numbers SUM to a total of 100.

Hint: Add up. Example: $55 \rightarrow 55 \text{ to } 60 = \underline{5} \rightarrow 60 \text{ to } 100 = \underline{40} \rightarrow \text{Therefore, } \underline{5} + \underline{40} = \underline{45}$

100	0
85	15
70	30
95	5
60	
55	
45	
35	
25	
10	
0	
35	
65	
95	
15	
55	
80	
25	
15	
5	
0	
25	
40	



95	
40	
35	
55	
25	
15	
90	
5	
75	
40	
55	
25	
65	
85	
0	
25	
70	
35	
5	
10	
45	
50	
65	



70	
65	
85	
5	
50	
15	
85	
25	
0	
30	
55	
75	
65	
45	
85	
15	
0	
5	
35	
75	
25	
65	
45	



5	
70	
15	
45	
100	
95	
20	
65	
35	
85	
15	
10	
55	
25	
0	
85	
25	
50	
15	
75	
25	
90	
25	

Making 100 – Level 2

Answer Key

Directions: Fill in each box so the two numbers SUM to a total of 100.

Hint: Add up. Example: $55 \rightarrow 55 \text{ to } 60 = \underline{5} \rightarrow 60 \text{ to } 100 = \underline{40} \rightarrow \text{Therefore, } \underline{5} + \underline{40} = \underline{45}$

100	0
85	15
70	30
95	5
60	40
55	45
45	55
35	65
25	75
10	90
0	100
35	65
65	35
95	5
15	85
55	45
80	20
25	75
15	85
5	95
0	100
25	75
40	60



95	5
40	60
35	65
55	45
25	75
15	85
90	10
5	95
75	25
40	60
55	45
25	75
65	35
85	15
0	100
25	75
70	30
35	65
5	95
10	90
45	55
50	50
65	35



70	30
65	35
85	15
5	95
50	50
15	85
85	15
25	75
0	100
30	70
55	45
75	25
65	35
45	55
85	15
15	85
0	100
5	95
35	65
75	25
25	75
65	35
45	55



5	95
70	30
15	85
45	55
100	0
95	5
20	80
65	35
35	65
85	15
15	85
10	90
55	45
25	75
0	100
85	15
25	75
50	50
15	85
75	25
25	75
90	10
25	75

Making 100 – Level 3

Building Numeracy Skills

Making 100 Directions: Fill in each box so the two numbers SUM to a total of 100.

Hint: Add up. Example: 24 → 24 to 30 = 6 → 30 to 100 = 70 → Therefore, 6 + 70 = 76

100	0
88	12
70	30
94	6
64	
49	
45	
35	
22	
10	
0	
37	
61	
99	
15	
59	
80	
29	
9	
3	
0	
25	
40	



92	
42	
33	
17	
25	
15	
90	
3	
78	
41	
54	
25	
65	
66	
0	
25	
70	
77	
1	
11	
48	
50	
32	



70	
69	
88	
6	
50	
11	
84	
22	
0	
31	
53	
79	
61	
59	
80	
20	
0	
5	
39	
73	
25	
78	
46	



46	
70	
19	
43	
100	
87	
20	
65	
35	
72	
11	
10	
5	
27	
0	
85	
25	
50	
19	
79	
25	
90	
25	

Making 100 – Level 3

Answer Key

Making 100 Directions: Fill in each box so the two numbers SUM to a total of 100.

Hint: Add up. Example: $24 \rightarrow 24 \text{ to } 30 = \underline{6} \rightarrow 30 \text{ to } 100 = \underline{70} \rightarrow \text{Therefore, } \underline{6} + \underline{70} = \underline{76}$

100	0
88	12
70	30
94	6
64	36
49	51
45	55
35	65
22	78
10	90
0	100
37	63
61	39
99	1
15	85
59	41
80	20
29	71
9	91
3	97
0	100
25	75
40	60



92	8
42	58
33	67
17	83
25	75
15	85
90	10
3	97
78	22
41	59
54	46
25	75
65	35
66	34
0	100
25	75
70	30
77	23
1	99
11	89
48	52
50	50
32	68



70	30
69	31
88	12
6	94
50	50
11	89
84	16
22	78
0	100
31	69
53	57
79	21
61	39
59	41
80	20
20	80
0	100
5	95
39	61
73	27
25	75
78	22
46	54



46	54
70	30
19	81
43	57
100	0
87	13
20	80
65	35
35	65
72	28
11	89
10	90
5	95
27	73
0	100
85	15
25	75
50	50
19	81
79	21
25	75
90	10
25	75

Making 1 Whole – Level 1

Building Numeracy Skills

Directions: Fill in each box so the two numbers SUM to a total of 1.00.

0.90	0.10
0.20	0.80
1.00	0
0.60	0.40
0.30	
0.50	
0.70	
0.20	
1.00	
0.90	
0.80	
0.20	
0.60	
0.80	
0.10	
0.90	
0	
0.10	
0.70	
0.60	
0.40	
0.90	
0.80	

0.50	
0.70	
0.20	
0.30	
0.50	
0.10	
0.90	
0.30	
0.70	
0.40	
0.50	
0.20	
0.60	
0.80	
0	
0.20	
0.70	
0.30	
1.00	
0.90	
0.40	
0.50	
0.60	

0.60	
0.70	
0.50	
0.90	
0.50	
0.10	
0.80	
0.20	
0	
0.30	
0.50	
0.70	
0.60	
0.40	
0.80	
0.10	
0.80	
0.50	
0.30	
0.70	
0.20	
0.60	
0.40	

0.40	
0.60	
0.10	
0.30	
1.00	
0.90	
0.20	
0.60	
0.10	
0.80	
0.10	
0.70	
0.50	
0.30	
0	
0.80	
0.20	
0.50	
0.10	
0.70	
0.20	
0.90	
0.30	

Making 1 Whole – Level 1

Answer Key

Directions: Fill in each box so the two numbers SUM to a total of 1.00.

0.90	0.10
0.20	0.80
1.00	0
0.60	0.40
0.30	0.70
0.50	0.50
0.70	0.30
0.20	0.80
1.00	0
0.90	0.10
0.80	0.20
0.20	0.80
0.60	0.40
0.80	0.20
0.10	0.90
0.90	0.10
0	1.00
0.10	0.90
0.70	0.30
0.60	0.40
0.40	0.60
0.90	0.10
0.80	0.20

0.50	0.50
0.70	0.30
0.20	0.80
0.30	0.70
0.50	0.50
0.10	0.90
0.90	0.10
0.30	0.70
0.70	0.30
0.40	0.60
0.50	0.50
0.20	0.80
0.60	0.40
0.80	0.20
0	1.00
0.20	0.80
0.70	0.30
0.30	0.70
1.00	0
0.90	0.10
0.40	0.60
0.50	0.50
0.60	0.40

0.60	0.40
0.70	0.30
0.50	0.50
0.90	0.10
0.50	0.50
0.10	0.90
0.80	0.20
0.20	0.80
0	1.00
0.30	0.70
0.50	0.50
0.70	0.30
0.60	0.40
0.40	0.60
0.80	0.20
0.10	0.90
0.80	0.20
0.50	0.50
0.30	0.70
0.70	0.30
0.20	0.80
0.60	0.40
0.40	0.60

0.40	0.60
0.60	0.40
0.10	0.90
0.30	0.70
1.00	0
0.90	0.10
0.20	0.80
0.60	0.40
0.10	0.90
0.80	0.20
0.10	0.90
0.70	0.30
0.50	0.50
0.30	0.70
0	1.00
0.80	0.20
0.20	0.80
0.50	0.50
0.10	0.90
0.70	0.30
0.20	0.80
0.90	0.10
0.30	0.70

Making 1 Whole – Level 2

Building Numeracy Skills

Directions: Fill in each box so the two numbers SUM to a total of 1.00.

ADD UP EXAMPLE: 0.65 → 0.65 to 0.70 is 0.05 → 0.70 to 1.00 is 0.30 → totals 0.05 + 0.30 = 0.35.

0.90	0.10
0.25	0.75
1.00	0
0.65	0.35
0.35	
0.55	
0.70	
0.25	
1.00	
0.95	
0.85	
0.20	
0.65	
0.85	
0.10	
0.95	
0	
0.05	
0.75	
0.60	
0.45	
0.95	
0.80	

0.50	
0.75	
0.20	
0.35	
0.55	
0.10	
0.95	
0.35	
0.75	
0.45	
0.50	
0.25	
0.65	
0.80	
0	
0.25	
0.70	
0.35	
1.00	
0.95	
0.45	
0.50	
0.65	

0.65	
0.75	
0.50	
0.95	
0.55	
0.15	
0.85	
0.25	
0	
0.30	
0.55	
0.75	
0.60	
0.45	
0.85	
0.15	
0.85	
0.50	
0.35	
0.75	
0.20	
0.65	
0.40	

0.45	
0.65	
0.15	
0.35	
1.00	
0.95	
0.65	
0.60	
0.05	
0.85	
0.10	
0.75	
0.50	
0.25	
0	
0.85	
0.25	
0.50	
0.15	
0.70	
0.25	
0.90	
0.25	

Making 1 Whole – Level 2

Answer Key

Directions: Fill in each box so the two numbers SUM to a total of 1.00.

ADD UP EXAMPLE: 0.65 → 0.65 to 0.70 is 0.05 → 0.70 to 1.00 is 0.30 → totals $0.05 + 0.30 = 0.35$.

0.90	0.10
0.25	0.75
1.00	0
0.65	0.35
0.35	0.65
0.55	0.45
0.70	0.30
0.25	0.75
1.00	0
0.95	0.05
0.85	0.15
0.20	0.80
0.65	0.35
0.85	0.15
0.10	0.90
0.95	0.05
0	1.00
0.05	0.95
0.75	0.25
0.60	0.40
0.45	0.55
0.95	0.05
0.80	0.20

0.50	0.50
0.75	0.25
0.20	0.80
0.35	0.65
0.55	0.45
0.10	0.90
0.95	0.05
0.35	0.65
0.75	0.25
0.45	0.55
0.50	0.50
0.25	0.75
0.65	0.35
0.80	0.20
0	1.00
0.25	0.75
0.70	0.30
0.35	0.65
1.00	0
0.95	0.05
0.45	0.55
0.50	0.50
0.65	0.35

0.65	0.35
0.75	0.25
0.50	0.50
0.95	0.05
0.55	0.45
0.15	0.85
0.85	0.15
0.25	0.75
0	1.00
0.30	0.70
0.55	0.45
0.75	0.25
0.60	0.40
0.45	0.55
0.85	0.15
0.15	0.85
0.85	0.15
0.50	0.50
0.35	0.65
0.75	0.25
0.20	0.80
0.65	0.35
0.40	0.60

0.45	0.55
0.65	0.35
0.15	0.85
0.35	0.65
1.00	0
0.95	0.05
0.65	0.35
0.60	0.40
0.05	0.95
0.85	0.15
0.10	0.90
0.75	0.25
0.50	0.50
0.25	0.75
0	1.00
0.85	0.15
0.25	0.75
0.50	0.50
0.15	0.85
0.70	0.30
0.25	0.75
0.90	0.10
0.25	0.75

Making 1 Whole – Level 3

Building Numeracy Skills

Directions: Fill in each box so the two numbers SUM to a total of 1.00.

ADD UP EXAMPLE: 0.36 → 0.36 to 0.40 is 0.04 → 0.40 to 1.00 is 0.60 → totals 0.04 + 0.60 = 0.64.

0.81	0.19
0.27	0.73
1.00	0
0.65	0.35
0.35	
0.58	
0.70	
0.25	
1.00	
0.95	
0.88	
0.20	
0.65	
0.85	
0.17	
0.95	
0	
0.07	
0.75	
0.60	
0.46	
0.95	
0.80	

0.50	
0.75	
0.20	
0.32	
0.55	
0.10	
0.91	
0.35	
0.75	
0.47	
0.50	
0.21	
0.65	
0.80	
0	
0.25	
0.70	
0.38	
1.00	
0.95	
0.45	
0.50	
0.62	

0.65	
0.78	
0.50	
0.95	
0.55	
0.13	
0.85	
0.25	
0	
0.30	
0.56	
0.75	
0.68	
0.45	
0.85	
0.15	
0.89	
0.50	
0.35	
0.75	
0.20	
0.67	
0.40	

0.45	
0.71	
0.15	
0.35	
1.00	
0.95	
0.67	
0.60	
0.05	
0.87	
0.10	
0.73	
0.50	
0.25	
0	
0.85	
0.22	
0.50	
0.15	
0.77	
0.25	
0.90	
0.25	

Making 1 Whole – Level 3

Answer Key

Directions: Fill in each box so the two numbers SUM to a total of 1.00.

ADD UP EXAMPLE: 0.36 → 0.36 to 0.40 is 0.04 → 0.40 to 1.00 is 0.60 → **totals** 0.04 + 0.60 = 0.64.

0.81	0.19
0.27	0.73
1.00	0
0.65	0.35
0.35	0.65
0.58	0.42
0.70	0.30
0.25	0.75
1.00	0
0.95	0.05
0.88	0.12
0.20	0.80
0.65	0.35
0.85	0.15
0.17	0.83
0.95	0.05
0	1.00
0.07	0.93
0.75	0.25
0.60	0.40
0.46	0.54
0.95	0.05
0.80	0.20

0.50	0.50
0.75	0.25
0.20	0.80
0.32	0.68
0.55	0.45
0.10	0.90
0.91	0.09
0.35	0.65
0.75	0.25
0.47	0.53
0.50	0.50
0.21	0.79
0.65	0.35
0.80	0.20
0	1.00
0.25	0.75
0.70	0.30
0.38	0.62
1.00	0
0.95	0.05
0.45	0.55
0.50	0.50
0.62	0.38

0.65	0.35
0.78	0.22
0.50	0.50
0.95	0.05
0.55	0.45
0.13	0.87
0.85	0.15
0.25	0.75
0	1.00
0.30	0.70
0.56	0.44
0.75	0.25
0.68	0.32
0.45	0.55
0.85	0.15
0.15	0.85
0.89	0.11
0.50	0.50
0.35	0.65
0.75	0.25
0.20	0.80
0.67	0.33
0.40	0.60

0.45	0.55
0.71	0.29
0.15	0.85
0.35	0.65
1.00	0
0.95	0.05
0.67	0.33
0.60	0.40
0.05	0.95
0.87	0.13
0.10	0.90
0.73	0.27
0.50	0.50
0.25	0.75
0	1.00
0.85	0.15
0.22	0.78
0.50	0.50
0.15	0.85
0.77	0.23
0.25	0.75
0.90	0.10
0.25	0.75

Doubles (Small and Large Numbers)

Building Numeracy Skills

Directions: Double each number and write that number in the box on right.

2	4
3	6
6	
10	
8	
12	
7	
13	
4	
14	
10	

8	
5	
10	
6	
4	
7	
12	
13	
11	
5	
3	

10	
11	
7	
8	
12	
5	
4	
9	
11	
12	
7	

8	
9	
10	
3	
9	
12	
13	
2	
14	
5	
9	

Directions: Double each number and write that number in the box on right.

20	40
30	60
50	
40	
30	
15	
100	
90	
25	
50	
75	

40	
30	
100	
150	
40	
80	
50	
75	
110	
100	
25	

50	
60	
90	
70	
30	
75	
20	
15	
150	
40	
50	

25	
140	
60	
15	
50	
30	
75	
70	
150	
80	
60	

Doubles (Small and Large Numbers)

Answer Key

Directions: Double each number and write that number in the box on right.

2	4
3	6
6	12
10	20
8	16
12	24
7	14
13	26
4	8
14	28
10	20

8	16
5	10
10	20
6	12
4	8
7	14
12	24
13	26
11	22
5	10
3	6

10	20
11	22
7	14
8	16
12	24
5	10
4	8
9	18
11	22
12	24
7	14

8	16
9	18
10	20
3	6
9	18
12	24
13	26
2	4
14	28
5	10
9	18

Directions: Double each number and write that number in the box on right.

20	40
30	60
50	100
40	80
30	60
15	30
100	200
90	180
25	50
50	100
75	150

40	80
30	60
100	200
150	300
40	80
80	160
50	100
75	150
110	220
100	200
25	50

50	100
60	120
90	180
70	140
30	60
75	150
20	40
15	30
150	300
40	80
50	100

25	50
140	280
60	120
15	30
50	100
30	60
75	150
70	140
150	300
80	160
60	120

Halves (Small and Large Numbers)

Building Numeracy Skills

Directions: Compute half of each number and write that number in the box on right.

4	2
6	3
2	
10	
8	
12	
18	
16	
6	
14	
12	

2	
20	
10	
6	
4	
8	
12	
18	
2	
6	
24	

10	
22	
26	
6	
18	
4	
12	
16	
22	
4	
10	

18	
14	
6	
2	
10	
24	
20	
26	
12	
8	
6	

Directions: Compute half of each number and write that number in the box on right.

40	20
60	30
10	
80	
30	
120	
100	
90	
40	
50	
20	

20	
30	
100	
150	
40	
80	
50	
180	
160	
100	
30	

50	
60	
90	
70	
30	
40	
120	
160	
150	
40	
50	

180	
140	
60	
20	
50	
30	
200	
140	
150	
80	
60	

Halves (Small and Large Numbers)

Answer Key

Directions: Compute half of each number and write that number in the box on right.

4	2
6	3
2	1
10	5
8	4
12	6
18	9
16	8
6	3
14	7
12	6

2	1
20	10
10	5
6	3
4	2
8	4
12	6
18	9
2	1
6	3
24	12

10	5
22	11
26	13
6	3
18	9
4	2
12	6
16	8
22	11
4	2
10	5

18	9
14	7
6	3
2	1
10	5
24	12
20	10
26	13
12	6
8	4
6	3

Directions: Compute half of each number and write that number in the box on right.

40	20
60	30
10	5
80	40
30	15
120	60
100	50
90	45
40	20
50	25
20	10

20	10
30	15
100	50
150	75
40	20
80	40
50	25
180	90
160	80
100	50
30	15

50	25
60	30
90	45
70	35
30	15
40	20
120	60
160	80
150	75
40	20
50	25

180	90
140	70
60	30
20	10
50	25
30	15
200	100
140	70
150	75
80	40
60	30

Multiplication Factor Strings using the Compression Method

Memorization of basic math facts of all four operations is essential arithmetic knowledge. Unlike subtraction and division, multiplication and addition fact mastery is usually easier for most students because of the reduced number of facts to memorize. The commutative property of addition and multiplication cut the number of memorized facts in half since $5 + 6$ yields the same sum as $6 + 5$, and 6×5 and 5×6 produce the same product in multiplication. Daily numeracy programs like Formative Loop include a five-minute daily writing assessment. The program's writing element is critical for many students to memorize and ingrain their math fact operations. The digital input and analysis side of the Formative Loop numeracy program affords classroom teachers with a tool to monitor and heighten student performance in real time.

However, as students begin fourth grade, it is also important to write factors for a given number in a linear and organized manner. When students write the factors for a number, they often write them in pairs. For example, given the number 24, many students write the math facts in the following manner: (1, 24); (4, 6); (3, 8) and (2, 12). Many times, elementary students miss a fact pair or two when instructed with this methodology. Additionally, factors written in pairs do not always provide pragmatic use. The Compression Method yields an organized factor string that not only lists the number's factors, but factors are written in an ascending order. Hence, given the number 24, the factor string is written in the following linear manner: 24: {1, 2, 3, 4, 6, 8, 12, 24}. This process connects all the factors for 24 in an organized and usable manner. It also helps students ingrain their multiplication math facts in long-term memory.

This short pedagogy paper provides the means for a teacher of any experience to instruct students using Compression Method methodology to write a string of factors for any number between 1 and 60. Prior to using this method, students must be proficient using the disability rules for 2, 3, 5, 6, 9, and 10. The divisibility rules for 4, 7 and 8 are more difficult for students to remember; however, those three numbers only appear together in the multiplication facts of 4×7 ; 4×8 ; 7×8 ; 4×4 ; 7×7 or 8×8 . Otherwise, those 3 numbers appear as a factor pair with 2, 3, 5, 6, 9, or 10. With small amounts of practice, students easily master the most common divisibility rules for 2, 3, 5, 6, 9 and 10. These rules are summarized below:

Divisibility Rules for 2, 3, 5, 6, 9, 10		
Number	Rule	Example
2	If the one's digit is even, then the number is divisible by 2.	Given the number 38. Even numbers: (0, 2, 4, 6, 8) The '8' is an even number. Hence, 38 is divisible by 2.
3	If the digits of a number sum to a multiple of 3, then the number is divisible by 3.	Given the number, 126. $1 + 2 + 6 = 9$. 9 divides by 3 without a remainder. Hence, 126 is divisible by 3.
5	If the one's digit is either a 5 or 0, then the number is divisible by 5.	Given the numbers 45 and 70. 45 ends in '5' and 70 ends in '0'. Hence, 45 and 70 are divisible by 5
6	If a number is divisible by <i>both</i> 2 and 3, then the number is divisible by 6.	Given the number 18. 18 is divisible by 2 and 3. Hence, it is divisible by 6, too
9	If the digits of a number sum to a multiple of 9, then the number is divisible by 9.	Given the number, 234. $2 + 3 + 4 = 9$. 9 divides by 9 without a remainder. Hence, 234 is divisible by 9.
10	If the one's digit is either a 0, then the number is divisible by 10.	Given the number 190. 190 ends in '0'. Hence, 190 is divisible by 10.

Multiplication Factor Strings using the Compression Method

Spaced Repetition – A Synopsis

One of the most effective and efficient pedagogical methods for a classroom teacher to instruct students is via spaced repetition. This pedagogy ensures that ALL students view a skill a threshold number of repetitions to ingrain mastery. Spaced repetition takes place during the math lesson – usually at the very beginning. It is a short 5 to 10 minute review of previously taught skills (usually 3 to 5 skills) presented in a rapid and lively manner prior to the onset of the daily core lesson. During a typical spaced repetition session, the teacher is actively monitoring students – especially students that have **NOT** mastered the skill. As the teacher observes the remaining few students master a particular math skill, that skill is replaced with another skill that has been previously taught. Hence, the process is not static, it is a sequential and dynamic process throughout the school year.

Spaced repetition may be used for standalone math skills like place value, even/odd, rounding, etc. However, the daily pedagogy may also be used for the skill mastery of more intricate process skills such as mastering the computation of lowest common denominators (LCD), pre-prepared measurement exercises, and factor string mastery using the compression method. It is a little more involved in these latter skill sets, but it is highly effective with adequate teacher understanding, preparation and professional practice.

Using Spaced Repetition for Compression Method Factor Strings

If the teacher presents the process of computing factor pairs in small daily chunks starting with the numbers 1 through 5, students become very adept at writing factor strings. Then, the teacher should require students to cumulatively write factor strings for the next five numbers (6 through 10), and then the next five (11 through 15). For time efficiency, once students master the factor strings for numbers 1 through 5, the teacher should continue to the next five numbers (i.e. 6-10). Eliminate writing the factors for numbers 1 through 5. Continue introducing two groups of 5 numbers in stages as mastery of the lower group is achieved until the factor string for 55 through 60 is reached. Students can use notebook paper or a daily measurement warm-up that may easily be flipped over to the blank side for the spaced repetition session. This instructional daily process will take consistent practice for 2 to 3 weeks to complete for all factor strings to 60. See the illustration below for numbers 1 – 15. Note: Factor String # 4 (Numbers 11 through 20), Factor String # 5 (Numbers 16 – 25), Factor String # 6 (Numbers 21 – 30), and so on.

Determining whether the number is either ‘prime - P’ or ‘composite - C’ is an easy add-on skill. Use a kinesthetic tactile method to identify prime numbers such as the two-finger ‘peace’ sign or the University of Texas Longhorns “Hook-em Horns” sign. Any kinesthetic method will work as long as students recognize numbers with only two factors are classified as prime numbers. A skill practice sheet is attached as a final assessment or intermediate homework for student practice computing all factors for the numbers 1 through 60, inclusive.

Sequencing of Factor String for Spaced Repetition – Numbers 1 – 15 shown

Factor Strings # 1	Factor Strings # 2	Factor Strings # 3
1: { } ****	1: { } P C 6: { } P C	6: { } P C 11: { } P C
2: { } P C	2: { } P C 7: { } P C	7: { } P C 12: { } P C
3: { } P C	3: { } P C 8: { } P C	8: { } P C 13: { } P C
4: { } P C	4: { } P C 9: { } P C	9: { } P C 14: { } P C
5: { } P C	5: { } P C 10: { } P C	10: { } P C 15: { } P C

**** NOTE: The number one (1) is **not** classified as either prime or composite. It is a ‘special’ number, in this situation.

Computing Factor Strings and Prime - Composite Identification

Write all the factors for each number using the 'compression method' – see example. After all the factors have been listed for each number, circle the correct number label: "Prime or Composite." Review example.

Example: 12 .. {1, 12}; then {1, 2, 6, 12}; then, {1, 2, 3, 4, 6, 12}

Prime or **Composite**

1: _____

NOT Prime or Composite

2: _____

Prime or Composite

3: _____

Prime or Composite

4: _____

Prime or Composite

5: _____

Prime or Composite

6: _____

Prime or Composite

7: _____

Prime or Composite

8: _____

Prime or Composite

9: _____

Prime or Composite

10: _____

Prime or Composite

11: _____

Prime or Composite

12: _____

Prime or Composite

13: _____

Prime or Composite

14: _____

Prime or Composite

15: _____

Prime or Composite

16: _____

Prime or Composite

17: _____

Prime or Composite

18: _____

Prime or Composite

19: _____

Prime or Composite

20: _____

Prime or Composite

21: _____

Prime or Composite

22: _____

Prime or Composite

23: _____

Prime or Composite

24: _____

Prime or Composite

25: _____

Prime or Composite

26: _____

Prime or Composite

27: _____

Prime or Composite

Computing Factor Strings and Prime - Composite Identification

28:	_____	Prime or Composite
29:	_____	Prime or Composite
30:	_____	Prime or Composite
31:	_____	Prime or Composite
32:	_____	Prime or Composite
33:	_____	Prime or Composite
34:	_____	Prime or Composite
35:	_____	Prime or Composite
36:	_____	Prime or Composite
37:	_____	Prime or Composite
38:	_____	Prime or Composite
39:	_____	Prime or Composite
40:	_____	Prime or Composite
41:	_____	Prime or Composite
42:	_____	Prime or Composite
43:	_____	Prime or Composite
44:	_____	Prime or Composite
45:	_____	Prime or Composite
46:	_____	Prime or Composite
47:	_____	Prime or Composite
48:	_____	Prime or Composite
49:	_____	Prime or Composite
50:	_____	Prime or Composite
51:	_____	Prime or Composite
52:	_____	Prime or Composite
53:	_____	Prime or Composite
54:	_____	Prime or Composite
55:	_____	Prime or Composite
56:	_____	Prime or Composite
60:	_____	Prime or Composite

Computing Factor Strings and Prime - Composite Identification

Write all the factors for each number using the 'compression method' – see example. After all the factors have been listed for each number, circle the correct number label: "Prime or Composite." Review example.

Example: 12 .. {1, 12}; then {1, 2, 6, 12}; then, {1, 2, 3, 4, 6, 12}

Prime or **Composite**

1: **(1)**

NOT Prime or Composite

2: **(1, 2) only even number that is prime.**

Prime or Composite

3: **(1, 3)**

Prime or Composite

4: **(1, 2, 4)**

Prime or **Composite**

5: **(1, 5)**

Prime or Composite

6: **(1, 2, 3, 6)**

Prime or **Composite**

7: **(1, 7)**

Prime or Composite

8: **(1, 2, 4, 8)**

Prime or **Composite**

9: **(1, 3, 9)**

Prime or **Composite**

10: **(1, 2, 5, 10)**

Prime or **Composite**

11: **(1, 11)**

Prime or Composite

12: **(1, 2, 3, 4, 6, 12)**

Prime or **Composite**

13: **(1, 13)**

Prime or Composite

14: **(1, 2, 7, 14)**

Prime or **Composite**

15: **(1, 3, 5, 15)**

Prime or **Composite**

16: **(1, 2, 4, 8, 16)**

Prime or **Composite**

17: **(1, 17)**

Prime or Composite

18: **(1, 2, 3, 6, 9, 18)**

Prime or **Composite**

19: **(1, 19)**

Prime or Composite

20: **(1, 2, 4, 5, 10, 20)**

Prime or **Composite**

21: **(1, 3, 7, 21)**

Prime or **Composite**

22: **(1, 2, 11, 22)**

Prime or **Composite**

23: **(1, 23)**

Prime or Composite

24: **(1, 2, 3, 4, 6, 8, 12, 24)**

Prime or **Composite**

25: **(1, 5, 25)**

Prime or **Composite**

26: **(1, 2, 13, 26)**

Prime or **Composite**

27: **(1, 3, 9, 27)**

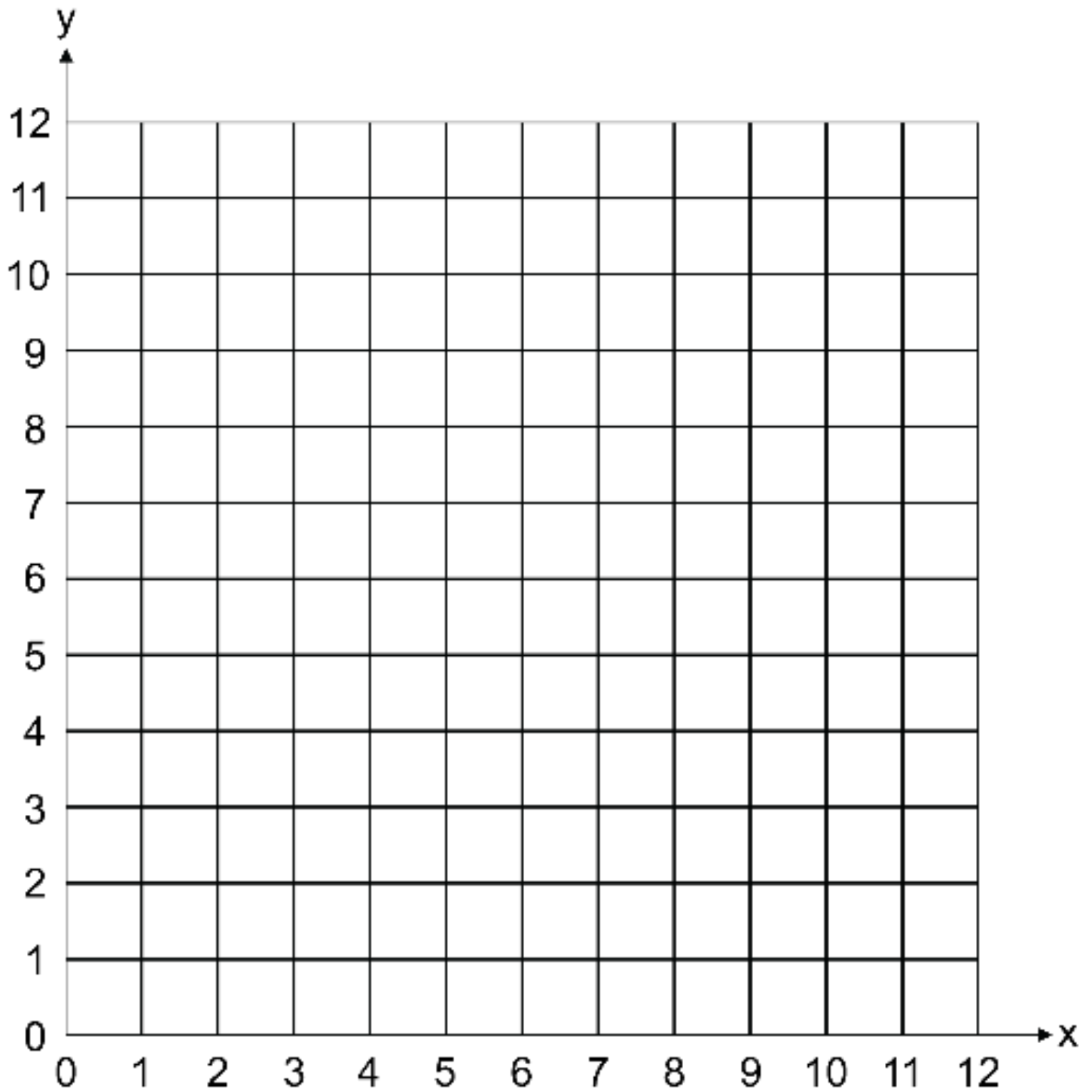
Prime or **Composite**

Computing Factor Strings and Prime - Composite Identification

28:	(1, 2, 4, 7, 14, 28)	Prime or Composite
29:	(1, 29)	Prime or Composite
30:	(1, 2, 3, 5, 6, 10, 15, 30)	Prime or Composite
31:	(1, 31)	Prime or Composite
32:	(1, 2, 4, 8, 16, 32)	Prime or Composite
33:	(1, 3, 11, 33)	Prime or Composite
34:	(1, 2, 17, 34)	Prime or Composite
35:	(1, 5, 7, 35)	Prime or Composite
36:	(1, 2, 3, 4, 6, 9, 12, 18, 36)	Prime or Composite
37:	(1, 37)	Prime or Composite
38:	(1, 2, 19, 38)	Prime or Composite
39:	(1, 3, 13, 39)	Prime or Composite
40:	(1, 2, 4, 5, 8, 10, 20, 40)	Prime or Composite
41:	(1, 37)	Prime or Composite
42:	(1, 2, 3, 14, 21, 42)	Prime or Composite
43:	(1, 43)	Prime or Composite
44:	(1, 2, 4, 11, 22, 44)	Prime or Composite
45:	(1, 3, 5, 9, 15, 45)	Prime or Composite
46:	(1, 2, 23, 46)	Prime or Composite
47:	(1, 47)	Prime or Composite
48:	(1, 2, 3, 4, 6, 8, 12, 16, 48)	Prime or Composite
49:	(1, 7, 49)	Prime or Composite
50:	(1, 2, 5, 10, 25, 50)	Prime or Composite
51:	(1, 3, 17, 51)	Prime or Composite
52:	(1, 2, 26, 52)	Prime or Composite
53:	(1, 53)	Prime or Composite
54:	(1, 2, 3, 6, 9, 18, 27, 54)	Prime or Composite
55:	(1, 5, 11, 55)	Prime or Composite
56:	(1, 2, 7, 8, 28, 56)	Prime or Composite
60:	(1, 2, 3, 4, 5, 6, 10, 12, 15, 30, 60)	Prime or Composite

Cartesian Coordinate – Teacher Modeling Resource

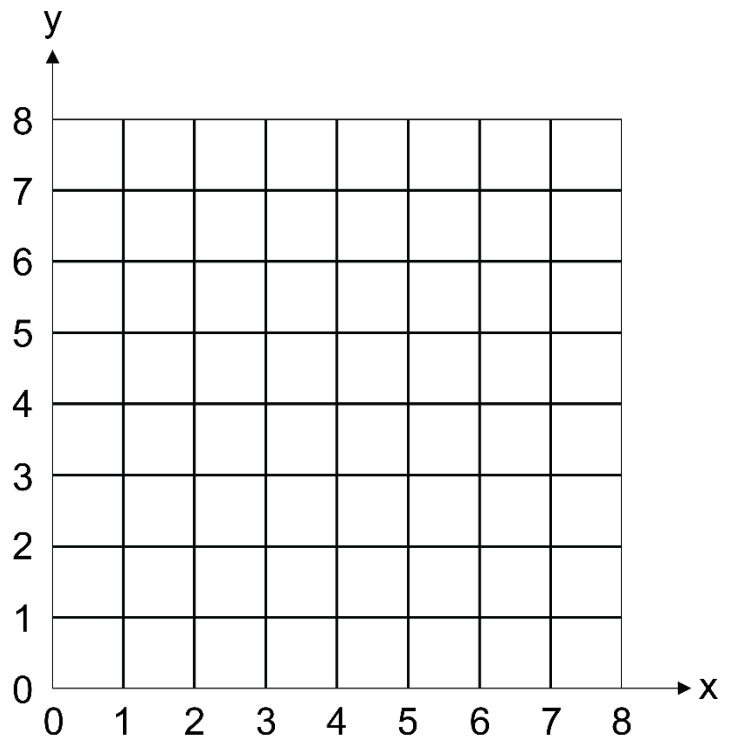
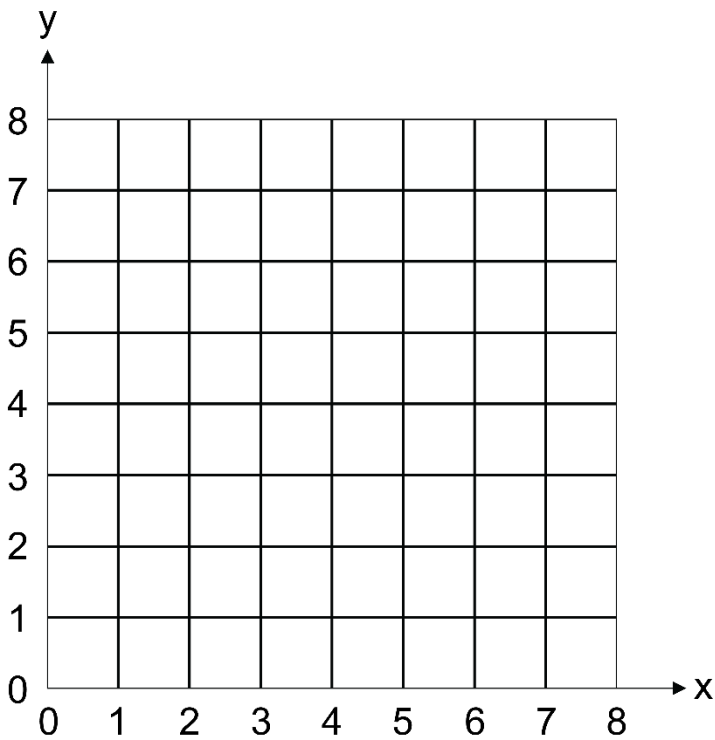
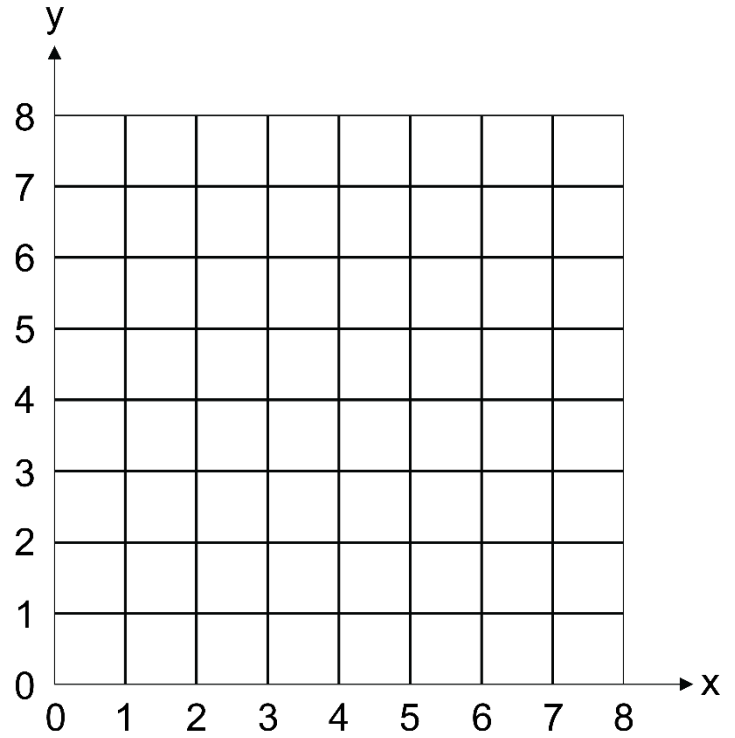
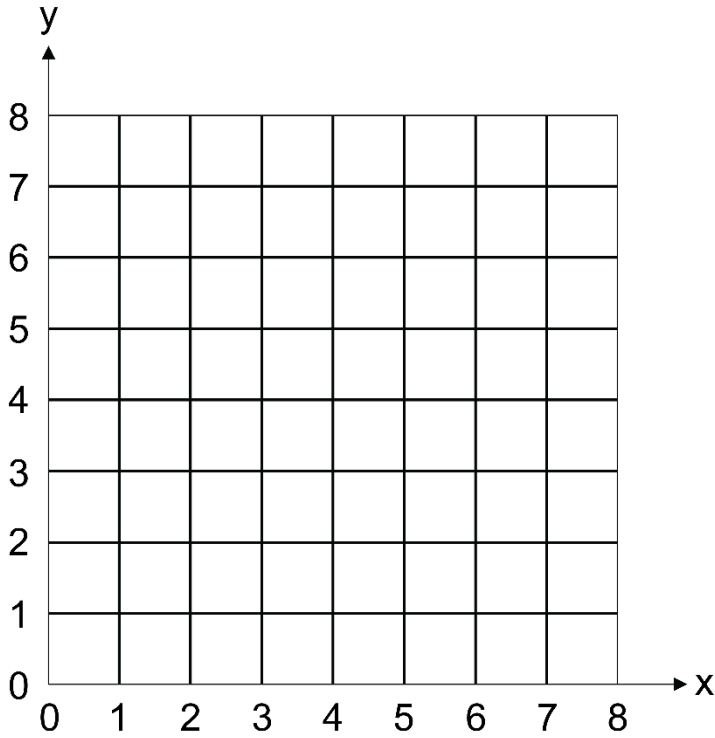
Developing Cartesian Coordinate Skills



Cartesian Coordinate Model – (Quadrant 1)

Cartesian Coordinate – Student Paper Copies

Developing Cartesian Coordinate Skills

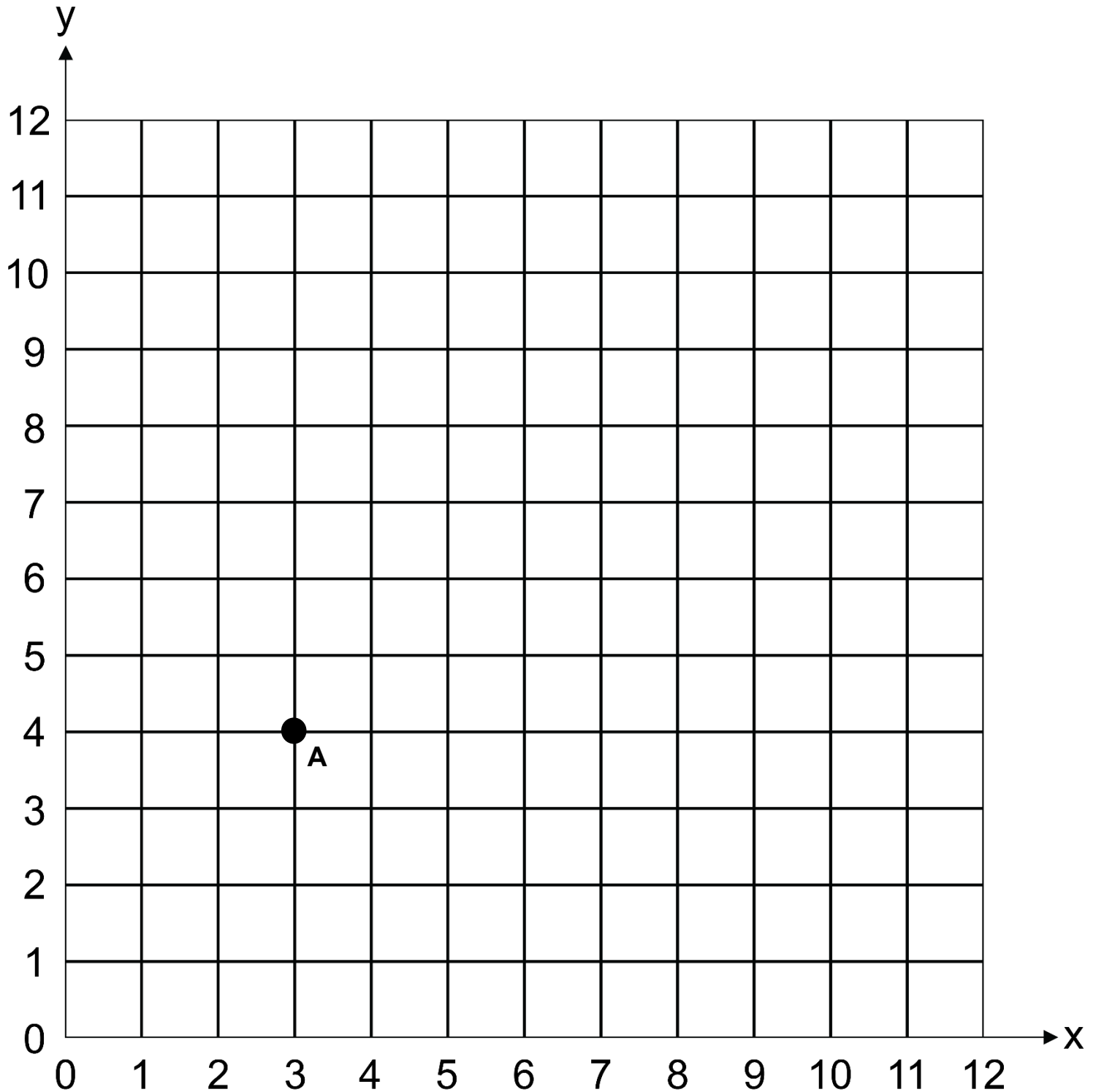


Cartesian Coordinate Model – (Quadrant 1) (Student Paper Copies)

Plotting Cartesian Coordinates (Quadrant 1) – V1

Developing Cartesian Coordinate Skills

Directions: Label and Plot the points below correctly on the coordinate plane.



Pt A - (x, y): (3, 4)

Pt D - (x, y): (1, 8)

Pt G - (x, y): (9, 8)

Pt J - (x, y): (0, 2)

Pt B - (x, y): (0, 5)

Pt E - (x, y): (9, 1)

Pt H - (x, y): (0, 9)

Pt K - (x, y): (4, 0)

Pt C - (x, y): (6, 1)

Pt F - (x, y): (6, 0)

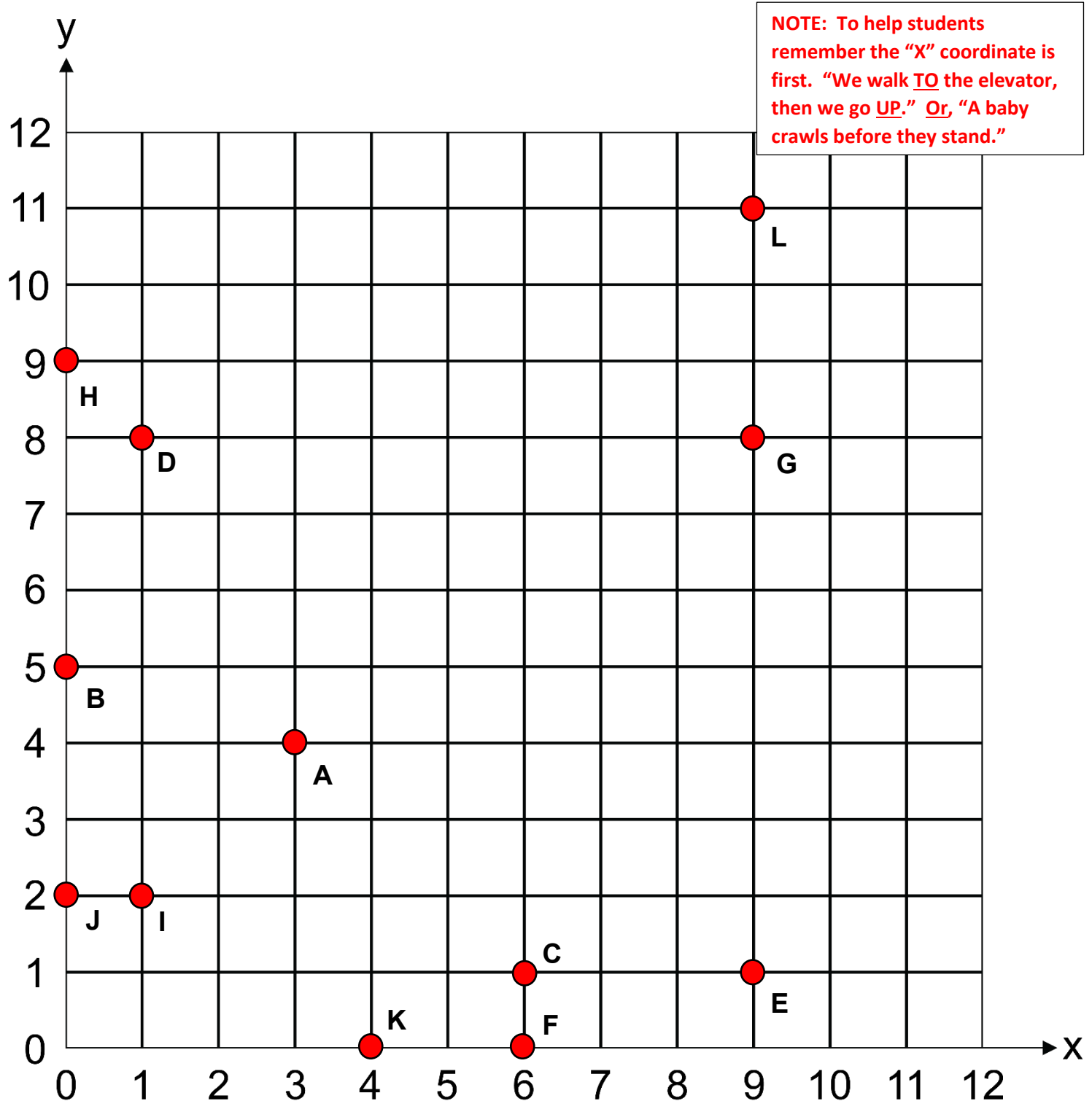
Pt I - (x, y): (1, 2)

Pt L - (x, y): (9, 11)

Plotting Cartesian Coordinates (Quadrant 1) – V1

Answer Key

Directions: Label and Plot the points below correctly on the coordinate plane.



Pt A - (x, y): (3, 4)

Pt D - (x, y): (1, 8)

Pt G - (x, y): (9, 8)

Pt J - (x, y): (0, 2)

Pt B - (x, y): (0, 5)

Pt E - (x, y): (9, 1)

Pt H - (x, y): (0, 9)

Pt K - (x, y): (4, 0)

Pt C - (x, y): (6, 1)

Pt F - (x, y): (6, 0)

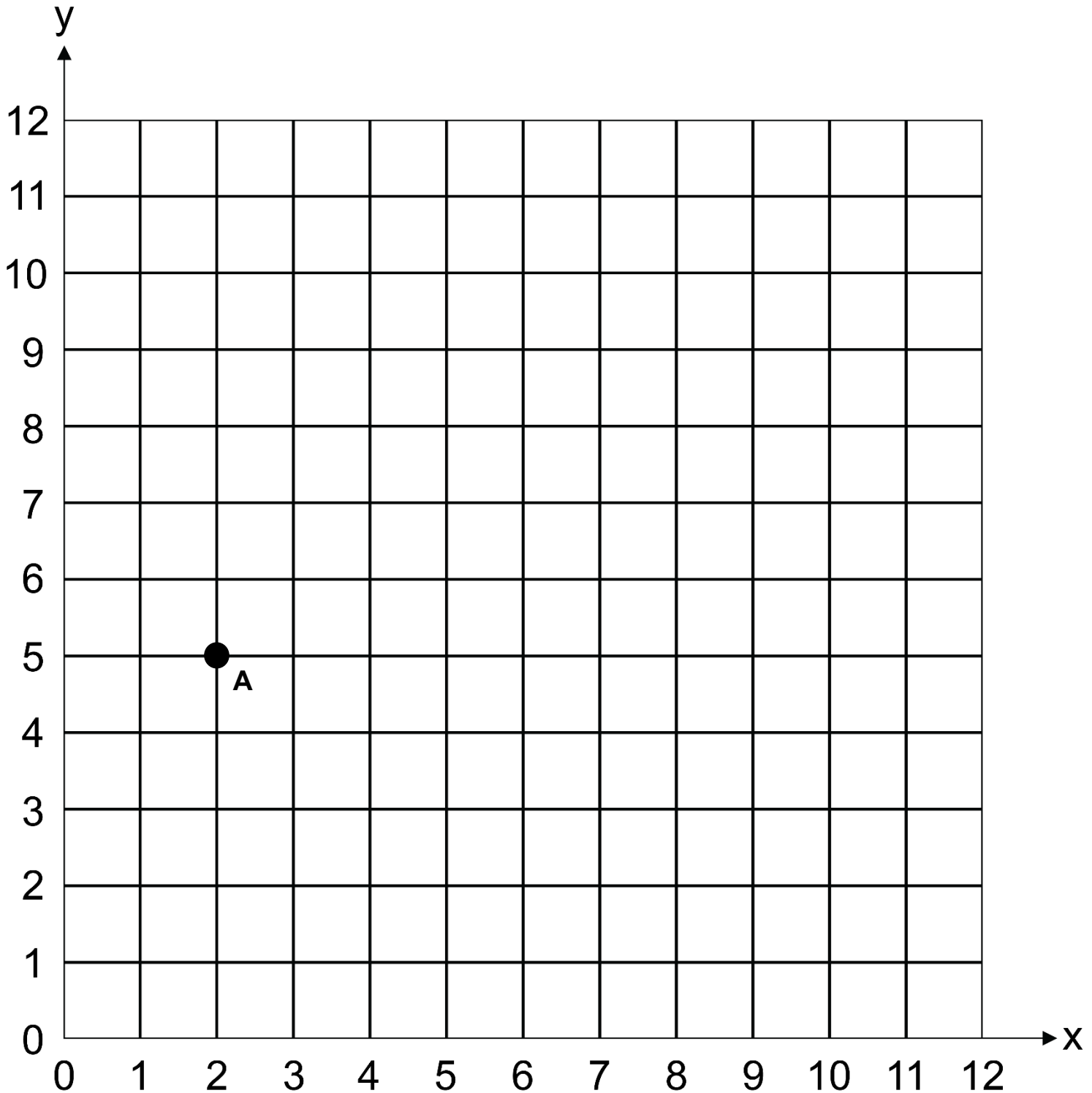
Pt I - (x, y): (1, 2)

Pt L - (x, y): (9, 11)

Plotting Cartesian Coordinates (Quadrant 1) – V2

Developing Cartesian Coordinate Skills

Directions: Label and Plot the points below correctly on the coordinate plane.



Pt A - (x, y): (2, 5)

Pt D - (x, y): (3, 8)

Pt G - (x, y): (9, 11)

Pt J - (x, y): (3, 2)

Pt B - (x, y): (7, 0)

Pt E - (x, y): (9, 7)

Pt H - (x, y): (0, 10)

Pt K - (x, y): (0, 8)

Pt C - (x, y): (0, 1)

Pt F - (x, y): (11, 0)

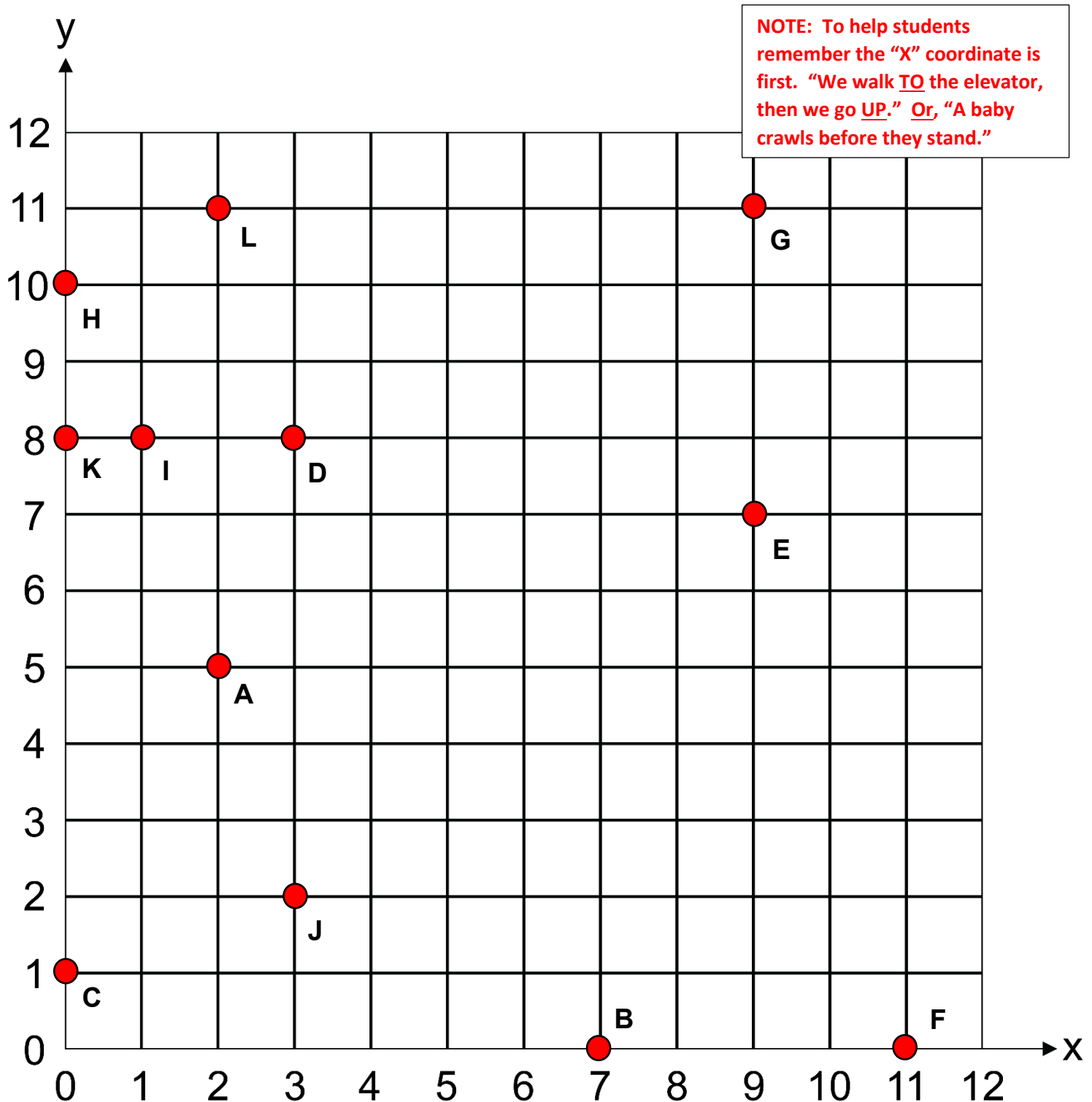
Pt I - (x, y): (1, 8)

Pt L - (x, y): (2, 11)

Plotting Cartesian Coordinates (Quadrant 1) – V2

Answer Key

Directions: Label and Plot the points below correctly on the coordinate plane.



Pt A - (x, y): (2, 5)

Pt D - (x, y): (3, 8)

Pt G - (x, y): (9, 11)

Pt J - (x, y): (3, 2)

Pt B - (x, y): (7, 0)

Pt E - (x, y): (9, 7)

Pt H - (x, y): (0, 10)

Pt K - (x, y): (0, 8)

Pt C - (x, y): (0, 1)

Pt F - (x, y): (11, 0)

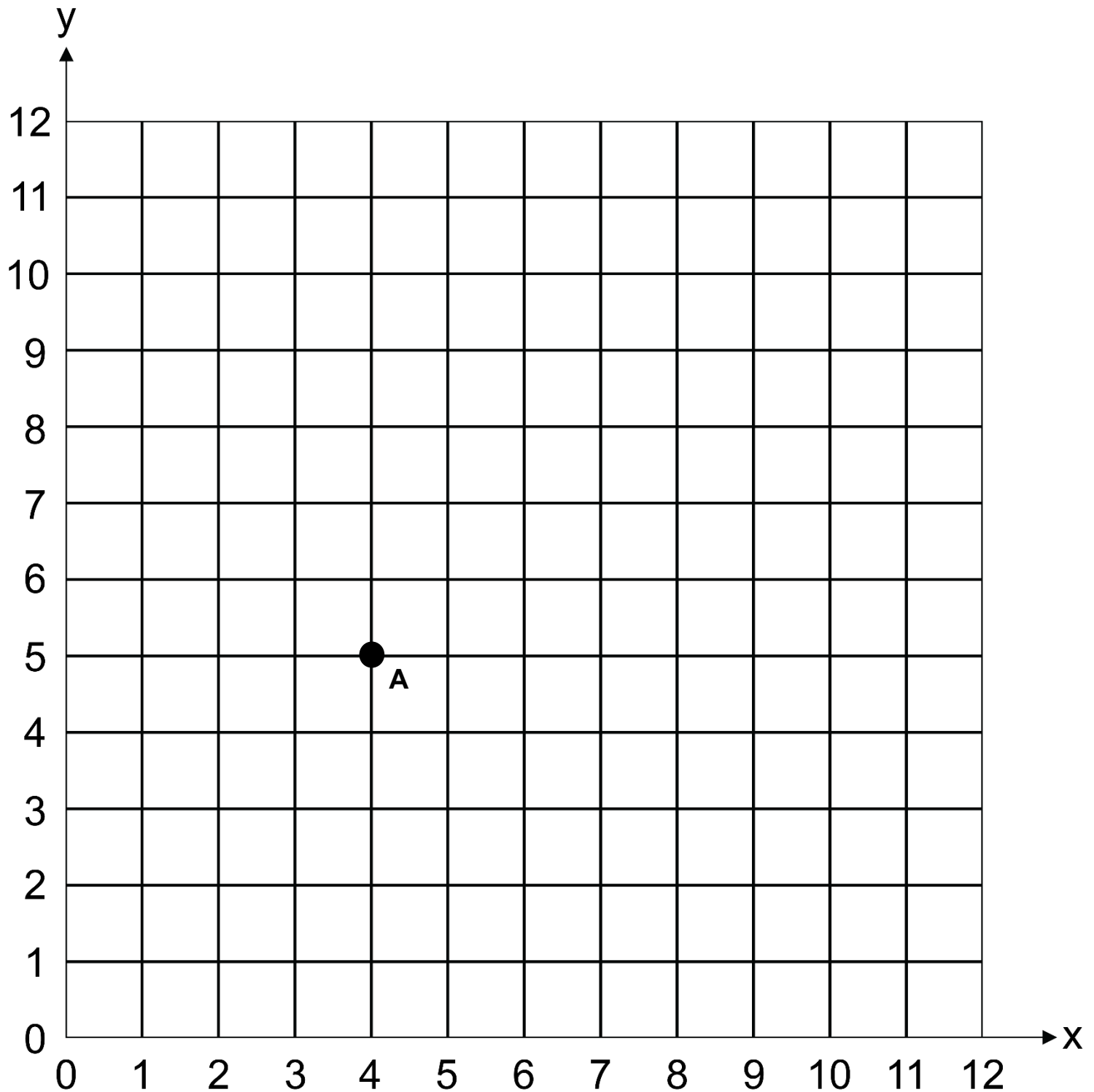
Pt I - (x, y): (1, 8)

Pt L - (x, y): (2, 11)

Plotting Cartesian Coordinates (Quadrant 1) – V3

Developing Cartesian Coordinate Skills

Directions: Label and Plot the points below correctly on the coordinate plane.



Pt A - (x, y): (4, 5)

Pt D - (x, y): (2, 8)

Pt G - (x, y): (12, 11)

Pt J - (x, y): (4, 8)

Pt B - (x, y): (2, 9)

Pt E - (x, y): (10, 7)

Pt H - (x, y): (0, 2)

Pt K - (x, y): (8, 0)

Pt C - (x, y): (0, 7)

Pt F - (x, y): (5, 0)

Pt I - (x, y): (6, 8)

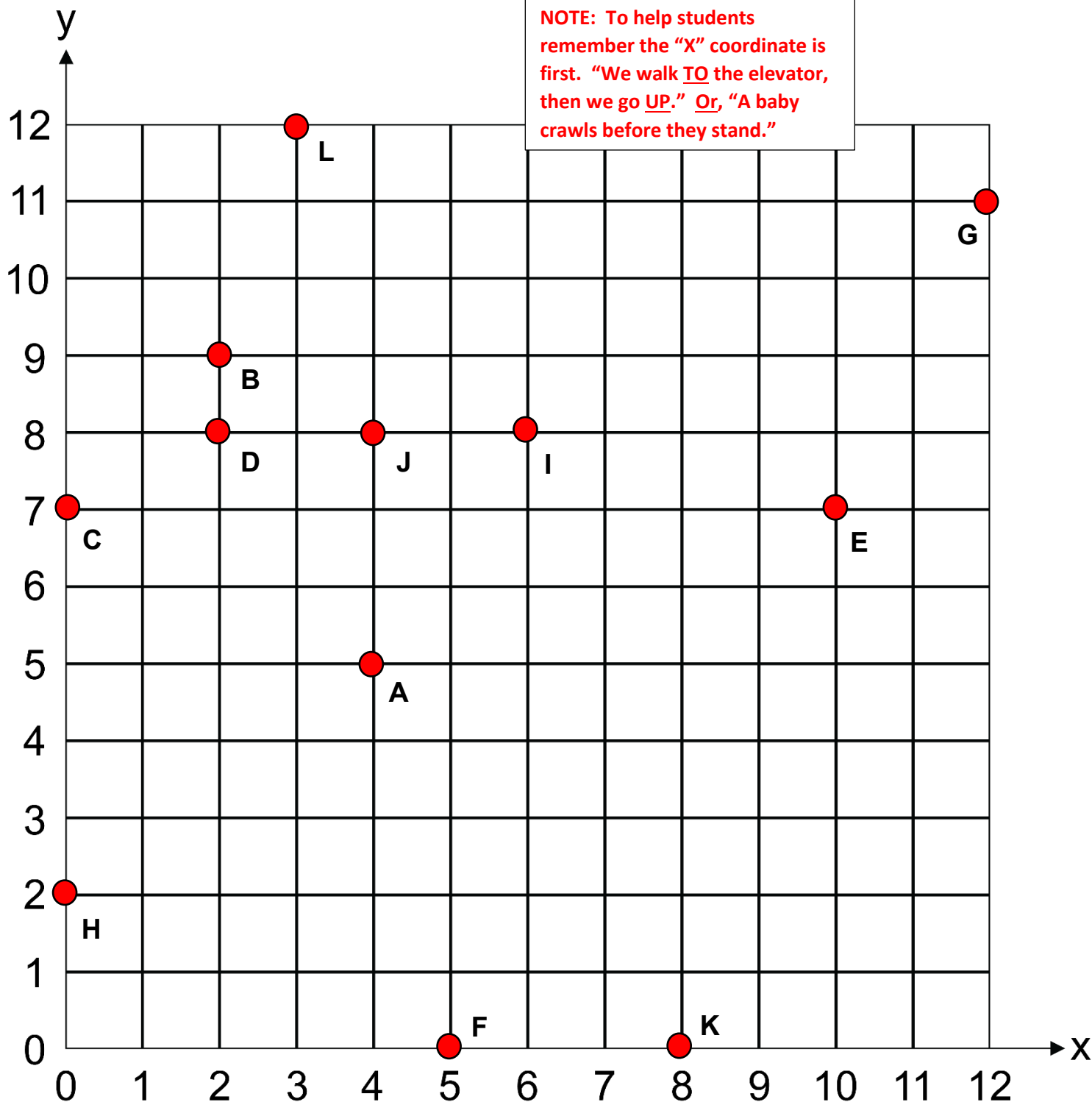
Pt L - (x, y): (3, 12)

Plotting Cartesian Coordinates (Quadrant 1) – V3

Answer Key

Directions: Label and Plot the points below correctly on the coordinate plane.

NOTE: To help students remember the “X” coordinate is first. “We walk TO the elevator, then we go UP.” Or, “A baby crawls before they stand.”



Pt A - (x, y): (4, 5)

Pt D - (x, y): (2, 8)

Pt G - (x, y): (12, 11)

Pt J - (x, y): (4, 8)

Pt B - (x, y): (2, 9)

Pt E - (x, y): (10, 7)

Pt H - (x, y): (0, 2)

Pt K - (x, y): (8, 0)

Pt C - (x, y): (0, 7)

Pt F - (x, y): (5, 0)

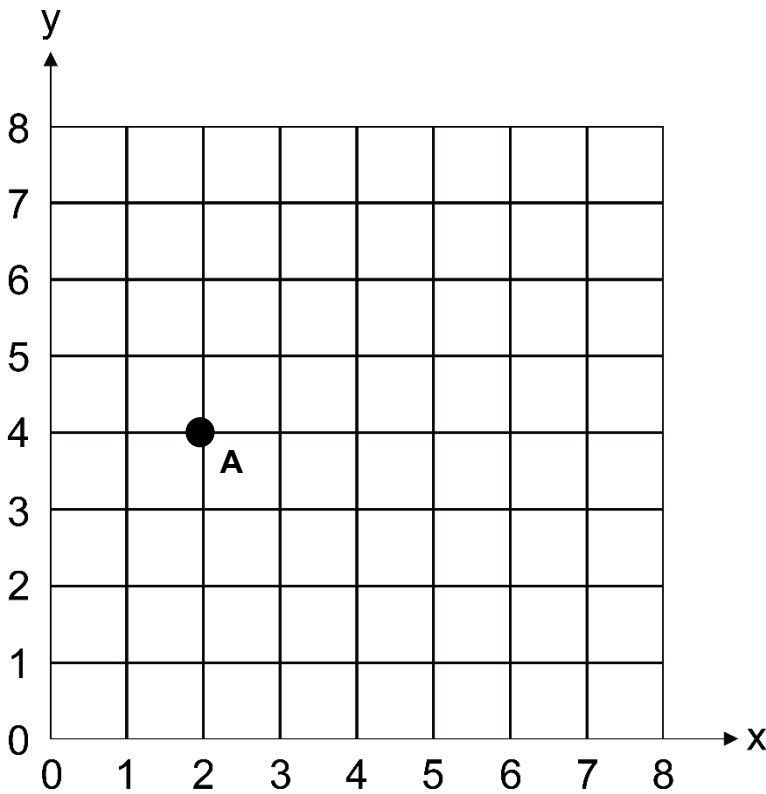
Pt I - (x, y): (6, 8)

Pt L - (x, y): (3, 12)

Plotting Cartesian Coordinates Mini Review (Quadrant 1) – V1

Developing Cartesian Coordinate Skills

Directions: Plot and label the points below correctly on the coordinate plane.



Pt A - (x, y): (2, 4)

Pt G - (x, y): (7, 8)

Pt B - (x, y): (0, 3)

Pt H - (x, y): (0, 8)

Pt C - (x, y): (2, 1)

Pt I - (x, y): (6, 7)

Pt D - (x, y): (1, 7)

Pt J - (x, y): (4, 6)

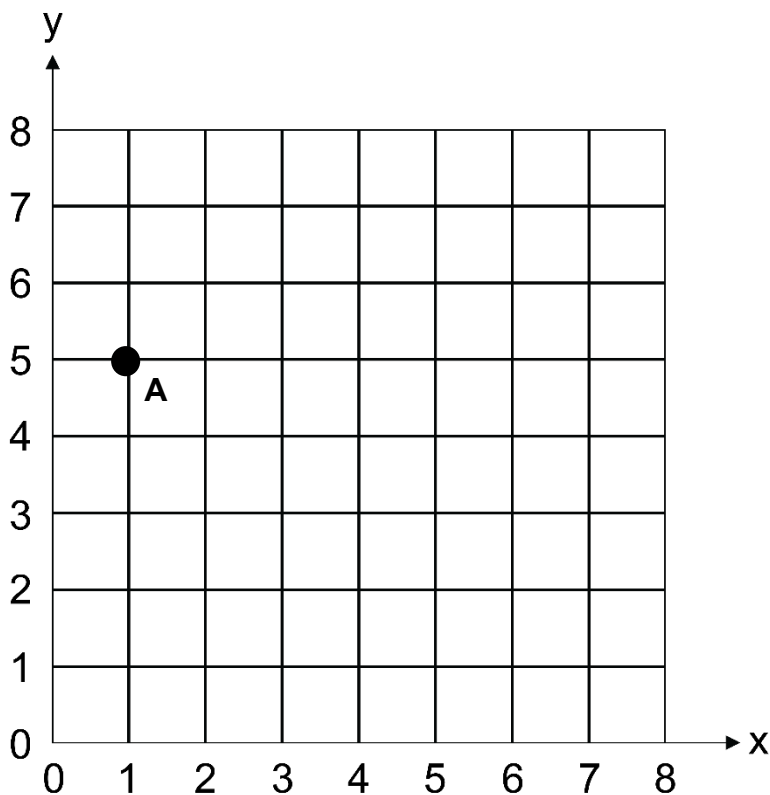
Pt E - (x, y): (6, 1)

Pt K - (x, y): (1, 0)

Pt F - (x, y): (4, 0)

Pt L - (x, y): (7, 4)

Directions: Plot and label the points below correctly on the coordinate plane.



Pt A - (x, y): (1, 5)

Pt G - (x, y): (5, 6)

Pt B - (x, y): (0, 2)

Pt H - (x, y): (0, 7)

Pt C - (x, y): (5, 1)

Pt I - (x, y): (7, 7)

Pt D - (x, y): (1, 8)

Pt J - (x, y): (4, 3)

Pt E - (x, y): (2, 1)

Pt K - (x, y): (4, 0)

Pt F - (x, y): (6, 0)

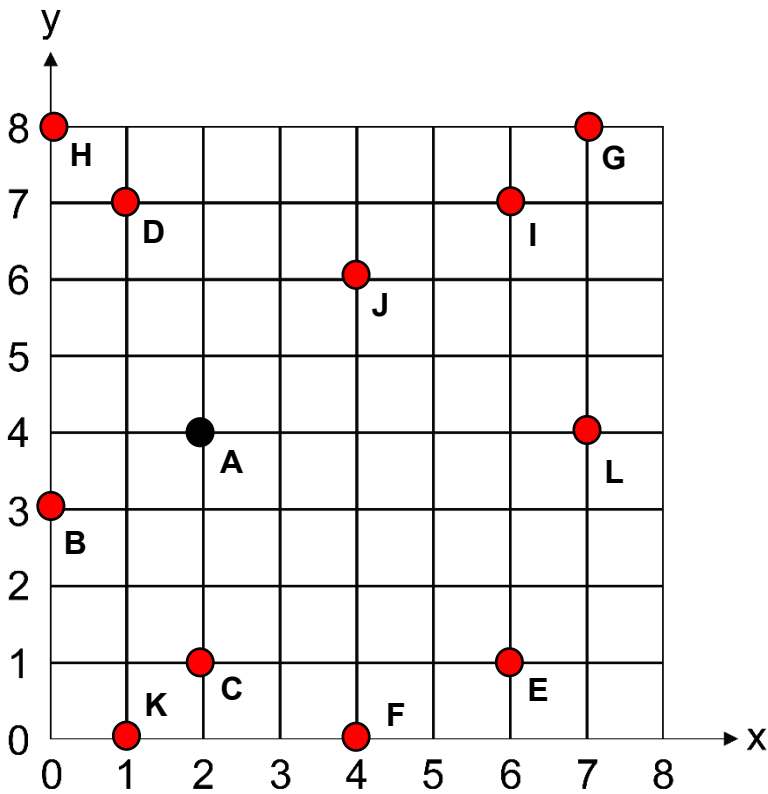
Pt L - (x, y): (8, 5)

Plotting Cartesian Coordinates Mini Review (Quadrant 1) – V1

Answer Key

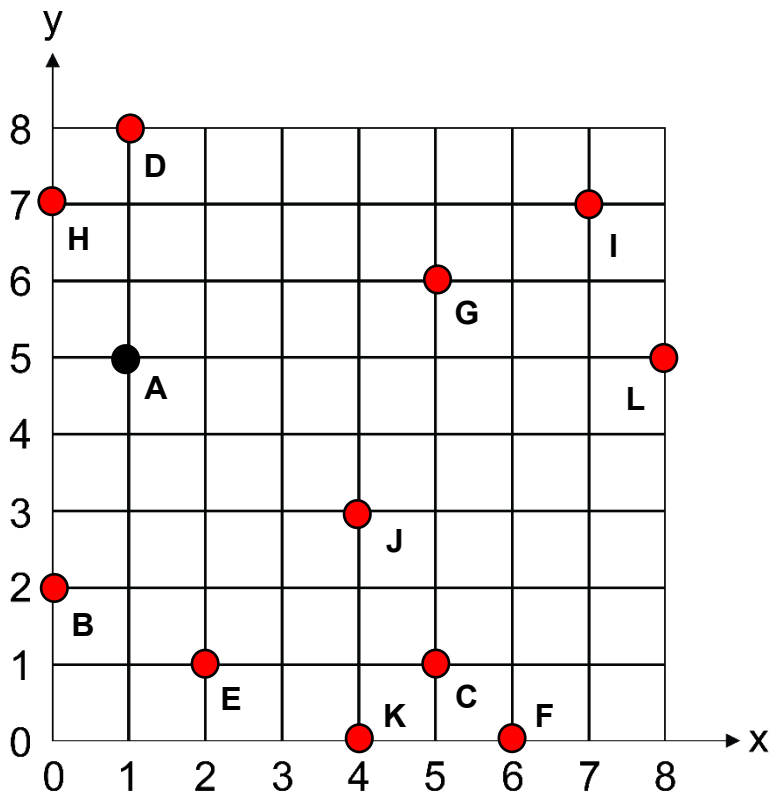
Directions: Plot and label the points below correctly on the coordinate plane.

NOTE: To help students remember the "X" coordinate is first. "We walk TO the elevator, then we go UP." Or, "A baby crawls before they stand."



- | | |
|------------------------------|------------------------------|
| Pt A - (x, y): (2, 4) | Pt G - (x, y): (7, 8) |
| Pt B - (x, y): (0, 3) | Pt H - (x, y): (0, 8) |
| Pt C - (x, y): (2, 1) | Pt I - (x, y): (6, 7) |
| Pt D - (x, y): (1, 7) | Pt J - (x, y): (4, 6) |
| Pt E - (x, y): (6, 1) | Pt K - (x, y): (1, 0) |
| Pt F - (x, y): (4, 0) | Pt L - (x, y): (7, 4) |

Directions: Plot and label the points below correctly on the coordinate plane.

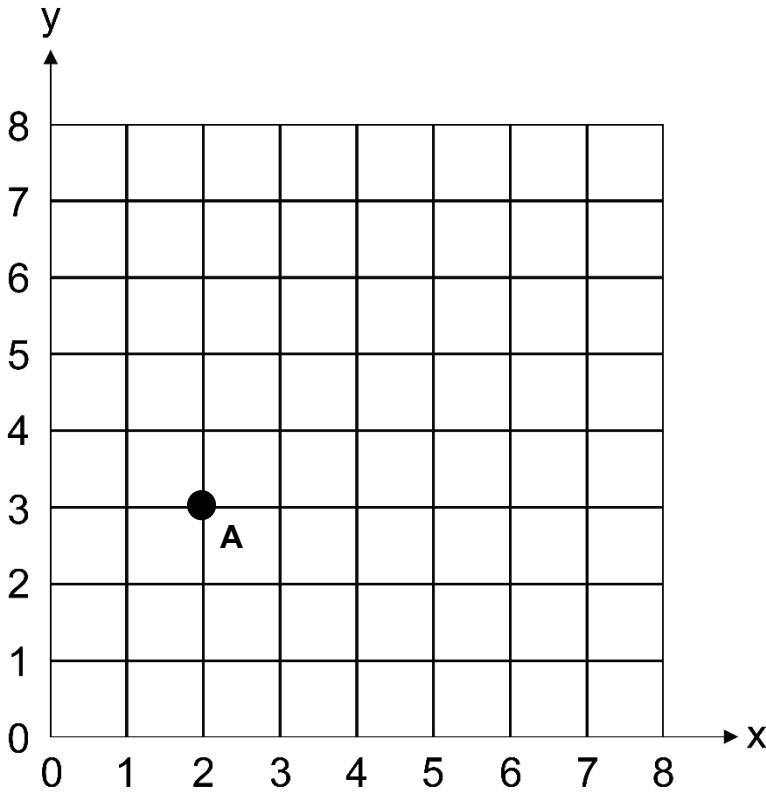


- | | |
|------------------------------|------------------------------|
| Pt A - (x, y): (1, 5) | Pt G - (x, y): (5, 6) |
| Pt B - (x, y): (0, 2) | Pt H - (x, y): (0, 7) |
| Pt C - (x, y): (5, 1) | Pt I - (x, y): (7, 7) |
| Pt D - (x, y): (1, 8) | Pt J - (x, y): (4, 3) |
| Pt E - (x, y): (2, 1) | Pt K - (x, y): (4, 0) |
| Pt F - (x, y): (6, 0) | Pt L - (x, y): (8, 5) |

Plotting Cartesian Coordinates Mini Review (Quadrant 1) – V2

Developing Cartesian Coordinate Skills

Directions: Plot and label the points below correctly on the coordinate plane.



Pt A - (x, y): (2, 3)

Pt G - (x, y): (6, 8)

Pt B - (x, y): (0, 4)

Pt H - (x, y): (0, 7)

Pt C - (x, y): (3, 1)

Pt I - (x, y): (4, 3)

Pt D - (x, y): (1, 8)

Pt J - (x, y): (4, 6)

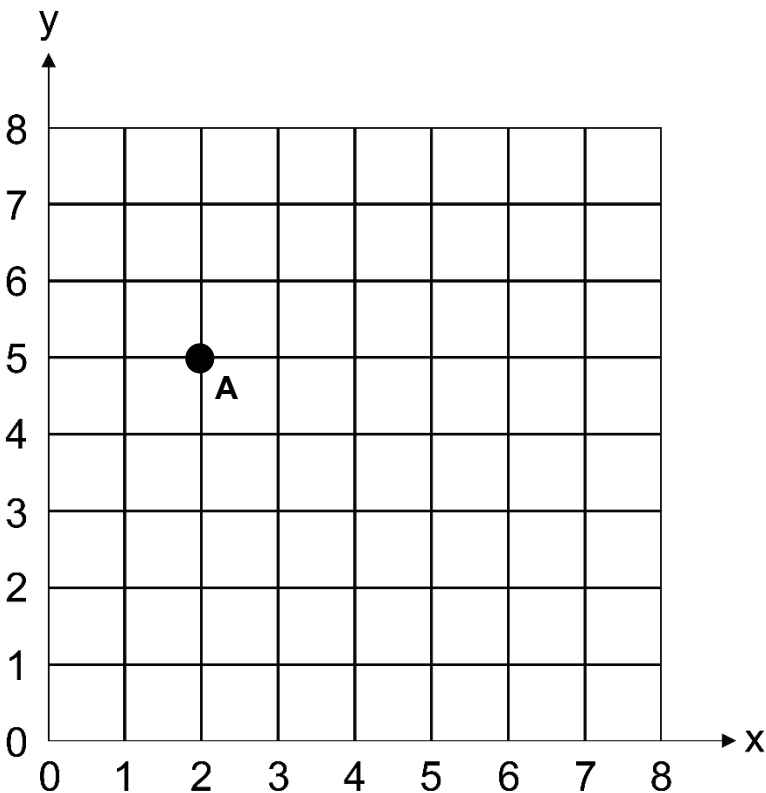
Pt E - (x, y): (7, 1)

Pt K - (x, y): (2, 0)

Pt F - (x, y): (5, 0)

Pt L - (x, y): (7, 5)

Directions: Plot and label the points below correctly on the coordinate plane.



Pt A - (x, y): (2, 5)

Pt G - (x, y): (5, 7)

Pt B - (x, y): (0, 3)

Pt H - (x, y): (0, 8)

Pt C - (x, y): (6, 1)

Pt I - (x, y): (7, 6)

Pt D - (x, y): (1, 7)

Pt J - (x, y): (4, 4)

Pt E - (x, y): (3, 1)

Pt K - (x, y): (5, 0)

Pt F - (x, y): (1, 0)

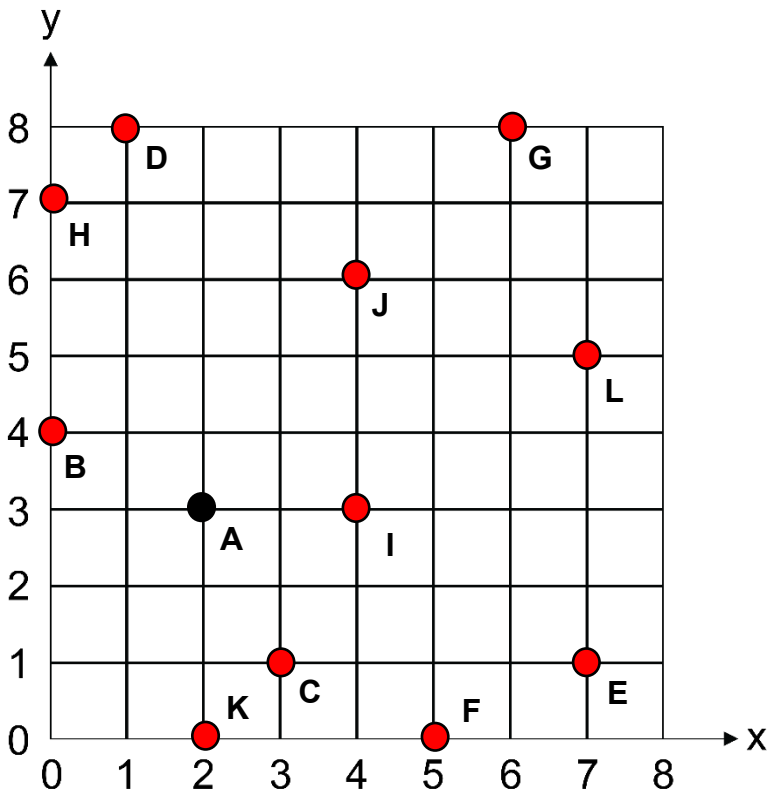
Pt L - (x, y): (6, 5)

Plotting Cartesian Coordinates Mini Review (Quadrant 1) – V2

Answer Key

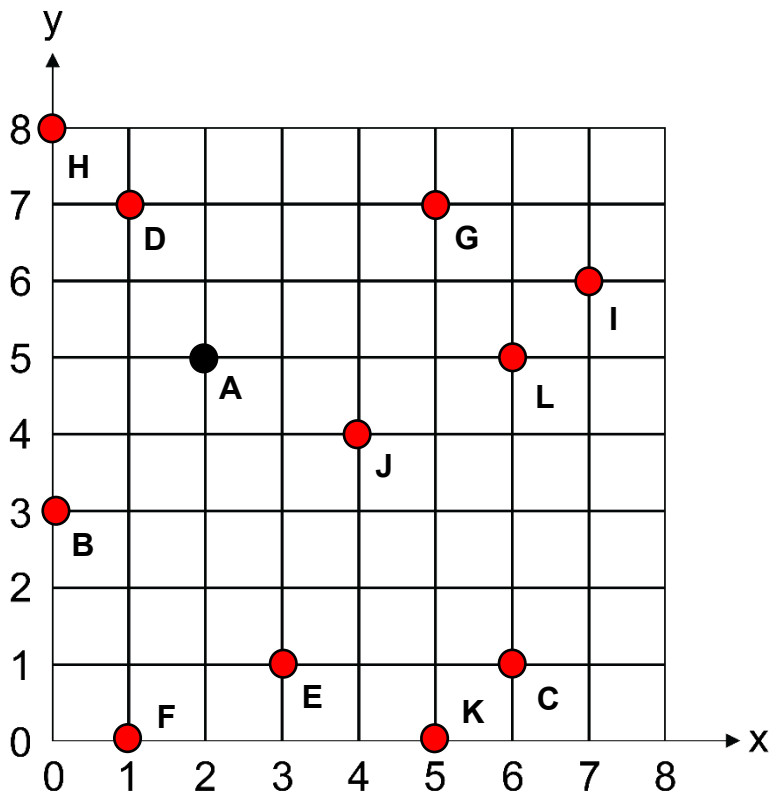
Directions: Plot and label the points below correctly on the coordinate plane.

NOTE: To help students remember the "X" coordinate is first. "We walk TO the elevator, then we go UP." Or, "A baby crawls before they stand."



- | | |
|------------------------------|------------------------------|
| Pt A - (x, y): (2, 3) | Pt G - (x, y): (6, 8) |
| Pt B - (x, y): (0, 4) | Pt H - (x, y): (0, 7) |
| Pt C - (x, y): (3, 1) | Pt I - (x, y): (4, 3) |
| Pt D - (x, y): (1, 8) | Pt J - (x, y): (4, 6) |
| Pt E - (x, y): (7, 1) | Pt K - (x, y): (2, 0) |
| Pt F - (x, y): (5, 0) | Pt L - (x, y): (7, 5) |

Directions: Plot and label the points below correctly on the coordinate plane.

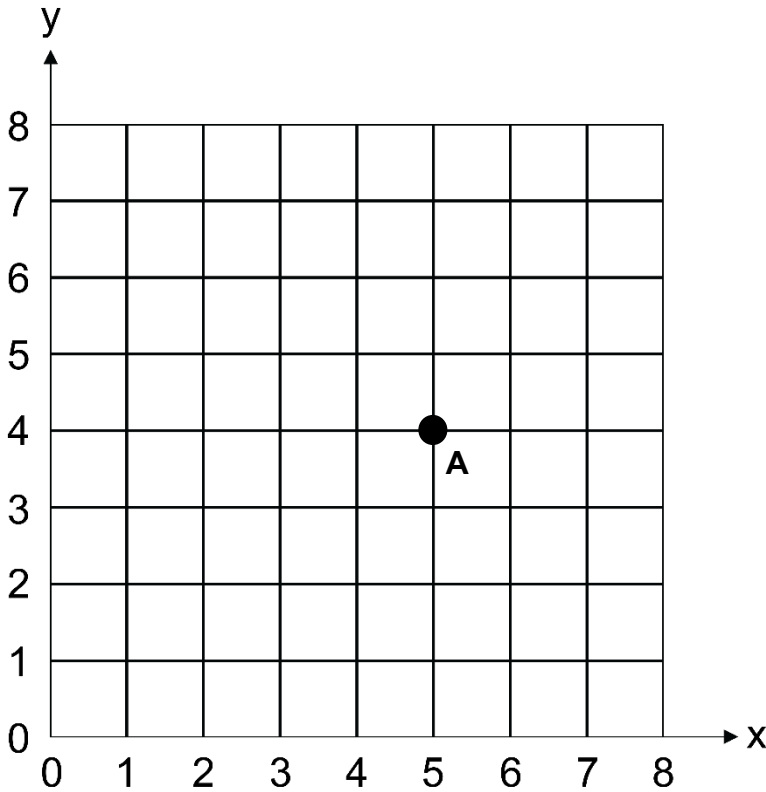


- | | |
|------------------------------|------------------------------|
| Pt A - (x, y): (2, 5) | Pt G - (x, y): (5, 7) |
| Pt B - (x, y): (0, 3) | Pt H - (x, y): (0, 8) |
| Pt C - (x, y): (6, 1) | Pt I - (x, y): (7, 6) |
| Pt D - (x, y): (1, 7) | Pt J - (x, y): (4, 4) |
| Pt E - (x, y): (3, 1) | Pt K - (x, y): (5, 0) |
| Pt F - (x, y): (1, 0) | Pt L - (x, y): (6, 5) |

Plotting Cartesian Coordinates Mini Review (Quadrant 1) – V3

Developing Cartesian Coordinate Skills

Directions: Plot and label the points below correctly on the coordinate plane.



Pt A - (x, y): (5, 4)

Pt G - (x, y): (6, 7)

Pt B - (x, y): (2, 3)

Pt H - (x, y): (0, 6)

Pt C - (x, y): (2, 0)

Pt I - (x, y): (4, 5)

Pt D - (x, y): (3, 7)

Pt J - (x, y): (3, 5)

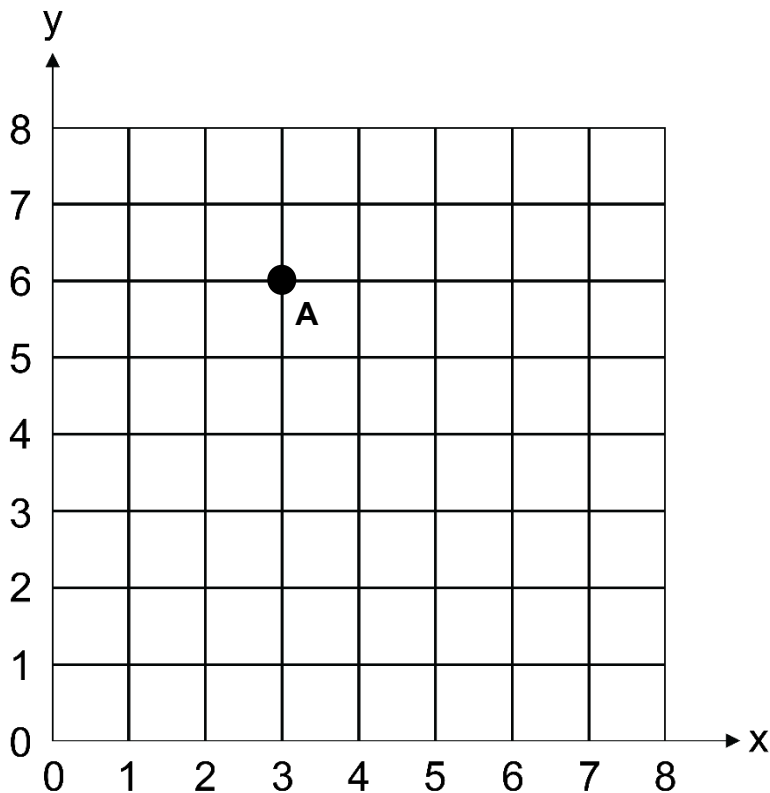
Pt E - (x, y): (6, 3)

Pt K - (x, y): (8, 0)

Pt F - (x, y): (0, 4)

Pt L - (x, y): (7, 6)

Directions: Plot and label the points below correctly on the coordinate plane.



Pt A - (x, y): (3, 6)

Pt G - (x, y): (5, 7)

Pt B - (x, y): (3, 2)

Pt H - (x, y): (0, 5)

Pt C - (x, y): (5, 0)

Pt I - (x, y): (2, 7)

Pt D - (x, y): (1, 5)

Pt J - (x, y): (4, 5)

Pt E - (x, y): (3, 1)

Pt K - (x, y): (2, 0)

Pt F - (x, y): (0, 3)

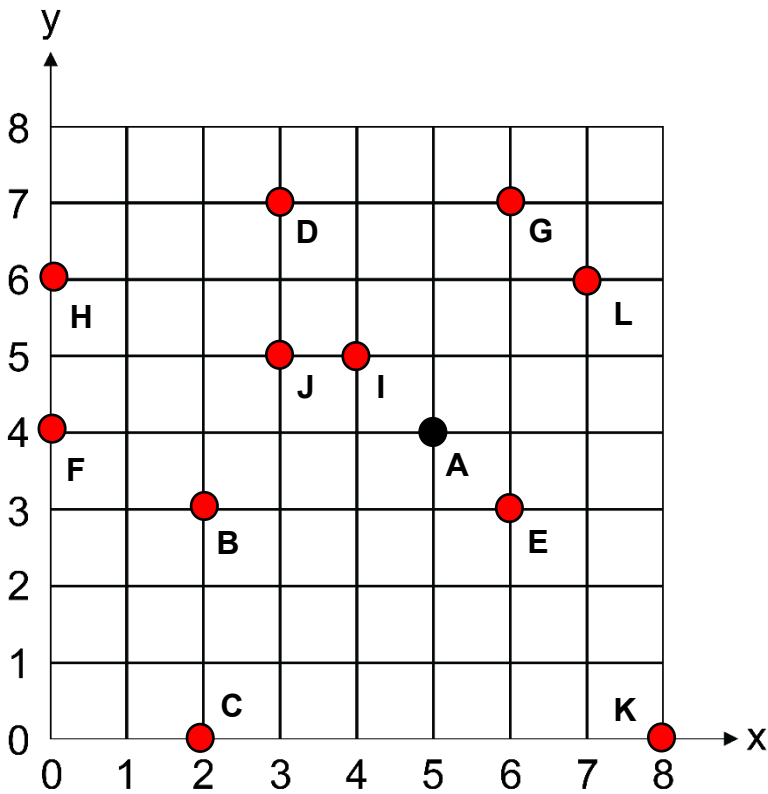
Pt L - (x, y): (8, 6)

Plotting Cartesian Coordinates Mini Review (Quadrant 1) – V3

Answer Key

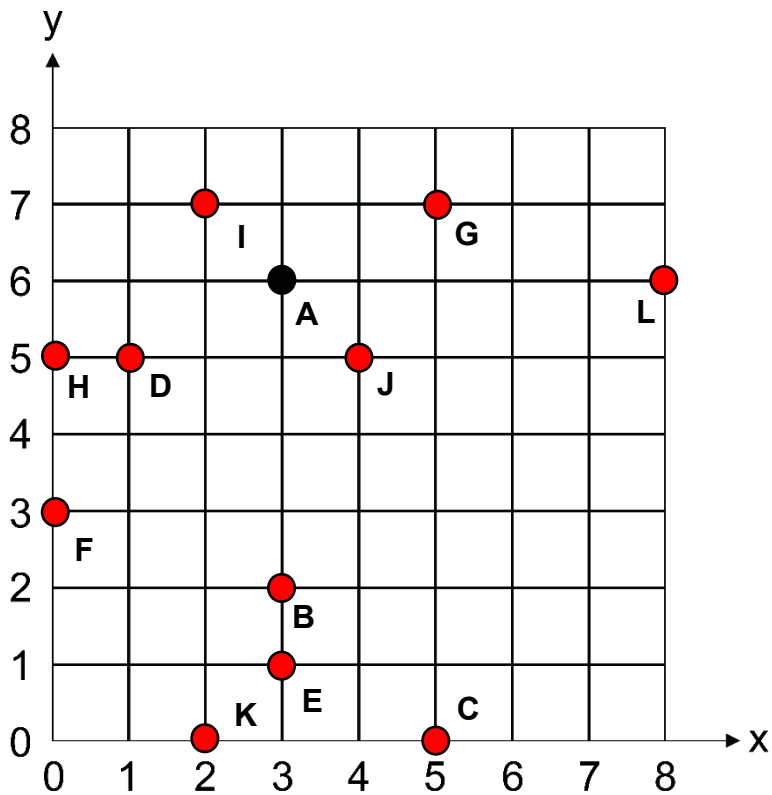
Directions: Plot and label the points below correctly on the coordinate plane.

NOTE: To help students remember the "X" coordinate is first. "We walk TO the elevator, then we go UP." Or, "A baby crawls before they stand."



- | | |
|------------------------------|------------------------------|
| Pt A - (x, y): (5, 4) | Pt G - (x, y): (6, 7) |
| Pt B - (x, y): (2, 3) | Pt H - (x, y): (0, 6) |
| Pt C - (x, y): (2, 0) | Pt I - (x, y): (4, 5) |
| Pt D - (x, y): (3, 7) | Pt J - (x, y): (3, 5) |
| Pt E - (x, y): (6, 3) | Pt K - (x, y): (8, 0) |
| Pt F - (x, y): (0, 4) | Pt L - (x, y): (7, 6) |

Directions: Plot and label the points below correctly on the coordinate plane.



- | | |
|------------------------------|------------------------------|
| Pt A - (x, y): (3, 6) | Pt G - (x, y): (5, 7) |
| Pt B - (x, y): (3, 2) | Pt H - (x, y): (0, 5) |
| Pt C - (x, y): (5, 0) | Pt I - (x, y): (2, 7) |
| Pt D - (x, y): (1, 5) | Pt J - (x, y): (4, 5) |
| Pt E - (x, y): (3, 1) | Pt K - (x, y): (2, 0) |
| Pt F - (x, y): (0, 3) | Pt L - (x, y): (8, 6) |

Cartesian Coordinates – Additive versus Multiplicative – V1

Developing Cartesian Coordinate Skills

Directions: Complete each table. Circle if the relationship is an additive or multiplicative pattern.

1.

x	0	2	5	7	8
y	5	7	10	12	13

Additive
 Multiplicative

2.

x	3	4	7	8	9
y	6	8	14		

Additive
 Multiplicative

3.

x	4	6	9	12	15
y	8			16	

Additive
 Multiplicative

4.

x	y
6	
7	21
10	
11	
12	36

Additive
 Multiplicative

5.

x	y
0	
2	8
5	
7	13
8	

Additive
 Multiplicative

6.

x	y
0	0
2	
5	15
7	
8	

Additive
 Multiplicative

Directions: Complete each table. Circle if the relationship is an additive or multiplicative pattern.

1.

x	1	3	4	8	9
y	2	6			

Additive
 Multiplicative

2.

x	0	2	5	7	8
y		8			32

Additive
 Multiplicative

3.

x	0	2	5	7	8
y		10			16

Additive
 Multiplicative

4.

x	y
2	4
8	
15	
20	40
30	

Additive
 Multiplicative

5.

x	y
5	
7	21
9	
15	
30	90

Additive
 Multiplicative

6.

x	y
3	9
5	
8	14
10	
15	

Additive
 Multiplicative

Cartesian Coordinates – Additive versus Multiplicative – V1

Answer Key

Directions: Complete each table. Circle if the relationship is an additive or multiplicative pattern.

1.

x	0	2	5	7	8
y	5	7	10	12	13

Additive
Multiplicative

2.

x	3	4	7	8	9
y	6	8	14	16	18

Additive
Multiplicative

3.

x	4	6	9	12	15
y	8	10	13	16	19

Additive
Multiplicative

4.

x	y
6	18
7	21
10	30
11	33
12	36

Additive
Multiplicative

5.

x	y
0	6
2	8
5	11
7	13
8	14

Additive
Multiplicative

6.

x	y
0	0
2	6
5	15
7	21
8	24

Additive
Multiplicative

Directions: Complete each table. Circle if the relationship is an additive or multiplicative pattern.

1.

x	1	3	4	8	9
y	2	6	8	16	18

Additive
Multiplicative

2.

x	0	2	5	7	8
y	0	8	20	28	32

Additive
Multiplicative

3.

x	0	2	5	7	8
y	8	10	13	15	16

Additive
Multiplicative

4.

x	y
2	4
8	16
15	30
20	40
30	60

Additive
Multiplicative

5.

x	y
5	15
7	21
9	27
15	45
30	90

Additive
Multiplicative

6.

x	y
3	9
5	11
8	14
10	16
15	21

Additive
Multiplicative

Cartesian Coordinates – Additive versus Multiplicative – V2

Developing Cartesian Coordinate Skills

Directions: Complete each table. Circle if the relationship is an additive or multiplicative pattern.

1.

x	0	2	5	7	8
y	0	6	15	21	24

Additive
 Multiplicative

2.

x	2	4	9	11	15
y	7	9			

Additive
 Multiplicative

3.

x	3	6	9	12	20
y	9			36	

Additive
 Multiplicative

4.

x	y
6	
7	28
10	
11	
12	48

Additive
 Multiplicative

5.

x	y
0	
4	12
6	
10	18
17	

Additive
 Multiplicative

6.

x	y
0	0
2	
5	20
7	
8	

Additive
 Multiplicative

Directions: Complete each table. Circle if the relationship is an additive or multiplicative pattern.

1.

x	2	3	7	8	9
y	2	3			

Additive
 Multiplicative

2.

x	0	6	7	8	9
y		24			36

Additive
 Multiplicative

3.

x	0	2	5	7	8
y		11			17

Additive
 Multiplicative

4.

x	y
2	8
8	
15	
20	80
30	

Additive
 Multiplicative

5.

x	y
5	15
7	
9	
15	
30	40

Additive
 Multiplicative

6.

x	y
3	18
5	
8	48
10	
15	

Additive
 Multiplicative

Cartesian Coordinates – Additive versus Multiplicative – V2

Answer Key

Directions: Complete each table. Circle if the relationship is an additive or multiplicative pattern.

1.

x	0	2	5	7	8
y	0	6	15	21	24

Additive
 Multiplicative

2.

x	2	4	9	11	15
y	7	9	14	16	20

Additive
 Multiplicative

3.

x	3	6	9	12	20
y	9	18	27	36	60

Additive
 Multiplicative

4.

x	y
6	24
7	28
10	40
11	44
12	48

Additive
 Multiplicative

5.

x	y
0	8
4	12
6	14
10	18
17	25

Additive
 Multiplicative

6.

x	y
0	0
2	8
5	20
7	28
8	32

Additive
 Multiplicative

Directions: Complete each table. Circle if the relationship is an additive or multiplicative pattern.

1.

x	2	3	7	8	9
y	2	3	7	8	9

Additive
 Multiplicative

2.

x	0	6	7	8	9
y	0	24	28	32	36

Additive
 Multiplicative

3.

x	0	2	5	7	8
y	9	11	14	16	17

Additive
 Multiplicative

4.

x	y
2	8
8	32
15	60
20	80
30	120

Additive
 Multiplicative

5.

x	y
5	15
7	17
9	19
15	25
30	40

Additive
 Multiplicative

6.

x	y
3	18
5	30
8	48
10	60
15	90

Additive
 Multiplicative

Additional Reference Literature

Contents

- ❖ **Consistency Yields Results – Only When...!**
- ❖ **Understanding Learning and Repetition**
- ❖ **Math Fact Mastery – Easy to Do**
- ❖ **Pictorial Math Models – Multiplication and Division of Fractions and Decimals**
- ❖ **Positive and Negative Integers - +, -, x & ÷**

*Section included to provide interested educators more perspective
on pedagogy and methodology*

Consistency Yields Results – Only When...!

*A Short Essay – Understanding that
CONSISTENCY is Key ONLY when students are
engaged daily in learning that is impactful to
performance*

Authored by:

Blaine Helwig

February 21, 2026

Consistency Yields Results – Only When...!

by *Blaine Helwig*

After volunteering to help a colleague with her yard work, I spent three hours mowing in the intense afternoon Texas heat. Despite the extra effort required by the overgrown lawn, her only comment upon completion was a reference to my gym routine, suggesting this was workout enough.

"It was tougher with the grass so high," I replied politely. "But if I lived here, I'd only be mowing every three weeks, hardly enough for a consistent workout."

This scenario might seem obvious, but I've seen the same pattern in schools. Many teachers and administrators implement core programs in that same 'once every few weeks' fashion. The most telling part? When asked about their academic strategy, these educators don't even realize their curricular effort is too inconsistent to produce real student 'gains.'



Consistency in Context

Consistence at anything we do is pivotal to mastering a task, skill or application. However, being consistent in an implementation will not automatically elevate student outcomes. **An educator must be consistent at practices and interventions THAT matter.** For instance, consistency in the wrong intervention is a year-long path to zero academic improvement. An educator must understand WHAT, HOW and WHY to implement in a Tier 1, stop-gap curricular program, or intervention process. Then and only then, does the element of consistency come into play that makes a substantial impact on student outcomes.

Consistency Yields Results – Only When...!



I have observed other patrons at my gym sporadically engage in varying exercises for months, and – of course – they do not observe physical gains in their muscle development. They have **no** targeted WHAT or WHY and quite often HOW in their daily physical regime that addresses their objective. Their determination is commendable; these individuals have regularly attended the gym for months. They are consistent, but without desired performance results because of an inconsistent program regimen that specifically targets their desired muscle groups.

It is no different in public-school classrooms. Teachers and school administrators **must** know WHAT and WHY curricular stop-gap programs and intervention processes are needed. The 'HOW' is determined once the initial two inquiries have been resolved. Then, *consistency is the necessary element that naturally follows.* ***In summary, consistency yields results ONLY WHEN the targeted approach addresses the fundamental goal.*** Otherwise, there is continued frustration each May when poor academic performance continues despite hard work, albeit inefficiently and ineffectively.

Understanding LEARNING and REPETITION

to Dramatically

Elevate Student Outcomes!

**A short essay to dramatically
improve student outcomes by
understanding learning
fundamentals, academic gaps
and pedagogy.**

Blaine Helwig

February, 2026

Executive Summary

Academic performance in Title 1 elementary and middle schools remains chronically stagnant. Nationally, low-income public schools rarely see year-over-year gains exceeding 5%, with between 30 to 70 percent of students consistently failing to meet grade-level standards. While systemic factors and administrative accountability contribute to this inertia – often determined by school boards or charter founders – this paper focuses exclusively on high-impact classroom interventions. Specifically, by examining pedagogical elements and "stop-gap" curricula that, when implemented with absolute fidelity, can dramatically elevate outcomes in literacy, mathematics, and science and effectively eradicate the achievement gap.

Sustained academic growth in all classrooms begins with effective student management, efficient routines, and strong teacher-student relational trust. Additionally, when teachers establish clear expectations and high standards for quality work, students often complete their assignments with little need for external motivation. However, to move beyond basic engagement and significantly impact performance, educators must address three specific areas: spaced repetition pedagogy, prior grade level academic gaps, and threshold (mastery-level) repetitions. It is these three areas that significantly reduce the stubbornly stagnant academic performance at Title 1 campuses.

Mastery thresholds are independent of core subjects like math and science but remain highly dependent on student cognitive ability. In public school elementary and middle school classrooms, teachers must navigate within a single instructional period a diverse spectrum of learners ranging from gifted and talented children to special education students. The challenge lies in delivering dynamic lessons that prevent high-ability students from disengaging during the repetition cycles necessary for others to reach mastery. *Spaced repetition pedagogy* provides an ideal pedagogical framework for this, allowing teachers *of all experience levels* to provide mastery skill and application levels in Title 1 schools. By utilizing this instructional method *and stop-gap curricula*, educators can efficiently return struggling students to Tier 1 grade-level proficiency within one school year.

Steven Johnson's concept of the "adjacent possible" suggests that innovation and progress rely on viable sequencing; without necessary precursors, the next phase cannot occur. This concept is highly applicable to education. When students, particularly those from low-income backgrounds, have significant skill gaps from prior grades, standard sequential lesson planning becomes difficult. Similarly, these academic gaps also press students into a non-linear learning situation, as their "adjacent possible" for new concepts is untenable. However, spaced repetition pedagogy in conjunction with stop-gap curricula offers a systematic, adaptable instructional system *to close academic gaps from prior grade levels*. It enables teachers *of all experience levels* to effectively build skill sequences in any core subject. Due to its simplicity, this pedagogical method allows new and seasoned educators to produce similar high-quality academic outcomes.

To achieve transformative social and academic results, educators must prioritize and fully integrate spaced repetition pedagogy and stop-gap curricula into their instructional frameworks. This methodology is a high-leverage tool for dramatically increasing student achievement without requiring additional school funding. By focusing existing instructional time on either discrete skill mastery or integrated application tasks, spaced repetition instruction ensures that students can confidently engage with grade-level content daily.

About the Author

Blaine Helwig is a local, state and nationally recognized campus administrator and was the J. Walter Graham Elementary Principal in Austin ISD for over 9 years. In that time period, J. Walter Graham Elementary (an urban Title 1 school) experienced dramatic and sustained academic success with typical inner city challenging student demographics. From 2009 to 2016, Graham Elementary School's academic performance earned exemplary accountability ratings and every possible academic distinction by the Texas Education Agency. The school was honored as a 2012 National Blue Ribbon School recipient, and the campus was featured as a National Blue Ribbon Profile School for academic excellence on the United States Department of Education's website - one of only four schools in the country to receive this prestigious honor. The Graham campus has also been recognized annually by Education Non-Profit Organizations for high and sustained academic performance. Finally, the language arts, mathematics and science stop-gap resources implemented at Graham that produced heightened student success are currently used in many other Title 1 campuses and districts with similar high percentages of English Language Learners, minority and low socioeconomic student populations.

In 1985, after completing a Bachelor of Science degree in Architectural Engineering from the University of Texas at Austin, Mr. Helwig worked for seven years as a senior structural design engineer, analyzing and designing state and federal highway bridges. He was also employed as a civil engineer in California and Utah with the United States Department of Defense as a lead project technical engineer overseeing earthen and hydraulic dam construction and large civil works projects. At present, Mr. Helwig retains his license as a registered professional engineer in Texas with a structural engineering specialization. Finally, Mr. Helwig is extremely appreciative of the United States Military for their financial support for his college education. He is a proud veteran of both the United States Army and the United States Air Force.

Mr. Helwig was conferred a Bachelor of Business Administration in Accounting in 1992. During this period of business study, he pursued additional and concentrated coursework in both economics and finance. After working as an accounting director for a large library system in central Texas, he was alternatively certified to work as an elementary teacher by the University of Texas. He taught fourth and fifth grade self-contained classrooms in the Round Rock Independent School District for six years. It was during those professional years that extensive language arts, science, social studies and mathematics curriculum were developed. The initial design work on the numeracy and literacy stop-gap resources was completed, implemented and beta-tested in intermediate classrooms. Those stop-gap intervention programs significantly evolved during his Title 1 school experience and are currently used by tens of thousands of elementary students in both traditional public schools as well as charter schools across the State of Texas.

In 2004, he was awarded a master's degree in educational administration from Texas State University and worked for two years as the assistant principal at Charlotte Cox Elementary in the Leander Independent School District, a suburban school district near Austin. He began work in the Austin Independent School District in 2006 as an Elementary Program Supervisor under the direction of the Associate Superintendent's Office. A year later, he started his principal assignment at J. Walter Graham Elementary and maintained that capacity until his retirement in the fall of 2016. In 2012, Mr. Helwig was recognized by the United States Department of Education as one of seven recipients in the country with the prestigious Terrel H. Bell award for school transformation for producing outstanding student achievement for all students regardless of race, language proficiency and socioeconomic status. He was also the 2012 recipient of the Central Texas HEB Principal Excellence in Education Award and a five-time nominee and a two-time finalist for Austin ISD Principal of the Year.

Currently, Blaine Helwig is a curriculum writer and a Title 1 education consultant in rural and urban school social and academic transformation. He is a cofounder of Celestial Numeracy, a daily numeracy program that presently serves over 100,000 elementary and middle students each day as well as a cofounder of The New 3Rs Academic Transformation.

Understanding LEARNING and REPETITION – Elevating Student Outcomes!

By Blaine Helwig

Every time I hear the word, **PRACTICE**, my gut reaction is to mentally recall the 2002 Philadelphia 76ers infamous press conference when Allen Iverson *repeatedly* utters, **“We are talking about practice, man. Not a game!”** The press conference continues for what seems an eternity with Iverson repeating and repeating the word, **practice** until the reporters covering the interview are laughing. Once watched, it is unforgettable. If you have not seen it, check out the video on YouTube. You will understand completely why it is an unforgettable interview. He repeats the word ‘practice’ so many times that the incident and word is ingrained in a viewer’s long-term memory.



Now, full-disclosure, Allen Iverson is a retired, famous, athletically gifted and hall-of-fame professional basketball player. His athletic ability was undeniably at a world class level. Now, having said that, he still needed to practice basketball skills to perform at a high level. But with his physical gifts, he probably needed to practice less than a tiny fraction of people that ever dribbled a basketball on a hardwood court. Allen Iverson possessed that level of gifted athletic ability.

Mastery of most human tasks is achieved through solitary, repetitive practice. This remains empirically true even when the skill is ultimately intended for team sports or collaborative group efforts. While participants inevitably bring diverse attributes and skill levels to a project, the fundamental components of their contribution are almost always refined in isolation. Many learning progressions begin with rudimentary, interdependent skills. Because these skills follow a strict sequence, mastery of one is a prerequisite for advancing to the next.

Human undertakings that require repeated practice include learning to play a guitar, studying a non-native foreign language, driving an automobile, replacing the worn disc pads on one’s car brakes, learning to read, teaching literacy or mathematics in an elementary classroom, becoming mathematically numerate, etc., etc., etc. The list of human endeavors that require repeated practice to achieve mastery appears infinite when we start considering all the tasks humans do each day. Of course, the higher the innate aptitude one possesses, the less repeated practice is usually required to fully master a skill or a set of simultaneous skills (i.e. an application) utilized at one time. Having said that, let’s return to former NBA superstar, Allen Iverson. While his demeanor was often debated, Iverson’s innate physical ability was undeniable, allowing him to achieve skill mastery with a fraction of the individual practice required by the vast majority of other basketball players.

Practice – Required Repetitions to Achieve Mastery

‘We are talking about practice’ – specifically, I am referring to the repeated attempts required to fully master a desired skill into long-term memory (i.e., ingrained long-term learning). I have written on this topic in the past, and I will briefly repeat the relevant aspect of that writing below – with regard to the number of repetitions required for a school-aged child to master a core content skill or application in mathematics, literacy, social studies, or science in a typical classroom environment.

Hence, the central and ubiquitous question to answer is, **“How many repetitions are required to master a typical academic skill?”** The answer based on my formal and empirical education, professional observations and life experiences is – **It depends!**

After working with elementary-aged students for the crux of my public education career, there are three (3) general student group classifications listed below that I believe are empirically valid and accurate depending upon the child’s cognitive situation.

- ❖ **Talented and Gifted (TAG) Students:** Between 1 to 3 repetitions required – the Allen Iverson metaphor
- ❖ **Regular Education Students:** Between 8 to 18 repetitions required
- ❖ **Students Receiving Special Education Services:** Varies on student disability – sometimes very few repetitions are needed and sometimes a great many – refer to the child’s Individual Education Plan (IEP).

The above breakdown based on student classification indicates an obvious challenge to any classroom teacher. **Why?** Every classroom in every public school is comprised of these three (cognitive) student groups; consequently, the question that every educator must address is quite simple, **“How do I teach all students to skill and application mastery when the associated repetitions vary widely among diverse student groups?”**

The answer is not difficult, but it is **without a doubt and unfortunately** the **road less travelled in public school pedagogy**. In fact, it is **one** of the primary reasons so many low-income students remain academically below grade level as they transition to succeeding grade levels in elementary school. Frankly, I was constantly baffled that so many elementary children do not achieve grade level literacy and arithmetic proficiency in the United States, and state legislatures and education agencies do not actively challenge the continued ineffective practices in the public school system. However, after working in the school system in different capacities for three decades, I discovered there are reasons for that. If the reader possesses interest in this topic, I have also written on that topic in great depth.

Note: It is of paramount importance that the reader understands, once a task is mastered to a desired level of proficiency, it takes significantly less time to regain that former level of proficiency after an absence of time. The required time to relearn that task will vary on several factors including task complexity, the amount of time that has passed since a person last completed that task, original levels of competency (proficient or at an expert level), and one’s age.

Critical Understanding of Skill and Application Development – 60,000 Foot Overview

Educators must recognize that foundational skills are the essential scaffolding for both dependent abilities and complex applications. In literacy, this progression begins with letter recognition and advances to phonemic mastery, such as blends and digraphs. Through deliberate and consistent practice, these isolated skill components integrate, enabling students to decode sentences with increasing fluency and ease while reading.



While most American preschoolers arrive with solid home-language skills, those entering programs where the instruction language differs from their native tongue face additional challenges. For these students, particularly those from low-income immigrant families, a more intensive pedagogical strategy is often required. Because

they lack foundational oral skills in the school's target language, primary grade educators must prioritize listening comprehension, phonics, phonemic awareness, and word fluency as the primary engines for reaching grade-level reading proficiency. If the reader is interested in the language acquisition process, refer to the white papers, resources and blogs on this literacy topic.

While an oversimplification of language acquisition, the process described above reflects a universal truth: *learning in any discipline is highly sequential*. To master core content in a typical and diverse classroom, teachers must address specific skill gaps through systematic "stop-gap" curricula; then and only then, educators are able to bridge prior learning deficits when teaching grade-level material. In a sentence, *stop-gap curricula must systematically target each student’s academic skill gaps while concurrently, the teacher employs efficient and effective spaced repetition pedagogy that addresses all three student groups*. Without this dual approach, low-income and immigrant students will continue to struggle with literacy and mathematics – a trend of low proficiency that has plagued Title 1 classrooms for half a century.

How to Teach to Skill and Application Mastery

One of the main mastery issues of grade level content and prior grade level academic skill gaps is not too much repetition, but too little.

An effective teacher must be able to adapt to differing student academic needs efficiently and effectively, or 30 to 60 percent of their students do not master grade level content. Spaced repetition pedagogy affords content mastery to occur in real time for all students!

Student mastery through pedagogical repetition is not a one-size-fits-all process; the frequency and type of practice required vary significantly based on the nature of the core content being taught. For instance, arithmetic mathematics has a finite, two skill-based operations (e.g. math facts and math processing skills); whereas each set of skills are directly embedded into an application (i.e., a traditional word or story problem).

In contrast, reading development is generally categorized into two distinct phases: learning to read and reading to learn (i.e., comprehension). The first phase focuses on decoding and mechanical fluency, typically the primary goal of the early grades. The second phase, which emphasizes deep comprehension and critical

analysis, becomes the central focus of the intermediate grade levels.

Moreover, in the primary grades, the instructional focus is largely restricted to foundational mechanics: phonemic awareness, systematic phonics, and word fluency. During this phase, educators prioritize "basic comprehension," the ability to follow simple narratives in developmental readers or early chapter books. This level of instruction is fundamentally skill-based and rote in nature; it serves as a prerequisite for the more complex, abstract cognitive processes required for "reading to learn," which governs literacy in the intermediate grades. Writing development follows a similarly incremental, skill-based trajectory. It begins with the mastery of orthography—the ability to spell simple English words—and understanding how those words combine to form basic grammatical sentences. As students mature, this foundational process expands: they move from simple structures to complex sentence construction and eventually to paragraph formation. At this advanced stage, the focus shifts toward logical sequencing, requiring students to organize thoughts coherently to convey increasingly sophisticated ideas.

In general, science instruction follows a similar logic: students must first internalize the basic principles of Earth, Physical, and Life sciences before they can apply them to real-world scenarios or explain them in written and auditory formats. Again, these are gross oversimplifications of the main core content areas, but the salient point is that effective and efficient pedagogical systems usually vary to secure mastery of each specific content area – and learning dependent skills in sequence is an important part of the learning process. To illustrate the necessity of sequence, consider multi-digit multiplication: a student cannot master a 3×2 computation without first understanding the conceptual meaning of multiplication and achieving automaticity with single-digit facts. In practice, attempting complex multi-step problems is nearly impossible until those foundational facts are memorized to the point of instant recall. A 3×2 multi-digit computation is not the immediate/adjacent "next step" after learning single digit multiplication facts. Of course, there is a critical sequence of dependent skills to learn first—such as understanding place value, physical meaning, and smaller digit multiplication computations that must be bridged to transition from basic facts to multi-digit proficiency.

Let's focus on the **math**, **reading** and **science** content areas in more instructional detail with regard to student mastery via repetitional practice.

- 1.) **Math.** Spaced Repetition offers a dynamic pedagogical approach that scales naturally across diverse student populations—from Gifted and Talented (TAG) and general education to most students with

learning disabilities. By adjusting the frequency of review based on individual performance, this method ensures all students reach mastery without the risk of boredom. Furthermore, its straightforward structure allows for seamless implementation by educators at any level of experience.

However, in the memorization and mastery of math facts as well as guaranteeing math processing skill proficiency, another programming step is required. It is highly beneficial to implement a global, schoolwide math numeracy program like [Formative Loop](#). Otherwise, students struggle with math fact dependent math processing skills such as multiple digit computational skills. To enhance application skills, specifically word and story problems, a structured paper-and-pencil daily format provides a clear path to mastery. This approach allows teachers to use active monitoring to identify specific problem types requiring additional spiral review within the spaced repetition system. In the end, entire classrooms of students master math facts and math processing skills as well as prior grade level academic deficient skills, and problem-solving applications. Once students have secured foundational problem-solving techniques through the fall semester, they can effortlessly transition to digital assessment formats. It is important to establish norms and expectations prior to transitioning to a digital medium.

Note: In the coming months, a comprehensive video detailing the Spaced Repetition pedagogical technique will be available for free download on the [New 3Rs website](#) under the ‘Videos’ tab. By implementing this structured approach, schools can fundamentally transform their math outcomes—enabling over 90 percent of students to meet or exceed state standards within a single academic year. Please refer to the footer for the website URL address.

- 2.) **Reading.** As described above, phonetically decoding words and associated phonemic letter sounds in comparison to comprehending what one reads are two different literacy learning stages. It is for this reason that in the primary grades, a teacher should be repetitive on phonemes, word decoding and word fluency so children master correct pronunciation of all words encountered during guided and independent reading sessions. In these learning stages, a teacher can use spaced repetition to ensure that students learn the letter sound skills and apply them into word study, read aloud, and guided reading sessions. However, it is imperative – especially in Title 1 elementary schools – that students possess word fluency. It is for these reasons that all students at the end of their first-grade year should be able to demonstrate reading fluency rates between 100 and 115 words per minute. At the end of second grade, fluency rates should be between 135 and 150 words per minute. These levels are not difficult to achieve if the teacher singles out fluency word skills as a priority, and the use of the 1,000-word fluency program can achieve these proficiency levels – especially in the Title 1 elementary schools. The program is a free download at [New 3Rs Academic Reformation](#). Again, it is a relatively easy task to achieve mastery of phonemic awareness of common sounds and decoding skills via a spaced repetition daily pedagogical medium.



The second stage of reading is heavily based on comprehension of text as well as the ever present assessed common literacy State standard (CCSS and TEKS) strands for vocabulary development, character analysis, inferences, summary, main idea, etc. The means to accomplish this task is to employ Guided Novel Instruction (GNI), weekly focus of specific literacy strands as well as accountable independent reading. The vast number of intermediate aged elementary students will not become lifelong readers if they are confined to reading short passages and answering related questions that access only standard-based literacy strands. Obviously, due to standardized test assessments, these

short comprehension passages must be employed to prepare students for not only the test format but provide sufficient practice in responding to those types of questions. However, it is the engagement of quality grade level novels that afford children to discover reading as an enjoyable endeavor in and of itself. Moreover, this process can apply all the literacy strands from State standards as well as apply the primary grade phonics and phonemic awareness skills until students read and comprehend with automaticity. Since students are engaged in GNI every day for at least 30 to 45 minutes, **the sheer volume and practice of reading practice** ensure all students secure grade level reading proficiency. The teacher is constantly interacting with students on specific skills in application when reading high-quality (student interest) chapter books/novels. Finally, as students discover novels as a form of entertainment, the accountable independent reading program sells itself to 80 to 90 percent of intermediate students. If there is accountability in the independent reading process in conjunction with GNI, a classroom teacher will discover that students consume reading novels on their own. Thus, the motivation factor and the related energy a teacher must expend need only be targeted for 10 to 20 percent of their students – a manageable number.

Note: The art of writing is *invariably* the last literacy element to be mastered during the language acquisition process. The language acquisition process in order of development is consistently listening, speaking, reading and finally, writing. The core content of learning to write a language is interesting since it is the last element to be mastered, but ironically, it had to be invented **before** the reading part of a language could come into existence. Much like reading, students must practice writing a lot each day to master the skill. As always, students are not mastering a skill without practicing it to threshold levels.

There is a tremendous difference for many elementary students, especially low-income students, in orally pronouncing English words fluently versus spelling those same words correctly when writing a short narrative or writing responses to queries from a comprehension reading passage. However, if students can correctly spell many of the most basic English words with automaticity, they are much better able to logically sequence their sentences to convey intent, and their daily practice is not an endless teacher directed correction of misspellings of common English words. Instead, the teacher-student conversations are extended to much richer content areas of grammar, word choice, logical sequencing, compound sentences as well as employing differing sentence transitions of dependent clauses to vary sentence structure. There is a free curriculum (i.e., 800 word stop-gap non-negotiable program) at the website in the footer that will dramatically assist in students' mastering basic English word spellings.

3.) Science. Long-term mastery in science mirrors mathematics because both subjects rely on building specific skills, using technical vocabulary, and applying multiple interconnected concepts.

For instance, students must possess thorough understanding of discrete science concepts/skills in energy forms – to apply those energy forms in a conservation of energy principle using, for instance, a real-world hydroelectric power dam. Then, it is easier to comprehend that water stored (i.e., potential energy) behind the dam falls vertically (i.e., kinetic energy) and rotates large metal turbines with magnets attached to produce an electric current. All aspects of these science processes must be



learned discreetly and then combined in a simple example to fully understand the energy transitional process working in combination. Again, it is for this reason that mastery of science skills/concepts should be pedagogically approached like mathematics with dynamic spaced repetition instruction and active student engagement every day to achieve mastery level repetitions for all three (3) student groupings listed above. Finally, fifth grade fall and spring daily warm-ups are available for free download at the URL in the footer of this document. These warm-ups can be added to the daily spaced repetition session. As with mathematics, science vocabulary is non-contextual, students often cannot

rely on context clues to determine a word's meaning as they would in a standard literacy passage. To ensure comprehension, elementary teachers should provide a working definition alongside visual text and real-world examples for specialized terms such as metamorphic rock, electric circuit, potential energy, and photosynthesis.

Note: While standardized math and science assessments primarily rely on written questions, their typically short format means that students with reading difficulties can often still grasp the 'gist' of the content. Because these questions are significantly more condensed than standard literacy passages, reading stamina is rarely the primary barrier. However, for students who lack fluency in basic arithmetic, assessment stamina remains a significant challenge

Importance of Classroom Structure and Sequential Lesson Design in Student Performance

Social and academic performance is contingent on more than only skill and application practice via repetitions. There are a finite number of significant elements that influence efficacy in the classrooms, and unfortunately, classroom teachers and campus administrators must be cognizant of the importance of those factors to eliminate the achievement gap in Title 1 elementary and middle schools.

This text assumes educators and administrators already recognize that effective classroom management, efficient routines, and sequential lesson design are vital. These three pillars share a singular goal: creating an organizational structure that maximizes student engagement and time-on-task. In practice, high levels of teacher and administrator structure directly correlate with superior academic and social growth, while a lack of structure typically results in lower performance. Therefore, campus leaders should utilize fall professional development to prioritize and reinforce specific management techniques—such as proximity and clear expectations—and logistical routines like transitions and material distribution.



Lesson planning, or more aptly, **sequentially** planned skill lessons in many Title 1 elementary and middle schools has become a lost art in the pedagogical craft. *Why?* I think this has occurred due to a series of events over the last 3 decades.

First, teachers are not trained to think in a logical framework in curricular content toward their lessons. They are being trained more in instructional mediums than attempts to lose focus on the root issue of low academic performance, such as small group guided math instruction. Since students have prior grade level academic gaps, instead of globally addressing the academic numeracy gaps via spaced repetition and Formative Loop, they employ small group guided math methodology during their math block which leaves many students not in the small group off task and ultimately produces poor overall academic performance.

Second, the educators' philosophy at the administrative and university level appear to acquiesce toward accepting poor results as the cost of doing business. They do not change their methodology when it has repeatedly proven to be ineffective. They appear to me that their ideological beliefs are more important than the results their philosophical beliefs actually produce.

Third, I also believe the rise of digital curricular resources in lieu of textbooks is a pivotal factor. Digital resources may save on printing paper, but it appears that efficacy is lost in classrooms that use them. It may also be due to the fact that the digital resources provide less tracking structure of the daily lessons. Again, less structure will always be associated with performance costs. Additionally, the use of digital standardized testing is another factor that hampers campus educators' instructional time. Teachers are placed in the unenviable

position of allocating a significant portion of class time providing practice on the testing medium. It is my belief that elementary literacy, mathematics and science standardized assessments should all be conducted with paper and pencil formats.

Fourth, teachers move on to the next lesson despite the fact that many of their students have not mastered prior daily lessons. They do not know how to dynamically spiral content, so students have sufficient repetitions to master the lesson. Their teaching philosophy for all pragmatic purposes evolves into, *“If the child gets it, they get it. If the child does not, they do not. Teacher moves on to the next lesson, regardless of their students understanding.”*

Final Thoughts

We live in a world where a license is the gatekeeper to a good living. From engineering to electrical work, credentials are the currency of the modern workforce. Yet, we continue to see students graduating without the ability to read or do math at grade level. What happens to these children when they become adults? You can see the answer today in every grocery store, coffee shop, and strip mall. Without basic academic mastery, their earning potential is capped at service-level wages, essentially locking them out of the salaries associated with white color professional work and skilled trades.

The inherent complexities of classroom dynamics contribute to the challenge. Teachers must manage numerous moving parts, including daily routines and diverse student academic needs. This is particularly difficult in Title 1 schools where educators must address significant literacy and numeracy gaps while teaching new material. Failure to master grade-level content over years creates critical academic literacy and numeracy gaps that destroy student confidence and self-esteem.



Stagnant performance despite consistent effort points to a flawed methodology. In schools, when academic growth stalls, it is generally due to the lack of global systems to directly address academic gaps and pedagogical philosophy. If the current processes are not producing results, they are by definition, ineffective. Today's public-school teaching philosophy has devolved into a harmful "move-on" mentality: ***"If the student gets it, they get it. If not, the class moves on, and those children fall further behind."*** This practice ensures a third to more than half of all students are promoted without essential skills. This systemic failure has become an accepted, normalized standard for teachers, administrators, parents, and politicians over the last five decades.

Additionally, the two issues that must be overcome by classroom educators to initiate academic reformation, especially at a Title 1 campus, are the following: ***Prior and dependent grade level academic skill gaps, and the diverse make-up of three main student cognitive groupings that are present in all classrooms.*** Moreover, Tier 1 grade level curriculum assumes that there are not prior grade level academic gaps; however, even novice elementary or middle school teachers are aware that children have prior academic grade level gaps that adversely impact grade level learning. Consequently, an instructional and stop-gap curricular system must be established to deal with the academic gaps while simultaneously addressing the three main student groups that are omnipresent in a typical elementary and middle school classroom.

To improve student outcomes in core subjects, schools must stop looking at external excuses and start questioning their internal instructional philosophy. Campus administration must implement *what **does** work, not what they **philosophically want** to work.* To meet all the academic needs of all students in the classroom while simultaneously addressing prior grade level skill gaps, educators must seek effective pedagogical solutions like spaced repetition and global stop-gap curricular systems that address academic numeracy and literacy gaps. If not, expect the chronic academic performance in the public schools to continue, unabated.

Math Fact Mastery

Easy to Do!

*An instructional methodology and structured format
to rectify Math Fact Innumeracy (and Math Processing
Skills) in all Socioeconomic Elementary Schools.*

Blaine A. Helwig

December 2022

Executive Summary

There are four (4) components to a standard 90-minute math block: daily numeracy skill development, spaced repetition, the core lesson and problem solving. This document expatiates on solving the more difficult of the four (4) main components – numeracy skill development (i.e., math fact and math processing skills). Numeracy skills are the building blocks of successful problem solving. However, many of this country's elementary students are not learning either of these two arithmetic skills to an automaticity level. It is not the students' fault; it is the methodologies that are employed in the classroom, or more accurately, not being used by educators. For the last 6 decades, the United States' academic results in mathematics clearly demonstrates that the accepted arithmetic methodology is poorly designed, irrational, unstructured, and confusing.

If dependent numeracy skill sets are deficient or missing, students have difficulty forming logical connections on higher ordered, but dependent skills. However, there are other adverse ramifications due to a lack of numeracy and its associated effect on daily problem-solving applications. First, students are not able to consistently solve arithmetic application word or story problems since those problems contain two to four embedded numeracy math fact and math processing skills. Second, if students do not possess sound arithmetic skills, they struggle academically in grasping relatively simple algebraic concepts since they never readily mastered the arithmetic skill dependences. Students' poor arithmetic and algebra skill set foundations are the root cause of the vast majority of students not comprehending higher mathematics courses such as linear algebra, differential and integral calculus, differential equations, discrete mathematics, etc. Third, the lack of mathematics skill sets prohibits serious acclimation into higher paying technical jobs and careers where fundamental math skill sets are compulsory. Finally, a number of parents frequently acquiesce that their children are, 'simply not good at math' instead of questioning the math philosophy, methodologies and pedagogical practices at their child's school. Their children's math outcomes are the result of poor pedagogy and resource implementation – and unfortunately the norm in far too many elementary schools.

This document provides a proven methodology to change the numeracy thinking from past decades of chronic nonperformance. It provides the *Why, What, When* and *How* of a systematic process so that public school educators understand the main issues in heightening their children's mathematics performance. This process is simple and replicable, but it does take a structured plan and effort – as do all human endeavors that work well. However, the end result of eradicating these academic numeracy skill gaps is to eliminate the infamous and ubiquitous Achievement Gap. In pragmatic reality, when the ***numeracy skill gaps are eradicated, the Achievement Gap vanishes as well!*** It is important to note that eliminating the numeracy skill gap and providing grade level skill prowess only places the child in a position to be a successful problem solver. There is one more step to academic performance. Students must practice application and problem solving daily in accordance with a state's mathematics standards and student learning expectations. However, there is good news. Grade level problem solving and application is a much easier task to address when the underlying numeracy skills are soundly founded.

Finally, proven outcomes are important in any assertion or proposition in any professional field. The process and pedagogy presented in this document produced two (2) urban Title 1 National Blue Ribbon Schools, and both schools are featured for academic excellence by the United States Department of Education as National Blue Ribbon Profile Schools. Graham Elementary and Blackshear Elementary Fine Arts Academy in the Austin Independent School District (Austin, Texas) have also earned multiple-year Gold Ribbon School (Children At Risk – Houston) awards and a myriad of Texas Education Agency (TEA) high academic performance recognitions.

About the Author

Blaine Helwig is a locally, state and nationally recognized campus administrator and was the J. Walter Graham Elementary Principal in Austin ISD for over 9 years. In that time period, J. Walter Graham Elementary (an urban Title 1 school) experienced dramatic and sustained academic success with typical inner city challenging student demographics. From 2009 to 2016, Graham Elementary School's academic performance earned exemplary accountability ratings and every possible academic distinction by the Texas Education Agency. The school was honored as a 2012 National Blue Ribbon School recipient, and the campus was featured as a National Blue Ribbon Profile School for academic excellence on the United States Department of Education's website - one of only four schools in the country to receive this prestigious honor. The Graham campus has also been recognized annually by Education Non-Profit Organizations for high and sustained academic performance. Finally, the language arts, mathematics and science stop-gap resources implemented at Graham that produced heightened student success are currently used in many other Title 1 campuses and districts with similar high percentages of English Language Learners, minority and low socioeconomic student populations.

In 1985, after completing a Bachelor of Science degree in Architectural Engineering from the University of Texas at Austin, Mr. Helwig worked for seven years as a senior structural design engineer, analyzing and designing state and federal highway bridges. He was also employed as a civil engineer in California and Utah with the United States Department of Defense as a lead project technical engineer overseeing earthen and hydraulic dam construction and large civil works projects. At present, Mr. Helwig retains his license as a registered professional engineer in Texas with a structural engineering specialization. Finally, Mr. Helwig is extremely appreciative of the United States Military for their financial support for his college education. He is a proud veteran of both the United States Army and the United States Air Force.

Mr. Helwig was conferred a Bachelor of Business Administration in Accounting in 1992. During this period of business study, he pursued additional and concentrated coursework in both economics and finance. After working as an accounting director for a large library system in central Texas, he was alternatively certified to work as an elementary teacher by the University of Texas. He taught fourth and fifth grade self-contained classrooms in the Round Rock Independent School District for six years. It was during those professional years that extensive language arts, science, social studies and mathematics curriculum were developed. The initial design work on the numeracy and literacy stop-gap resources was completed, implemented and beta-tested in intermediate classrooms. Those stop-gap intervention programs significantly evolved during his Title 1 school experience and are currently used by tens of thousands of elementary students in both traditional public schools as well as charter schools across the State of Texas.

In 2004, he was awarded a Master's degree in Educational Administration from Texas State University and worked for two years as the assistant principal at Charlotte Cox Elementary in the Leander Independent School District, a suburban school district near Austin. He began work in the Austin Independent School District in 2006 as an Elementary Program Supervisor under the direction of the Associate Superintendent's Office. A year later, he started his principal assignment at J. Walter Graham Elementary and maintained that capacity until his retirement in the fall of 2016. In 2012, Mr. Helwig was recognized by the United States Department of Education as one of seven recipients in the country with the prestigious Terrel H. Bell award for school transformation for producing outstanding student achievement for all students regardless of race, language proficiency and socioeconomic status. He was also the 2012 recipient of the Central Texas HEB Principal Excellence in Education Award and a five-time nominee and a two-time finalist for Austin ISD Principal of the Year.

Currently, Blaine Helwig is a curriculum writer and a Title 1 education consultant in rural and urban school transformation. He is a cofounder of Celestial Numeracy, a daily numeracy program that presently serves over 90,000 elementary and middle students each day as well as a cofounder of The New 3Rs Academic Transformation.

Math Fact Mastery – Easy to Do!

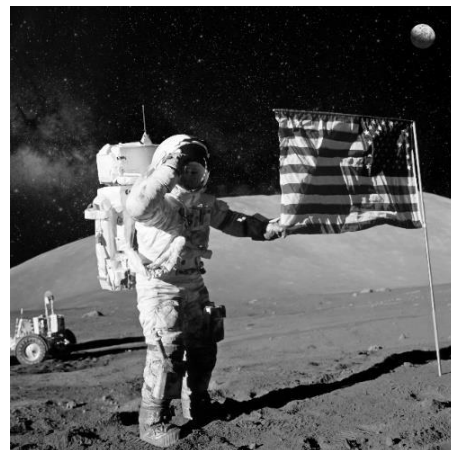
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Student Math Fact Mastery – Easy to Do!

By Blaine Helwig

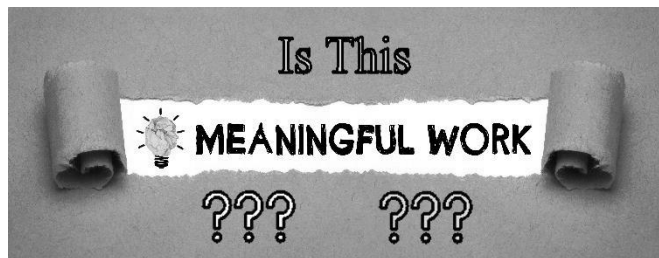
On July 20th, 1969, mankind demonstrated the ability to place men on the Moon and bring them safely back to Earth. This space journey is approximately a five-day 250,000 mile trek – one way. Oddly in comparison, educators have NOT found the methodology to ensure that elementary students’ master their 4 operational arithmetic math facts (i.e., addition, subtraction, multiplication and division) to automaticity, and that sojourn is much less than a quarter million miles.



Something seems amiss here – for **IT IS** difficult to send a person to the moon, but it does not seem problematic for students to master four arithmetic operations either in an isolated classroom or globally in an urban, Title 1 elementary school regardless of enrollment levels. *And, fortunately, it is not overly difficult to ensure math fact mastery!* It is a task – like any other – that can be accomplished at any socioeconomic status elementary school!

But, there is a catch! There must be a plan, desire and effort on the part of both the campus administration and faculty to achieve any system process objective. Or, more pedagogically and pragmatically speaking, **IF** students are required to learn their math facts to automaticity (defined below), elementary educators must find **value** in students possessing this skill knowledge to justify investing the time and effort.

WHY is Math Fact Mastery to Automaticity Important?



“*Why are we doing this?*” Why do we **need** to do this? Of course, before we discuss an effective math fact numeracy program, it is necessary to take a step back and discuss ‘*why*’ this specific numeracy skill work is pragmatically or conceptually important. Hence, educators should always ask the following question prior to implementation of any curricular resource: “***WHY*** is

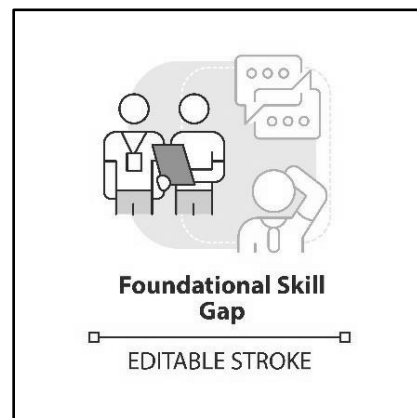
this skill or learning process important for students to know – especially to automaticity levels in the case of math facts?” So, let’s delve into reasons that math fact mastery is essential arithmetic knowledge and teachers should press their students to automaticity.

- **First**, it is a required math standard in every State, and that alone should indicate it is a good idea. ***Why?*** Extremely experienced educators have debated this standard requirement for much longer than I have been alive, and for good reason. There is so much numeracy ability tied to a student’s automaticity of their math facts and ***knowing what each fact physically represents***. As any seasoned educator is aware, math processing skills are dependently and directly tied to math fact automaticity: multi-digit computations, estimation calculations, reducing fractions to lowest terms, changing fractions or decimals to equivalents (i.e., improper, decimal, proper and mixed number), finding equivalent fractions, prime factorization), and many more.
- **Second**, a student is positioned to understand mathematics at much deeper levels beginning in the second semester 2nd grade when their mental focus is not



compromised by counting on their fingers or drawing stick/circular diagrams on their paper to compute the answer to a basic math fact. It is important to note that a math fact is indeed a **fact!** Thus, it does not change ever in one's lifetime. 6×7 equals 42 now and forever – it is by definition a fact – it can be proven by repeated addition, arrays, equal groups, or an area representation.

- **Third**, Algebra! Students become lost and confused quickly when they do not possess automaticity in simple arithmetic computations while solving equations for variables and inequalities to the point that they often miss the conceptual aspect of algebra. **Note:** Every elementary teacher should be required to visit or watch a short video of a seventh-grade middle school algebra class and witness the demise of students who are arithmetically, math skill/numeracy deficient. After that middle school visit or video, there would be no question or debate why math fact automaticity is important based on that observation.
- **Fourth**, upon graduation from high school, many students enter university or vocational schools for further education. Currently, professional careers in the technical fields require mathematics (and science) skill sets. Competency in arithmetic, algebra, trigonometry and geometry are the fundamental prerequisites for university level mathematics or vocational training courses. As an engineering graduate and a registered professional engineer in the State of Texas, I never met a junior or senior in my engineering classes or as a civil or mechanical engineer that was not highly adept in public school mathematics – ever!
- **Fifth**, the infamous achievement gap is actually a **SKILL GAP** in both mathematics (and reading). If students are not math fact and processing skill competent, then it is highly unlikely they will be able to solve multi-step application (i.e., word or story) problems. A word or story problem is nothing more than discrete, embedded numeracy skills in a series of sentences.



Math Fact Requirements and Automaticity Defined by Grade Level

1st and 2nd Grades: Adequate exposure to addition and subtraction – kiddos need to move from the tactile manipulative to pictorial representations (e.g., number lines, drawing dots, etc.) and finally, to paper pencil mental mathematics. At this age, many students will count on their fingers during this embryonic stage – and that is expected. However, the teacher should provide ample opportunities to their students so they begin to ingrain the most basic 1 digit math addition and subtraction facts from 0 to 12 (e.g., $0 + 5 = ?$; $6 + 7 = ?$ and $4 + 12 = ?$). Let's define automaticity for both clarity and define student expectations for the task at hand.

- **Automaticity first grade** means completing 25 mixed – 1 digit addition and subtraction facts in 2 minutes and 30 seconds. Translation: 150 seconds divided by 25 problems is about 7 seconds per fact.
- **Automaticity second grade** means completing 50 mixed – 1 digit addition and subtraction facts in 2 minute and 30 seconds. Translation: 150 seconds divided by 50 problems is 3 seconds per fact.

Note: It is recommended to provide less problems in the primary grades for psychological reasons. Thus, 25 and 50 math facts are doable in the primary grades, respectively. Giving children 100 mixed addition or subtraction assessments will very likely be unnerving to many first and second graders, and it is unnecessary. There is adequate time to slowly adjust increasing more math facts in the intermediate grades with a structured plan.

3rd Grade: A minimum of multiplication facts – from 0 to 12 with associated physical understanding (e.g., $0 \times 5 = ?$; $5 \times 9 = ?$ and $12 \times 11 = ?$). Division facts are also easily mastered at this grade level with a simple plan.

4th through 6th Grades: Access and review ALL four math fact operations until students demonstrate automaticity to the standard – all four operations mastered to automaticity as well as physical understanding.

- **Automaticity third through sixth grades** means completing 100 mixed – 1 digit facts in each operation in 5 minutes. Translation: 300 seconds divided by 100 problems is 3 seconds per fact.

Note: The assessment should be a written one! Use a **written** 2 minute and 30 seconds or 5-minute math fact assessment. It is an essential ingredient to success so that students ingrain math fact knowledge into long-term memory.

WHAT Achievement Results are Expected and WHAT Digital Tracking Program?

The second question an educator should ask before implementing any curricular program or methodology is, “*WHAT student outcomes can be expected from our work?*” Using the method described in this short document – all students classified as general education, and a majority of students receiving special education services will master their four (4) math fact operations by the end of third grade. The author can attest that the described methodology **resulted in approximately 98% of intermediate students possessing grade level automaticity** every school year for 13 consecutive years in an urban, Title 1 elementary school. Those academic results were emulated by other elementary schools that followed the same methodology in both non-Title 1 and Title 1 elementary schools. It is important to note that if students are receiving special education that their Individual Education Plan (IEP) must be followed to the letter of the law. It is a legal and binding document. Also, if a student has known processing issues (e.g., 504 services), the teacher should modify the standards so the student has a reasonable and achievable goal. These modifications affect a small number of students, but the teacher needs to use a case-by-case approach with each child.

Another ‘*what*’ question exists in the case of math fact tracking to alleviate the burden of daily numeracy preparation for each student. Thus, “*WHAT digital tracking program should be used to provide efficiency, monitoring and distribution of math fact assessments?*” There are several choices that school or district personnel may select; however, the author believes the best choice is Formative Loop (www.formativeloop.com) daily numeracy program for many reasons. **First**, it is an **individualized** blended (hybrid) program where each student writes a five (5) minute assessment. Then, after an adult quickly inputs the assessment results into Formative Loop, the computer program not only tracks the students’ progress in real time but it provides student ordered assessments ready for daily distribution. **Second**, Formative Loop offers a written assessment. Digital math fact and numeracy programs that offer **only** visual computer screen format are NOT as effective. The fact that a student physically writes the assessment appears to invoke a psychometric response in their brain that allows students to ingrain math facts into their long-term memory. **Third**, the computer program offers a homework option to provide targeted practice on the skill, and it includes a build-up feature for each math fact operation which is key for student learning. **Fourth**, Formative Loop offers a free resource library for each grade level, so the teacher has a treasure trove of available processing math skill or math fact skill, as needed. This resource



library assists teachers in all aspects of lesson planning and instruction. **Fifth**, all student results and overall performance may be viewed in real time from any computer since Formative Loop is a web-based numeracy program. Thus, a struggling student allows a teacher to identify, motivate and intervene with that student – thus, affording targeted intervention for each child in the class or school. **Sixth**, Formative Loop not only has a math fact component, but it also provides a math processing skill scheme as well for the same low price. Thus, there are two possible schemes that may be selected. One – a math fact and

processing skill scheme combined – one five-minute formative assessment each day. Or, two – two (2) separate five (5) minute assessments each morning – a math fact and a math processing skill scheme. At our National Blue Ribbon recognized elementary schools, we opted for the second option since we wanted ninety (90) percent of the math facts completed by students at the holiday break in December – the end of the fall semester. Using the two-tiered formative assessment system, there is ONLY **one** five (5) minute math processing assessment after the student finishes the math fact scheme, but during the fall semester, both skill areas were simultaneously monitored in real time. **Seventh**, the one or two five (5) minute daily assessment(s) can be given to the students as they arrive in the morning to class. Hence, no math class minutes are lost and there is sufficient time to grade, input and provide intervention as needed throughout the day. **Eighth**, Formative Loop is a flexible program with regard to grading and inputting daily assessments as well as providing any interventions as required. There are two options to consider in this area as well. Either classroom teachers grade and input the student assessments, **or** volunteers, an administrator, teaching assistants or an instructional specialist grade and input the five (5) minute daily assessments. At our schools, we opted for the latter option (i.e., **external** grading and inputting) to ensure conformity of grading and high-quality controls for all classroom. Additionally, Formative Loop offers flexibility of grouping student intervention groups to press all students for academic success. This functionality permits an interventionist to look at the daily assessments and group 5 or 6 students who may have difficulty with place value expansion to the thousands place value, for example. **Ninth**, if academic performance at the campus is a priority, it is possible to monitor elementary and middle schools regardless of school enrollment size. Hence, students do not ‘slide by’ and not learn their arithmetic skills to the state standards. **Finally**, the price of Formative Loop is inexpensive – 7 dollars per student for the entire school year as of the writing of this document.

WHEN are Achievement Results Realized?

The third question focuses on *expected* student outcomes, and results should always be addressed prior to implementation of any proposed curricular program. Otherwise, the new curricular program is non-accountable and classroom work may go on for years without any indication if the new program or resource is effective. Thus, the third question that should be asked is, “**WHEN** will the data show a significant and expected rise in student outcomes?”

Another area that requires definition is identifying the metric that student achievement is evaluated. Is the metric a qualitative or a quantitative data analysis? In the core subjects (i.e., mathematics, reading, writing or science), the author believes student achievement must be an objective analysis as opposed to a subjective one. Thus, standardized testing is the most objective means to evaluate if a core subject curricular program is effective or not. Moreover, it is ultimately the means that campus academic performance is measured with regard to a state’s education agency as well as in the eyes of the general public.



It is important to note that implementing Formative Loop and pressing it to fruition prepares students in becoming successful problem solvers. In short, daily numeracy (i.e., math facts and math processing skills) positions students to be **READY** to successfully solve a word or story problem that is comprised of embedded numeracy skills. For example, a typical 4th grade elementary word/story problem from a standardized test is provided below; however, *in order to correctly solve the word/story problem*, the student must be proficient at the following discrete numeracy skills: multiplication and subtraction facts; place value, rounding and

estimation skills; multi-digit subtraction skills; and mathematics vocabulary usage (difference). If the student is NOT proficient in any one of these numeracy skills, the likelihood of a correct solution is not high.

Betty runs 3 miles every Tuesday, Wednesday and Thursday. On Mondays, Fridays and both days on the weekend, she jogs 7 miles per day. Estimate the difference in total miles when she runs 7 miles a day compared to the total number of miles when she runs only 3 miles per day?

Again, daily numeracy enables students to be positioned to successfully engage in the problem's computations; however, the student must practice solving 'word' or 'story' (application) problems as well. **Hence, the other half of the equation to generate high student outcomes are the core daily lessons that press skill level development and a daily problem-solving resource.** The author has coined the term problem-solving resources as 'bridge resources.' For more information on these resources, please read the following two blogs located at the website provided in the document's footer: **Bridge Resources and their Academic Need** – and – **Word Problems: Student Benefits and Teaching Tips**. It is important to note that if improving performance on any task is a desired goal, then it must be practiced in a structural and predictable means.

Hence, if both problem solving and daily numeracy are prioritized on a daily and consistent basis, then it will **only take one (1) school year to see dramatic results in student achievement**. Struggling academic Title 1 schools can achieve standard testing gains from 30 percent student passing rates to the 80's and 90's in one school year! For instance, in our Title 1 elementary campuses, student outcomes dramatically increased in the first year of implementation – from the mid 50's and low 60's to the high 90 percentage marks.

With effective classroom management, daily problem solving as well as **pressing** daily numeracy via Formative Loop, it should only take one school year to achieve significant increases in student outcomes regardless of the socioeconomic school status of the campus. Finally, after the first year of implementation, the following school years, daily numeracy is much easier since students' progress to the next grade with heightened numeracy and problem-solving skill sets. Thus, the academic results achieved are sustained for as long as the program is implemented.

HOW to Implement an Accountable and Performance Driven Daily Math Fact Program!

The final question – outside of Who is accountable for the curricular program is, ***“HOW do I implement an accountable and performance driven daily numeracy program?”*** Or, more directly, what are the specific steps to implement a high performing numeracy program in either a classroom or schoolwide?

Since Formative Loop offers a build-up process for each math fact operation, many schools put the program in place and do a hands-off approach. This type of curricular program management is NOT recommended. If high results are desired, a teacher and campus administrator must act like athletic coaches and motivate students to perform well. They must provide extra practice and attention to struggling students, or the classroom's/school's pedagogical system and student learning philosophy evolves into *'If the students get it, they get it. If they do not, they don't!'*



If the following proven curricular numeracy system is implemented and thoroughly pressed, almost all students in a class or school will demonstrate grade level mathematics prowess on the classroom activities and on annual standardized examinations. The most effective numeracy program is a symbiotic approach between daily classroom mini-lessons (i.e., spaced repetition) on specific numeracy skills in conjunction with Formative Loop. Of course, the build-up math fact sequence (i.e., 0's, 1's, 2's, 3's, to 10's for each math fact operation)

ensures that students are prepared for the final mixed assessment for that operation; however, the inclusion of specific numeracy skills (i.e., Making 10, Doubles, etc.) places students on a fast-track toward mastering the facts in those individual sequences. It is important to understand that Formative Loop will work without using mini-lessons/spaced repetition numeracy skill classroom work; however, this pedagogy is one of the most effective and efficient guided math methodologies. Its inclusion at the onset of the core math block will dramatically expedite the math fact (and math processing skill) student learning process.

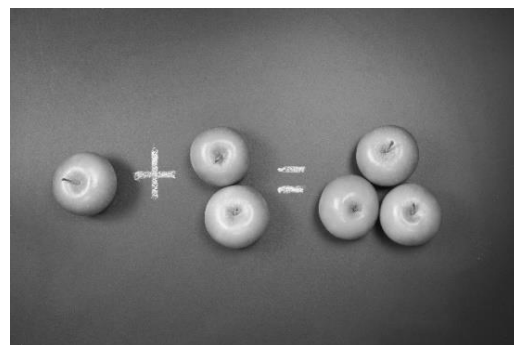
It is strongly recommended that the classroom teacher or the school principal select the Formative Loop **dual sequencing** for both math facts and math processing skills. This means that there are two (2) five (5) minute assessments per day, but once a student masters all four (4) math fact operations, then there is only one (1) five (5) minute math processing skill assessment. Additionally, there is so much numeracy ability directly tied to math fact mastery that the extra effort of campus educators is rewarded in due course; however, the major advantage is that students are simultaneously learning and mastering both math facts and math processing skills. Finally, many primary-aged students will arrive in third grade with primary grade math fact mastery in both addition and subtraction, consequently, it is recommended at the beginning of third grade that students be held accountable for mastery of all four (4) operations at a 3 second per math fact mastery standard.

Note: The teacher or school principal may need to request the Formative Loop dual sequencing fact and processing skill sequences from that company. The price per student is the same as a single sequence numeracy scheme that includes both math fact and math processing skills, but student performance will be much higher using the two (2) five (5) minute assessments each morning. Also, if the two (2) five (5) minute assessments are completed in the first 15 minutes of the school day as students arrive to school, there is ample time to grade and input the two (2) student assessments as well as conduct any needed interventions during the school day. Again, using this type of programming, the daily assessments do not deduct instructional minutes from the standard ninety (90) minute core math block.

Note: Formative Loop always begins each student on the final mixed assessment on each of the four (4) math fact operations to evaluate if the student already possesses mastery of that skill. If not, then the student is moved to the build-up process starting at separate assessments of the 0's (e.g., $0 + 3 = ?$; $5 + 0 = ?$). Then, after mastering the 0's, the student is moved to the 1's (e.g.; $1 + 8 = ?$; $4 + 1 = ?$), and then, the 2's, 3's, 4's, etc. This layered practice provides students with the ability and confidence to do well on the final mixed of the math fact operation. **Tip:** A student is able to copy the above line in the skill build-up and not ingrain their math facts at each layer. If a student is exhibiting this behavior that is not conducive to learning, require the student to cover each completed horizontal line/row of addition facts with a separate piece of paper – depriving students of the ability to copy the (completed) above rows. Homework is also provided via the Formative Loop program on the specific skill that student is assessed. It is highly recommended to utilize the program's functionality and provide students homework so they are given ample practice and do not arrive to school each morning expected to complete a five (5) minute assessment, cold turkey. Finally, on each assessment, there is a black star (★) that provides the adult grader with a **recommended** place for skill resource mastery. However, this black star is only a recommendation, and the grader should use their educational judgement based on their knowledge of each student (e.g., student receiving special education or 504 services).


Addition Math Facts

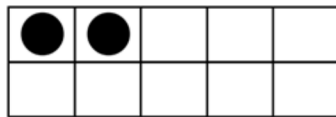
As noted above, the most effective approach to math fact and math processing skill mastery is a symbiotic approach using a 5-to-10-minute mini-lesson (i.e., spaced repetition) at the onset of the core math lesson and simultaneously implementing Formative Loop. Consequently, the teacher should conduct a short mini-lesson that reviews at least three (3) skill areas. In the case of math facts, those three (3) skills areas are Making 10, Addition Doubles, and Multiples (skip count single digits from 1 to 12) practice. ***In the primary grades*** (i.e., first and second), teachers should always sequence these skills with their students in the following sequence: tactile, pictorial and then and only then, paper-pencil independent exercises. For intermediate grade level (i.e., third through sixth grades) teachers, the basic implementation recommendations are provided below.



Making 10 – An intermediate grade level teacher *may elect* to begin this skill activity with either a tactile, pictorial or paper-pencil approach depending on the needs of their students. For tactile, the teacher can show 2 fingers, and their students would respond with eight fingers (i.e., $2 + 8 = 10$). It is recommended teachers begin with the numbers close to ten in the beginning – 7, 8, 9, or 10. Use only these four numbers for a couple days until students have mastered them. Then, extend the possible numbers to 5 and 6 and Make 10. Include the remaining digits/numbers (0 through 4) as the students are prepared to transition. The teacher should be closely monitoring students that academically struggle to ensure that they can demonstrate mastery and are ready to move on. Provide those specific students extra practice as needed during the day – when they are lined up to go to recess, specials/essential areas, lunch or dismissal, for instance. The pictorial model is also easy to facilitate in this short minilesson ‘spaced repetition’ session. The teacher can quickly draw 7 dots on the white board, and the students show the number of fingers to Make 10. The paper-pencil aspect should be used last when the students prove they are aptly prepared for mental mathematics. Those resource sheets are provided at the end of this document, and they are also in the Formative Loop math processing skill sequence. As previously mentioned, the Formative Loop program offers a free resource section per grade level from first through eighth grade. Those resources contain almost every math fact and processing skill for that grade level, and a teacher may need access to grade level skill resources either above or below their students’ current grade level to differentiate for varying student needs.

MAKING 10

Tactile:  + = 10

Pictorial: 
 $2 + \underline{\quad} = 10$

Paper-Pencil: $2 + \underline{\quad} = 10$



Then, extend the possible numbers to 5 and 6 and Make 10. Include the remaining digits/numbers (0 through 4) as the students are prepared to transition. The teacher should be closely monitoring students that academically struggle to ensure that they can demonstrate mastery and are ready to move on. Provide those specific students extra practice as needed during the day – when they are lined up to go to recess, specials/essential areas, lunch or dismissal, for instance. The pictorial model is also easy to facilitate in this short minilesson ‘spaced repetition’ session. The teacher can quickly draw 7 dots on the white board, and the students show the number of fingers to Make 10. The paper-pencil aspect should be used last when the students prove they are aptly prepared for mental mathematics. Those resource sheets are provided at the end of this document, and they are also in the Formative Loop math processing skill sequence. As previously mentioned, the Formative Loop program offers a free resource section per grade level from first through eighth grade. Those resources contain almost every math fact and processing skill for that grade level, and a teacher may need access to grade level skill resources either above or below their students’ current grade level to differentiate for varying student needs.

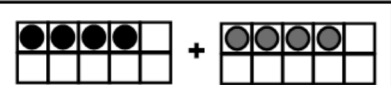
Note: Making 10 is an extremely important numeracy skill since it is Base 10. Making 10 is the same skill set for Making 100; Making 1,000, etc. Example: *Make 10:* Given a 3 – Answer: 7. *Make 100:* Given a 30 – Answer: 70. Thus, a Base 10 system on requires adding a zero (0) to a number. Paper resources are attached at the end of this document.

Note: The Making 10 skill set can be used for subtraction math facts, too – single digit from double digit math facts (e.g., $15 - 6 = ?$ and $13 - 9 = ?$). Information provided in that section of this document.

Doubles – Doubles is similar to the ‘Making 10’ skill exercise, and it also possesses numeracy value. In this pedagogy, the teacher can show 4 fingers or write a ‘4’ on the class white board, then students respond by showing a doubling of that number with the correct numbers of fingers extended using their hands. Or, students can use a small white board and show the teacher the number ‘8’ that indicates the correct sum for doubling the number ‘4.’ It is important to note that if using a finger

DOUBLES

Tactile:  → 

Pictorial: 
 $4 + 4 = \square$

Paper-Pencil: $4 + \underline{\quad} = 8$

approach, *fingers should be shown using two hands*. For example, if 4 is written on the white board, then students should show five fingers on one hand and three finger on the second raised hand. They should **not** show two hands with 4 fingers extended on each hand. In that case, students are parroting the teacher’s hands, and not clearly demonstrating understanding.

When the teacher arrives at doubling 6, the students can either write ‘12’ on a small white board to visually indicate their response; or, they can show a quick closed fist (i.e., representing the number 10) and 2 fingers. Again, the teacher should begin with small numbers (1, 2, 3, and 4), then repeat each day until those digits are mastered. At that point, the teacher may add 5 and 6 and larger numbers sequentially until the number ‘12’ is reached as students demonstrate readiness. Again, the teacher should be observing any students that struggle to ensure they are ‘coming along for the academic ride.’ As needed, provide them ample practice during the transitions.

Note: When this spaced repetition pedagogy is used as described above, it is recommended the teacher observe the lowest academic students in the classroom. When their learning threshold is met and they demonstrate skill mastery, then the educator can be assured all students own the skill. Since the sessions are so rapid and repetitive each day, students who have mastered the skill do not become bored with a couple extra days of practice.

Note: Once Doubling integers is mastered, the teacher can extend this baseline knowledge to expand their addition fact knowledge to Doubles MINUS ONE and Doubles PLUS ONE. For example, if $2 + 2 = 4$, then $2 + 1 = 3$ and $2 + 3 = 5$. Paper resources are attached at the end of this document.

Multiples – Multiples fluency (i.e., skip counting)

is a key aspect of arithmetic numeracy for elementary students. Begin this exercise with single digit numbers from 1 to 12 (see picture). Like all else, the pedagogy should be structured and sequential for successful student learning. First, the teacher should chorally count with the students. For instance, a teacher may elect to write the multiples as the class is collectively reciting the multiples. Then, the teacher and students can chorally count together. Second, the teacher can require students to skip count by writing multiples of a given number and a set time limit – for instance, 15 or 20 seconds. For example, the teacher may write 5 on the classroom white board or show students his/her hand with 5 fingers, and students **write** with dry-erase markers on their white boards. Students can also use dry erase markers on their desks or by traditionally writing multiples on a piece of scratch or notebook paper. *It is highly recommended that the above activities be completed both orally and written.* Finally, students should be required to complete a Multiples exercise via writing the numbers from 1 to 12. This Multiples (1-12) exercise should be completed in five (5) minutes for third through sixth graders after students have been sufficiently prepared. Additionally, homework should be provided each night at this time to ensure students are practicing until students demonstrate mastery in the five minute timed period.

Multiples (1-12)											
Directions: Fill in the table with the correct multiples by skip counting downward.											
1	2	3	4	5	6	7	8	9	10	11	12
0	0	0	0								
1	2	3									
2	4										
3											
4											
5											

It is important to stress that the teacher should begin skip counting activities with the easier multiples (i.e., 2's, 10 and 5). After the class has mastered those three numbers via skip counting, both orally and written, then the teacher should begin including daily practice of 3's, then 4's, until the 12's are completed. Once a specific number is mastered, the teacher should replace that number from the daily spaced repetition (minilesson) practice with a new multiple in the sequence. The minilesson/spaced repetition pedagogy should require approximately 10 minutes of the ninety (90) minute core lesson. These rapid spaced repetition (mini-lessons) sessions on Making 10, Doubles, Multiples, etc., etc., etc. should continue until ALL students have mastered the content.

Note: It is likely that many students will require assistance counting by 12's. It is recommended to start slowly. On the first day, only count to 36 or 48 (i.e., 0, 12, 24, 36, 48). Then, add additional multiples of 12 until 120 is reached.

Note: Learning to skip count 12's is important for feet and inches equivalencies. Skip counting 15's is useful for time/clocks – quarter of hours. Skip counting 25's is important for money – quarter dollars. Finally, the first multiple of any number is always zero (0). Example – multiples of 3: {0, 3, 6, 9, 12, 15, 18, 21, 24, ...}

Note: Mastering multiples/skip counting from numbers 1 through 12 will help provide students a physical meaning when they are learning multiplication facts. Notably – that multiplication can be viewed as repeated addition (i.e., multiples) of the same number. For example: (0, 6, 12, 18, ...) or $6 + 6 + 6 = 18$ or $3 \times 6 = 18$.

Addition is a commutative property; consequently, $4 + 5 = 9$ and $5 + 4 = 9$ compute the same sum as the two addends can be transposed. The commutative addition property divides the number of addition math facts to be memorized by a factor of 2. Thus, a student is only required to memorize 36 discrete addition facts from the 2's to the 9's, inclusive. However, if a student masters Making 10, Doubles and the Doubles PLUS ONE work in the classroom, then they must only learn 14 discrete addition facts (i.e., $5 + 7 = ?$; $8 + 3 = ?$ and $9 + 7 = ?$). With students working simultaneously with Formative Loop build-up addition sequencing, children are extremely successful at mastering all of their addition facts from digits 0 through 10 in only a couple weeks.

Subtraction Math Facts

For many intermediate grade level students, subtraction is invariably the most difficult of the four (4) math fact operations to master – 100 mixed (i.e., 0 to 18 single and two digit) problems in 5 minutes or less. First, unlike addition, subtraction does not possess a commutative property. Thus, $15 - 8 = ?$ and $15 - 7 = ?$ are two (2) separate problems to children since in this case, the 15 and 8 or 15 and 7 cannot be interchanged without changing the context of positive and negative integer mathematics. Thus, students do not benefit as they did from the addition math fact commutative property and must memorize many more math facts in subtraction. Second, children are much better at augmenting two objects as is done in addition than finding a difference between them. Finally, the concept of a difference between two numbers is more difficult to physically grasp for many students – even when a number line is used as a pictorial manipulative. Consequently, subtraction is more difficult than addition, but it is also doable in an expedited manner with a plan and a consistent systematic process.

**GOOD THINGS
RARELY
HAPPEN BY
ACCIDENT
- IT TAKES A
PLAN AND
EFFORT!**

Formative Loop's numeracy program is exceedingly helpful in its individualized worksheet distribution for each student and its progress monitoring for either a teacher and his or her classroom, or a campus administrator regardless of student enrollment. The program's functionality with its build-up math fact from the zero (0) to ten (10) will provide subtraction fact mastery typically over three or four weeks; however, as with addition, there is a classroom spaced repetition methodology that presses the student learning process more rapidly.

Approximately seventy (70) percent of the students will achieve subtraction math fact mastery using only the Formative Loop program without additional educator effort. Still, an educators' goal is for **all** students to master their math facts – including students possessing a cognitive disability (e.g., students receiving special education services). It is important to note that students receiving special education services with *significant* disabilities can also be successful but their mastery stipulations should be determined in accordance with their IEP.

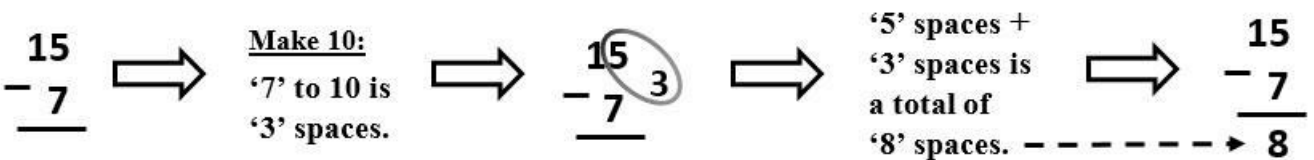
If certain students struggle with their math fact memorization – like subtraction – they should be provided extra practice and strategies to press them to completion. There are three (3) strategies outlined below that are highly effective in pressing intermediate grade level students to subtraction math fact completion.

- 1.) The vast majority of students are able to subtract one-digit math facts from one-digit math facts (e.g., $7 - 4 = ?$ and $9 - 2 = ?$) with relative ease. But, a significant number of students struggle to master the one digit from two-digit subtraction math facts, let's discuss several strategies that assist students to master subtraction facts to automaticity. During the addition fact stage, students mastered the processing skill 'Making 10' for digits 0 to 10. Thus, using the 'Making 10' skill in combination with addition fact mastery, students possess the ability to memorize the more difficult subtraction math facts very quickly using a simple strategy employing both skills. As a matter of fact, it is the means by which the author subtracts one digit from two-digit math subtraction facts to this day.

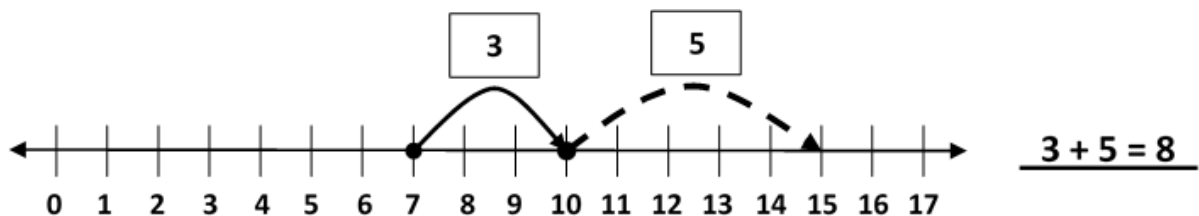
For example, given the subtraction math fact $15 - 7 = ?$; students 'Make 10' with the subtrahend (i.e., the number 7) and add it to the one's digit in the minuend (i.e., the '5' in 15) to obtain the difference.

The diagrams below explain this learning process from a visual perspective.

The difference in subtraction is ALWAYS the total number of spaces between any two integers. Thus, there are a total of 8 spaces between 7 and 15.



It is highly recommended that students are shown this process using a whole number line repeatedly until mastered. In short, students must understand the physical mechanics of the process, or they will be confused at some point. Of course, it is imperative that students understand that the process *is a very quick means to find the total number of spaces between the two integers or the difference*. It is also paramount that the students are adept at the Making 10 numeracy skill or they will be learning two



The difference of $15 - 7$ is a total of 8 spaces. Hence, $15 - 7 = 8$

different skills – Making 10 and finding differences. Students should ONLY be learning subtraction at this stage of the pedagogy.

Note: If students do **NOT** understand the physical meaning of why Making 10 works in these subtraction cases, students will **INCORRECTLY** attempt to use this method with one digit from one digit subtraction facts (e.g., $5 - 3 = ?$). Thus, this method works with **ONLY 1** digit from 2 digit subtraction math facts (e.g., $14 - 9 = ?$ and $17 - 8 = ?$) **since the difference includes the number 10 between the two integers.**

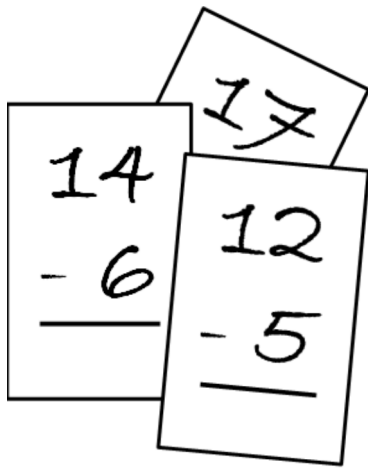
Note: It is of paramount importance that students are taught that subtraction means the number of spaces between two numbers/integers because subtraction always possesses the same physical meaning when computing differences. For instance, when a student is subtracting negative and positive integers such as: $(-4) - (+5) = -9$, subtraction remains the difference between the two integers. Since there are nine (9) spaces between -4 and +5, the difference is 9. Of course, the answer or difference is a negative (-) nine (9) since the process subtracts a larger integer (+5) from a smaller integer (-4). If we reverse the integers in the equation so, $(+5) - (-4) = +9$, students will discover there are still nine (9) spaces between the two integers (-4 and +5), but a smaller integer (-4) is subtracted from a larger integer (+5) so the overall difference in this case is a positive (+) nine (9). Mathematically, students need to understand that subtraction operations are **ALWAYS** the difference in the total number of spaces between two integers or decimals or fractions.

- 2.) Another strategy to press students to math fact mastery is by creating an additional class of students using Formative Loop's functionality. Formative Loop allows any number of separate 'classes' to be created for math facts or math processing skill schemes. This affords the teacher or an entire grade level of teachers to place struggling students in a separate Formative Loop ad hoc classroom and an **intervention student group is created – which is exceedingly beneficial not only organizationally but individual student accountability.** For instance, if a large elementary school has eight (8) third grade classes but there are a total of 25 students in those 8 classes that have not mastered their



- subtraction facts, then a separate ad hoc class can be created with only those children included in the intervention class. Thus, the newly created class can be hypothetically named, “THIRD GRADE ADDITION FACTS” or “THIRD GRADE SUBTRACTION FACTS.” Then, those students can be pulled for a quick five (5) minute practice session. If the student passes, promote him or her to the next level (e.g., from subtraction 4's to subtraction 5's) when you input the results. This functionality affords the teacher or the principal to print and prepare all the assessments in seconds, and when a student completes the math fact, they are removed from the intervention class. At that point, the educator can update their normal classroom math fact scheme of their progress. In doing so, the students will soon realize that they will NOT 'slide' by unnoticed, and that they will be held accountable to learn this important numeracy skill. It invariably creates a strong positive relationship and bond between the teacher or interventionist or the principal. It has been the author's professional experience that when students realize that their teacher, interventionist or principal puts time, assistance and encouragement into their learning, children respond by expending tremendous effort to succeed.
- 3.) **Diagnostic Math Flash Cards** is the last strategy to press students to math fact completion. Diagnostic flash cards are an incredible tool for students mastering the **remaining** six to ten math facts in any one of the math fact operations (i.e., addition, subtraction, multiplication or division). As students build their math fact knowledge from the 2's to the 9's – step by step, they steadily and slowly ingrain the math facts to long-term memory. However, when students complete the math fact build-up and begin the mixed assessment for any of the four (4) math fact operations, a handful of students invariably struggle with specific but small number of math facts.

For example, in subtraction, if students are not using the 'Making 10' method, their nemesis will most likely be a series of one digit from two-digit subtraction problems that act as an impediment from finishing a mixed assessment in five (5) minutes. When the educator or volunteer is grading the student's mixed assessment, they immediately notice the few remaining facts that the student skipped. This diagnostic opportunity should not be missed or overlooked. *The student is indicating the precise*



areas of math fact need on that mixed assessment by the unanswered math fact problems. It is highly recommended that the educator uses 3 by 5-inch blank index cards and create 6 to 10 math ‘diagnostic’ fact cards that the student has NOT mastered to automaticity. These practice cards should be given to the student with the following advice, “These are the ‘subtraction’ facts that you do not know. **ONLY study these few facts tonight with your mother, father or an older brother and sister. Then, tomorrow morning you will know them.**” A common educator mistake is to give the child an entire set of flashcards to study at night in lieu of only the 6 to 8 specific fact cards that they do not know. If the student is provided an entire set of math fact flash cards, they do not specifically study the facts that they do not know.

Yet another effective method is for the student to turn their assessment paper over to the blank side and write the two or five math facts that they do not know, ten (10) times each. As with the diagnostic flash cards, this exercise aids the student in memorizing the last remaining subtraction (i.e., addition, multiplication or division) math facts that they have not committed to long-term memory. Again, using this method, the child studies **ONLY** the few facts that they do not know. Then, at dismissal or when the interventionist/principal encounters the child in the hallway, they can ask them those few subtraction (e.g., addition, multiplication or division) math fact problems.

Note: The above recommendations will provide ALL students the ability to do well when memorizing their math facts in all four operations. However, this process is **NOT** going to happen by accident. There must be a structured plan, consistency, methodology that is effective and motivating of students to press them to success. Happenstance will not likely press Title 1 campuses to high student achievement. What will be effective are highly organized structures in the student learning processes – as the ones described in this document.

Multiplication Math Facts

Back to easy, again. Multiplication possesses the same commutative property as addition. Hence, $5 \times 7 = ?$ and $7 \times 5 = ?$ are the same math fact since the two factors can be interchanged at will. This makes the total discrete multiplication facts to memorize from the 2’s through 9’s at 36. However, the 2’s are nothing more than addition doubles, and if the teacher does simple mini-lessons/spaced repetition on perfect squares (2×2 , 3×3 , 4×4 , etc.), the total number of discrete facts is only 20. There is more good news. If the teacher stresses the multiples 1–12 numeracy skill via oral and written practice from the time students began their addition fact work, multiplication facts for the vast majority of third (3rd) grade students complete this memory task to automaticity in a little over two (2) weeks. **Why?** Students immediately have a physical understanding of multiplication from their multiples work in the form of repeated addition as well as they are only memorizing a total of twenty (20) discrete multiplication facts.



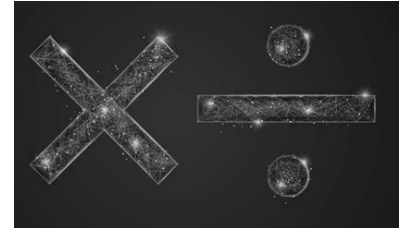
For the small group of students that struggle, use the same Formative Loop intervention class and the diagnostic flash cards described above in the subtraction section. There are other small but helpful tips – to assist students toward mastering their multiplication facts. First, there are only two math facts between 50 and 60: $9 \times 6 = 54$ and $7 \times 8 = 56$. However, the product of 7×8 is a **5, 6, 7, 8** counting mnemonic memorization pattern. Thus, when a student sees 7×8 or 8×7 , they immediately recognize the product is 56. Again, 5, 6, 7, 8. This often reminds students that the other fact’s product in the 50’s, is 54 (i.e., 9×6). If the teacher presses perfect square mini-lessons,

that helps students with 8×8 , but the only other multiplication math fact in the 60's is 9×7 which equals 63. There is only one fact in the 70's – 8×9 and one in the 80's – $9 \times 9 = 81$ – another perfect square. If these small reminders are stressed, several of the more challenging math facts are easily learned.

Note: Students may find an old Russian peasant math mnemonic interesting and quite possibly, helpful. The two-handed multiplication works **ONLY** for **multiplying by 9** (e.g., $9 \times 2 = ?$; $5 \times 9 = ?$ and $8 \times 9 = ?$). Here is how it works: Hold both hands out with all digits/thumbs and fingers extended – palms to the ground. If the product of 3×9 is desired, curl the 3rd (middle) finger from the left – the third finger on the left hand. There are two (2) fingers to the left of the curled finger and seven (7) extended to the right of that finger. Hence, 3×9 must equal 27. Another example, 9×9 , curl the 9th finger from the left – the fourth finger on the right hand. There are eight (8) fingers extended to the left of the curled finger, and there is only one (1) finger extended to its right. Thus, 9×9 is equal to 81.

Division Math Facts

Division math facts are also not much of a challenge. The multiples work completed earlier is really good for connections and meaning. Most students recognize the connection between multiplication and division since the numbers are the same. However, *it is a common mistake* to simply inform students that 'division is the opposite of multiplication,' and then, leave them to their own devices in learning the operation.



Instead, third grade teachers must stress a manipulative, tactile environment as they did with multiplication. Division (as was multiplication) is a new concept in third grade, and the division learning process must focus on the physical concept first. However, it is extremely beneficial for fourth teachers' instructional ability when students arrive in their classroom's knowing both multiplication and division math facts.

Of course, division in the mathematical form of a 'fact family' is indeed the exact opposite of multiplication; however, again, it does not seem that way to the vast majority of elementary students. Computing a product given both factors is as straightforward as addition with two addends. It is a left to right linear approach. *This situation is not true with division.*

Multiplication Practice: Find the Missing Factor – Name: _____			
4's, 5's and 6's			
$1 \times \underline{\quad} = 4$	$5 \times \underline{\quad} = 5$	$6 \times \underline{\quad} = 12$	$6 \times \underline{\quad} = 6$
$4 \times \underline{\quad} = 8$	$4 \times \underline{\quad} = 24$	$6 \times \underline{\quad} = 6$	$6 \times \underline{\quad} = 30$
$6 \times \underline{\quad} = 12$	$6 \times \underline{\quad} = 48$	$4 \times \underline{\quad} = 8$	$5 \times \underline{\quad} = 30$
$5 \times \underline{\quad} = 15$	$4 \times \underline{\quad} = 24$	$5 \times \underline{\quad} = 40$	$6 \times \underline{\quad} = 54$
$6 \times \underline{\quad} = 18$	$5 \times \underline{\quad} = 30$	$5 \times \underline{\quad} = 30$	$6 \times \underline{\quad} = 60$
$1 \times \underline{\quad} = 6$	$4 \times \underline{\quad} = 8$	$1 \times \underline{\quad} = 6$	$5 \times \underline{\quad} = 55$
$5 \times \underline{\quad} = 15$	$5 \times \underline{\quad} = 45$	$6 \times \underline{\quad} = 12$	$4 \times \underline{\quad} = 20$
$4 \times \underline{\quad} = 12$	$4 \times \underline{\quad} = 8$	$6 \times \underline{\quad} = 18$	$5 \times \underline{\quad} = 40$

*In division, there is a missing element and the multiplication product is given – but it is called the dividend in the case of division. **What is missing from a multiplication standpoint is a factor, and therein lies the solution.***

The author created a three-part series called, 'Find the Missing Factor' which is a systematic methodology of computing the

quotient (or a divisor) via a multiplication math fact. The three (3) practice sheets reduce the mystery of learning the automaticity of division math facts. The three 'Find the Missing Factor' sheets are separated into missing factors for the following three sets: (1-3), (4-6) and (7-9). *Division is a non-commutative property* like subtraction, *but the 'Find the Missing Factor' methodology turns the process back into a commutative approach to division – at least in the manner that students learn associations of two numbers - factors.*

For instance, $6 \times \underline{\quad} = 42$, reinforces the 6 and 7 exchanging or commutative process of the equation's 'factors' but now, for learning the associated division math facts. In short, the student is attempting to locate the missing factor which in the division world is computing a quotient. All three (3) 'Find the Missing Factor' resource

sheets are included at the end of the document. Each of the three assessment sheets should be completed in 5 minutes, and students rapidly complete the Formative Loop math fact case for division. In reality, the combination of the Formative Loop build-up for division math facts and the ‘Find the Missing Factor’ resource press students to complete division facts as third graders in about two (2) weeks.

Note: It is recommended to challenge students to complete the ‘Find the Missing Factor’ resource pages, and/or provide them homework on each sheet in conjunction with their Formative Loop build-up process for division math facts.

Math Processing Skills (Formative Loop Numeracy Bonus)

The other numeracy skills in arithmetic other than math facts are math processing skills. Some of those skills are place value, rounding, Making 10, even and odd, estimation, computation skills, fractions, decimals, etc. For this reason, it is highly beneficial for the educator to select the two separate Formative Loop numeracy schemes – one for only the math facts and the other one for math processing skills. In doing so, both numeracy skill sets are learned simultaneously and both are critical to a students’ ability to be prepared for embedded numeracy skills in word or story problems.

It is important to realize that Formative Loop is designed as **both a stop-gap and grade level resource**. Thus, the program simultaneously addresses prior grade level numeracy gaps as well as current grade level skill standards. In doing so, students are rapidly pressed back to grade level mathematics without a detailed analysis of missing skills for each student. The Formative Loop numeracy program is designed based on quantile philosophy and Bloom’s Taxonomy without the need to solve each student’s dependent math skill needs. The corrective actions occur as students’ progress through the math fact and math skill processing schemes at their own individual pace rectifying dependent numeracy skill gaps and adding grade level skills both sequentially and simultaneously.

Final Comments on Student Math Facts Mastery – Easy to Do!



Ensuring that math facts and processing skills are mastered by ALL students is not an overly arduous task to accomplish. Of course, a structured and consistent plan as well as educator effort is required. *It is NOT a complicated issue; in fact, it is more of a common-sense problem.* But, it cannot be a passive learning process for students, and educators must have a plan and a predictable structured system. Teachers and administrators must motivate and encourage struggling students during the learning process. This process can’t be left for pure chance; it requires effort. However, the benefits to

both teacher and students far outweigh the expended energy. It only takes the educators’ will and an effective plan to get this numeracy work completed for every child!

There are additional advantages when students master their math facts and processing numeracy skills. First, they will become adept problem solvers which is the goal of every math educator in public education. Without numeracy skills, students become cognitively overwhelmed when attempting to solve a word/story problem either by faltering when they are not able to solve one (or more) of the embedded discrete math skills. Or, if they inefficiently and laboriously solve each embedded math skill while problem solving, children frequently do not possess the stamina to complete multiple word problems on a standardized assessment. Second, students will not be prepared with the prerequisites in algebra, geometry and trigonometry. Since arithmetic skills are the foundation for those three mathematics’ areas in middle and high school, students without those skills are not proficient in learning higher order dependent skills. Third, the salaries in lucrative technology

fields require math and science skills; thus, without requisite public school math skill sets, students' career opportunities in either vocational schools or university will be limited.

As a highly successful urban, Title 1 teacher and campus administrator, I am unable to academically turnaround challenging campuses and eliminate the achievement gap without the prescribed mythologies for numeracy skill development, Formative Loop and a bridge resource (i.e., daily problem-solving resource). The reasons for this thinking are straightforward. Formative Loop allows the principal to implement a schoolwide accountable numeracy program that targets every student in real time. Thus, no student slips through the proverbial academic crack. All students are placed in a position to perform academically well at a low-income Title 1 campus. The program's functionality affords that level of monitoring and support for each and every student at the campus, and additional intervention classes can be easily created to account for the remaining students struggling in any one of the four math fact operations.



Additionally, not all elementary educators understand and share the urgency and academic need of student math fact numeracy skill automaticity. However, Formative Loop's functionality affords the campus administrator to implement an external global numeracy program as opposed to a classroom teacher handling all the Formative Loop daily numeracy duties in their entirety. Actually, in the nearly three decades of this type of curricular programming, the vast majority of classroom teachers are extremely pleased with this level of numeracy support. Yet, at every campus, there are always several classroom educators that do **not understand and consequently, do not prepare** their students for a fundamental arithmetic math foundation.

It has always been unclear to me the reason(s) a handful of teachers and administrators fail to recognize that students' numeracy skill ability is key to problem solving and future mathematical prowess. I find it pointless to speculate on their reasoning since all student data, outcomes or logical rational is all but ignored. What can be stated accurately is that mathematical ignorance has adverse ramifications upon student achievement outcomes as well as limiting the career options many years later when their students are adults. Moreover, if the two (2) five-minute daily assessments are graded and inputted by external classroom personnel in the manner described in this document, the campus administrator is able to dramatically minimize those teachers' negative impact on student achievement, social justice and educational equity at the campus.



Any curricular program is subject to varying constraints of teacher experience. Campus administrators have long recognized that they are unable to consistently employ an entire faculty of seasoned classroom teachers, and pragmatically, they must hire novice and entry-level educators. Academic reformation has long sought that the solution to Title 1 campuses must originate solely from teacher training. Of course, training teachers to be efficacious in the classroom is vitally important, but the training should focus on induction training, effective classroom management, spaced repetition and specific instructional pedagogy development. Similarly, as at Title 1 campuses, high socioeconomic elementary and middle schools are also constantly hiring entry-level teachers, but their academic campus' performance does not appreciably suffer in any given school year. **Why?** Affluent campuses are a forgiving academic environment since the mass of their students do not possess significant academic literacy and numeracy gaps. In short, students attending medium to high socioeconomic schools are grade level ready academically, so students are prepared and make mathematical connections regardless if the instruction is delivered via a veteran educator or a first-year teacher.



However, when using Formative Loop’s schoolwide numeracy program, the dire **need** for teacher experience is minimized since an entry-level teacher possesses the capacity to produce the same student outcomes as a highly seasoned educator. It is imperative that this point not be missed. *The implementation of this type of numeracy program allows the campus principal to ensure high mathematics performance for every student within one year of implementation – regardless of teacher experience levels.* **Why?** The daily numeracy program not only presses math facts and math processing skills, it is

designed to simultaneously eradicate prior grade level numeracy gaps. Thus, low-income students are similarly positioned academically as their more affluent peers and are equally capable of forming the logical mathematical connections regardless if the instruction is provided by a novice teacher or a veteran one.

It is equally important to stress that the quality of the teacher’s skill development core lesson can be monitored by the students’ two assessment results in daily numeracy. Furthermore, the implementation of a problem-solving resource (i.e., bridge resource) also affords the principal the ability to monitor the application process for each student as equally well as each student’s numeracy ability. Hence, the classroom teacher is permitted to design their own core lesson that fits their instructional style, but the lesson should focus on skill development since daily numeracy and problem solving are addressed via Formative Loop and a bridge resource. **Why?** Because the *infamous achievement gap is actually a skill gap!* Once the skill gap is eradicated or dramatically reduced, the problem solving resource prepares the student for a grade level assessment as required by each State’s mathematics standards.

If the reader is given the impression that the above process is a complicated system to implement, it is not! If this system were complicated or a random process, neither extreme would be effective. Intricate systems and happenstance rarely if ever work; they break down due to too many moving parts or a lack of planning. The system that is successful is **a highly organized and simple system.** The least moving parts is the most effective and efficient system design in in any professional field. The Formative Loop system greatly limits the number of moving parts. Equally important, since numeracy skills in arithmetic are essential and finite in number, they evolve into a repetitive need each school year. Thus, the numeracy process must be controlled and automated to yield heightened student outcomes. In the engineering field, the following statement is a system philosophy that is applicable to the Formative Loop numeracy programming, *“If a repetitive process exists, it can be automated into a system of ‘mechanized’ efficacy and efficiency.”*

A complicated or random system will not work. Either extreme ultimately fails.

Only an organized and simple system can be both efficient and effective.

Continuing, teachers quickly assess students using the two (2) five (5) minute assessments (math fact and math processing skills) each morning in their classrooms; however, again, the two (2) student assessments are checked and inputted by math specialists, volunteers, TAs and/or administrators – external from the classroom. This collaborative work can be completed very quickly with a sound system, and there are viable options for conducting any student intervention work that may be needed based on the students’ two (2) – five (5) minute assessments. One efficient methodology is student grouping of skill deficiencies in a classroom or classroom teachers conduct the intervention – as needed. Since the student is retested on that math processing skill the following day to verify mastery, the grader knows immediately if the interventions were completed as required.

I would be remiss if I failed to mention that some educators provide the SAME 100 mixed fact sheets over and over to a child after the child fails to demonstrate appreciably improve. This practice has befuddled me for decades. The educator has not realized that the 100 mixed facts are too much for the intermediate student, and the task needs to be broken down to manageable segments for them. Hence, the Formative Loop build-up math fact program. This simple process eliminates the anxiety that some students feel on these types of timed tasks. The key is not to relent to their anxiety because the educator did not adapt and redesign student learning, pragmatically, a viable sequencing to ensure student success. The author worked with elementary students for almost three (3) decades in all core elementary subjects. As either a classroom teacher or campus administrator, I have never had an issue with a student feeling overwhelmed. I broke the task into manageable steps and learning for my students as does Formative Loop's math fact build-up program. It handles this process automatically and each student is pressed on specific strategies outlined in this document that are personally effective for them.

Finally, when I was a Title 1 elementary principal, I would engage at least one hour to one and a half hours per day – *everyday*, checking and inputting third (3rd) grade students Formative Loop's numeracy assessments. I engage in this time since I knew it was a critical step in student achievement results – eradicating the numeracy



gap of prior skills and ensuring grade level numeracy. When those third-grade students matriculated to the fourth and fifth grades, the mass of those students were on grade level and readily passed math fact assessments and daily processing skills. At that point, those students were at the independent stage of learning. I continued to focus my time and energy on third grade daily numeracy as well as addressing deficient numeracy skills from any newly enrolled 4th and 5th grade students at my school. Many of the newcomers to 4th and 5th grades struggled with math fact and processing skills because they had been conveniently ignored at their previous elementary campus.

Using the methods described in this document, multiple National Blue Ribbon Schools and National Blue Ribbon Profile Schools have been produced. The results at these urban, Title 1 elementary schools matched the student outcomes of the highest socioeconomic status elementary schools in the country. With a plan, focus, commitment, consistency, motivation, educational equity is not only possible, it is a replicable process at any socioeconomic elementary or middle school.

Appendix

Table of Contents

Listing of Numeracy Resources			
Resource Name	Applicable Grade Level	Recommended Timed Allotment	Page(s)
Doubles Pictorial Representation	1st and 2nd	None	A1 – A4
Doubles – Addition	3rd and 6th	5 minutes	A5 – A8
Doubles Plus 1 Pictorial Representation	1st and 2nd	None	A9 – A12
Doubles Plus 1 – Addition	3rd and 6th	5 minutes	A13 – A16
Making 10 – Pictorial Representation	1st and 2nd	None	A17 – A20
Making 10 – Number Sentences	1st and 2nd	None	A21 – A24
Making 10 – Mental Math	1st	2 minutes 30 seconds	A25 – A28
Making 10 – Mental Math	2nd	2 minutes 30 seconds	A29 – A32
Making 10 – Mental Math	3rd – 6th	5 minutes	A33 – A34
Multiples - 1	3rd – 6th	5 minutes	A35 – A36
Multiples – 1 Two Practice Sheets per Page	3rd – 6th	Homework and In-Class Practice	A37
Multiples – 1 Four Practice Sheets per Page	3rd – 6th	Homework and In-Class Practice	A38
Perfect Square Multiplication Practice	3rd – 6th	5 minutes	A39 – A42
Find the Missing Factor	3rd – 6th	5 minutes	A43 – A48

DOUBLES

Directions: Place circles in the correct number of boxes. Correctly complete the number sentence and find the Doubles' SUM.

●	●	●	●			+	●	●	●	●		

4 + 4 = 8

●	●					+						

2 + =

●	●	●	●	●			+					

5 + =

●	●	●					+					

3 + =

●							+					

1 + =

●	●	●	●				+					

4 + =

●	●	●	●	●			+					
●												

6 + =

●	●	●	●	●			+					
●	●	●										

8 + =

●	●	●	●	●			+					
●	●	●	●	●								

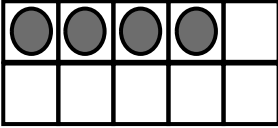
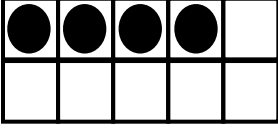
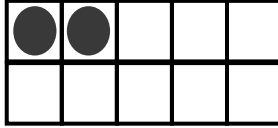
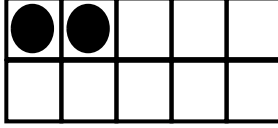
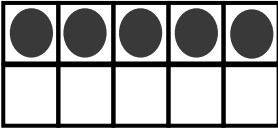
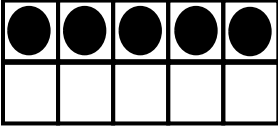
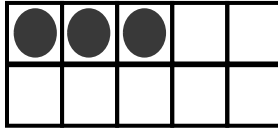
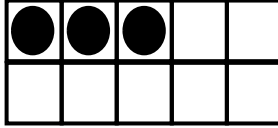
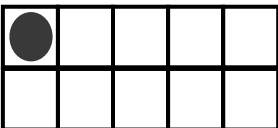
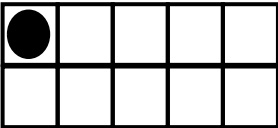
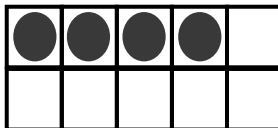
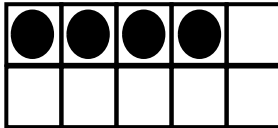
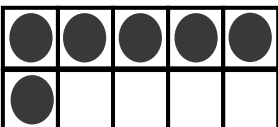
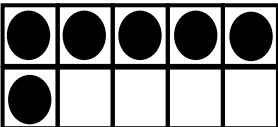
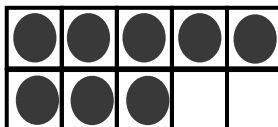
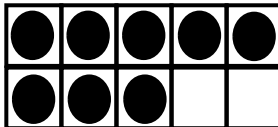
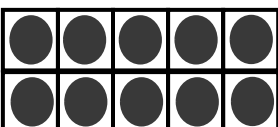
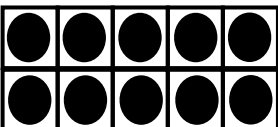
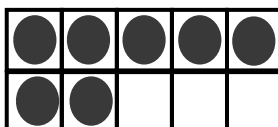
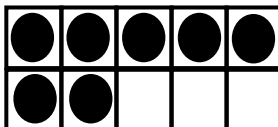
+ =

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●	●											

7 + =

D LES

Directions: Place circles in the correct number of boxes. Correctly complete the number sentence and find the Doubles' SUM.


$$4 \quad 4 = 8$$

$$2 \quad 2 = 4$$

$$5 \quad 5 = \square$$

$$3 \quad 3 = 6$$

$$1 \quad 1 = 2$$

$$4 \quad 4 = 8$$

$$6 \quad 6 = 12$$

$$8 \quad 8 = \square$$

$$10 \quad 10 = 20$$

$$7 \quad 7 = \square$$

DOUBLES

Directions: Place circles in the correct number of boxes. Correctly complete the number sentence and find the Doubles' SUM.

●	●			

 +

●	●			

 $2 + 2 = 4$

●	●	●		

 +

 $3 + \square = \square$

●	●	●	●	

 +

 $4 + \square = \square$

●				

 +

 $1 + \square = \square$

●	●	●	●	●

 +

 $5 + \square = \square$

●	●	●	●	●
●				

 +

 $6 + \square = \square$

●	●	●	●	●
●	●	●	●	

 +

 $9 + \square = \square$

●	●	●	●	●
●	●			

 +

 $7 + \square = \square$

●	●	●	●	●
●	●	●	●	●

 +

 $\square + \square = \square$

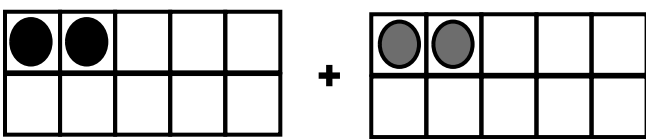
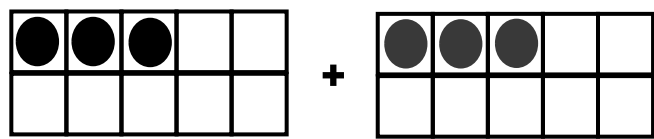
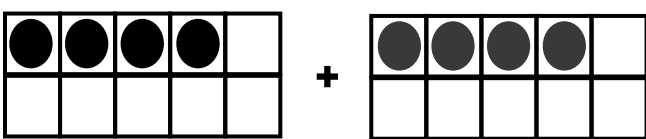
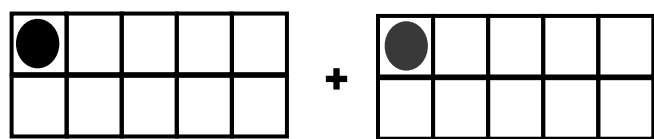
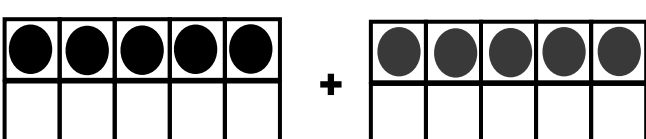
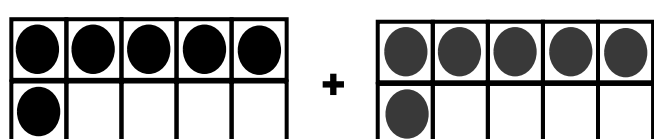
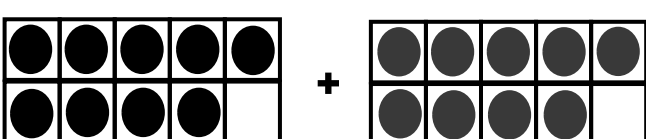
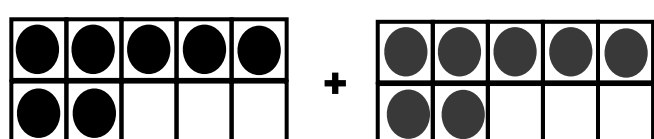
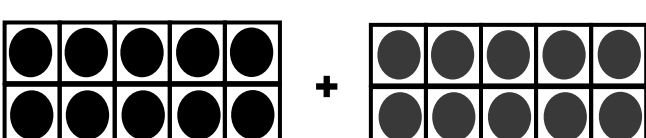
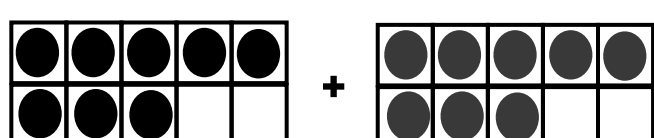
●	●	●	●	●
●	●	●		

 +

 $8 + \square = \square$

DOUBLES

Directions: Place circles in the correct number of boxes. Correctly complete the number sentence and find the Doubles' SUM.


$$2 + 2 = 4$$

$$3 + 3 = 6$$

$$4 + 4 = 8$$

$$1 + 1 = 2$$

$$5 + 5 = 10$$

$$6 + 6 = \square$$

$$9 + 9 = 18$$

$$7 + 7 = 14$$

$$+ \square = \square$$

$$8 + 8 = 16$$

3rd – 8th Grade Doubles – Math Fact Practice – Version 1

Directions: Add and find each sum (DOUBLES). Use another sheet of paper to cover the above row after it has been completed. Complete as many of the doubles below in 5 minutes. Good Luck!!!

$$\begin{array}{r} 6 \\ + 6 \\ \hline \end{array} \quad \begin{array}{r} 2 \\ + 2 \\ \hline \end{array} \quad \begin{array}{r} 3 \\ + 3 \\ \hline \end{array} \quad \begin{array}{r} 9 \\ + 9 \\ \hline \end{array} \quad \begin{array}{r} 1 \\ + 1 \\ \hline \end{array} \quad \begin{array}{r} 10 \\ + 10 \\ \hline \end{array} \quad \begin{array}{r} 8 \\ + 8 \\ \hline \end{array} \quad \begin{array}{r} 5 \\ + 5 \\ \hline \end{array} \quad \begin{array}{r} 7 \\ + 7 \\ \hline \end{array} \quad \begin{array}{r} 4 \\ + 4 \\ \hline \end{array}$$

$$\begin{array}{r} 5 \\ + 5 \\ \hline \end{array} \quad \begin{array}{r} 3 \\ + 3 \\ \hline \end{array} \quad \begin{array}{r} 4 \\ + 4 \\ \hline \end{array} \quad \begin{array}{r} 6 \\ + 6 \\ \hline \end{array} \quad \begin{array}{r} 2 \\ + 2 \\ \hline \end{array} \quad \begin{array}{r} 10 \\ + 10 \\ \hline \end{array} \quad \begin{array}{r} 7 \\ + 7 \\ \hline \end{array} \quad \begin{array}{r} 9 \\ + 9 \\ \hline \end{array} \quad \begin{array}{r} 8 \\ + 8 \\ \hline \end{array} \quad \begin{array}{r} 1 \\ + 1 \\ \hline \end{array}$$

$$\begin{array}{r} 9 \\ + 9 \\ \hline \end{array} \quad \begin{array}{r} 1 \\ + 1 \\ \hline \end{array} \quad \begin{array}{r} 3 \\ + 3 \\ \hline \end{array} \quad \begin{array}{r} 8 \\ + 8 \\ \hline \end{array} \quad \begin{array}{r} 7 \\ + 7 \\ \hline \end{array} \quad \begin{array}{r} 4 \\ + 4 \\ \hline \end{array} \quad \begin{array}{r} 2 \\ + 2 \\ \hline \end{array} \quad \begin{array}{r} 6 \\ + 6 \\ \hline \end{array} \quad \begin{array}{r} 10 \\ + 10 \\ \hline \end{array} \quad \begin{array}{r} 5 \\ + 5 \\ \hline \end{array}$$

$$\begin{array}{r} 1 \\ + 1 \\ \hline \end{array} \quad \begin{array}{r} 4 \\ + 4 \\ \hline \end{array} \quad \begin{array}{r} 5 \\ + 5 \\ \hline \end{array} \quad \begin{array}{r} 10 \\ + 10 \\ \hline \end{array} \quad \begin{array}{r} 3 \\ + 3 \\ \hline \end{array} \quad \begin{array}{r} 9 \\ + 9 \\ \hline \end{array} \quad \begin{array}{r} 8 \\ + 8 \\ \hline \end{array} \quad \begin{array}{r} 6 \\ + 6 \\ \hline \end{array} \quad \begin{array}{r} 7 \\ + 7 \\ \hline \end{array} \quad \begin{array}{r} 2 \\ + 2 \\ \hline \end{array}$$

$$\begin{array}{r} 8 \\ + 8 \\ \hline \end{array} \quad \begin{array}{r} 2 \\ + 2 \\ \hline \end{array} \quad \begin{array}{r} 3 \\ + 3 \\ \hline \end{array} \quad \begin{array}{r} 9 \\ + 9 \\ \hline \end{array} \quad \begin{array}{r} 1 \\ + 1 \\ \hline \end{array} \quad \begin{array}{r} 7 \\ + 7 \\ \hline \end{array} \quad \begin{array}{r} 6 \\ + 6 \\ \hline \end{array} \quad \begin{array}{r} 10 \\ + 10 \\ \hline \end{array} \quad \begin{array}{r} 5 \\ + 5 \\ \hline \end{array} \quad \begin{array}{r} 4 \\ + 4 \\ \hline \end{array}$$

$$\begin{array}{r} 6 \\ + 6 \\ \hline \end{array} \quad \begin{array}{r} 3 \\ + 3 \\ \hline \end{array} \quad \begin{array}{r} 4 \\ + 4 \\ \hline \end{array} \quad \begin{array}{r} 9 \\ + 9 \\ \hline \end{array} \quad \begin{array}{r} 5 \\ + 5 \\ \hline \end{array} \quad \begin{array}{r} 2 \\ + 2 \\ \hline \end{array} \quad \begin{array}{r} 8 \\ + 8 \\ \hline \end{array} \quad \begin{array}{r} 7 \\ + 7 \\ \hline \end{array} \quad \begin{array}{r} 10 \\ + 10 \\ \hline \end{array} \quad \begin{array}{r} 1 \\ + 1 \\ \hline \end{array}$$

$$\begin{array}{r} 2 \\ + 2 \\ \hline \end{array} \quad \begin{array}{r} 10 \\ + 10 \\ \hline \end{array} \quad \begin{array}{r} 8 \\ + 8 \\ \hline \end{array} \quad \begin{array}{r} 9 \\ + 9 \\ \hline \end{array} \quad \begin{array}{r} 5 \\ + 5 \\ \hline \end{array} \quad \begin{array}{r} 6 \\ + 6 \\ \hline \end{array} \quad \begin{array}{r} 1 \\ + 1 \\ \hline \end{array} \quad \begin{array}{r} 3 \\ + 3 \\ \hline \end{array} \quad \begin{array}{r} 7 \\ + 7 \\ \hline \end{array} \quad \begin{array}{r} 4 \\ + 4 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \\ + 7 \\ \hline \end{array} \quad \begin{array}{r} 1 \\ + 1 \\ \hline \end{array} \quad \begin{array}{r} 6 \\ + 6 \\ \hline \end{array} \quad \begin{array}{r} 2 \\ + 2 \\ \hline \end{array} \quad \begin{array}{r} 4 \\ + 4 \\ \hline \end{array} \quad \begin{array}{r} 9 \\ + 9 \\ \hline \end{array} \quad \begin{array}{r} 8 \\ + 8 \\ \hline \end{array} \quad \begin{array}{r} 5 \\ + 5 \\ \hline \end{array} \quad \begin{array}{r} 10 \\ + 10 \\ \hline \end{array} \quad \begin{array}{r} 3 \\ + 3 \\ \hline \end{array}$$

$$\begin{array}{r} 2 \\ + 2 \\ \hline \end{array} \quad \begin{array}{r} 7 \\ + 7 \\ \hline \end{array} \quad \begin{array}{r} 10 \\ + 10 \\ \hline \end{array} \quad \begin{array}{r} 3 \\ + 3 \\ \hline \end{array} \quad \begin{array}{r} 1 \\ + 1 \\ \hline \end{array} \quad \begin{array}{r} 5 \\ + 5 \\ \hline \end{array} \quad \begin{array}{r} 4 \\ + 4 \\ \hline \end{array} \quad \begin{array}{r} 9 \\ + 9 \\ \hline \end{array} \quad \begin{array}{r} 8 \\ + 8 \\ \hline \end{array} \quad \begin{array}{r} 6 \\ + 6 \\ \hline \end{array}$$

$$\begin{array}{r} 1 \\ + 1 \\ \hline \end{array} \quad \begin{array}{r} 4 \\ + 4 \\ \hline \end{array} \quad \begin{array}{r} 6 \\ + 6 \\ \hline \end{array} \quad \begin{array}{r} 8 \\ + 8 \\ \hline \end{array} \quad \begin{array}{r} 2 \\ + 2 \\ \hline \end{array} \quad \begin{array}{r} 10 \\ + 10 \\ \hline \end{array} \quad \begin{array}{r} 3 \\ + 3 \\ \hline \end{array} \quad \begin{array}{r} 9 \\ + 9 \\ \hline \end{array} \quad \begin{array}{r} 7 \\ + 7 \\ \hline \end{array} \quad \begin{array}{r} 5 \\ + 5 \\ \hline \end{array}$$

3rd – 8th Grade Doubles – Math Fact Practice – Version 1

Directions: Add and find each sum (DOUBLES). Use another sheet of paper to cover the above row after it has been completed. Complete as many of the doubles below in 5 minutes. Good Luck!!!

$$\begin{array}{r} 6 \\ + 6 \\ \hline 12 \end{array} \quad \begin{array}{r} 2 \\ + 2 \\ \hline 4 \end{array} \quad \begin{array}{r} 3 \\ + 3 \\ \hline 6 \end{array} \quad \begin{array}{r} 9 \\ + 9 \\ \hline 18 \end{array} \quad \begin{array}{r} 1 \\ + 1 \\ \hline 2 \end{array} \quad \begin{array}{r} 10 \\ + 10 \\ \hline 20 \end{array} \quad \begin{array}{r} 8 \\ + 8 \\ \hline 16 \end{array} \quad \begin{array}{r} 5 \\ + 5 \\ \hline 10 \end{array} \quad \begin{array}{r} 7 \\ + 7 \\ \hline 14 \end{array} \quad \begin{array}{r} 4 \\ + 4 \\ \hline 8 \end{array}$$

$$\begin{array}{r} 5 \\ + 5 \\ \hline 10 \end{array} \quad \begin{array}{r} 3 \\ + 3 \\ \hline 6 \end{array} \quad \begin{array}{r} 4 \\ + 4 \\ \hline 8 \end{array} \quad \begin{array}{r} 6 \\ + 6 \\ \hline 12 \end{array} \quad \begin{array}{r} 2 \\ + 2 \\ \hline 4 \end{array} \quad \begin{array}{r} 10 \\ + 10 \\ \hline 20 \end{array} \quad \begin{array}{r} 7 \\ + 7 \\ \hline 14 \end{array} \quad \begin{array}{r} 9 \\ + 9 \\ \hline 18 \end{array} \quad \begin{array}{r} 8 \\ + 8 \\ \hline 16 \end{array} \quad \begin{array}{r} 1 \\ + 1 \\ \hline 2 \end{array}$$

$$\begin{array}{r} 9 \\ + 9 \\ \hline 18 \end{array} \quad \begin{array}{r} 1 \\ + 1 \\ \hline 2 \end{array} \quad \begin{array}{r} 3 \\ + 3 \\ \hline 6 \end{array} \quad \begin{array}{r} 8 \\ + 8 \\ \hline 16 \end{array} \quad \begin{array}{r} 7 \\ + 7 \\ \hline 14 \end{array} \quad \begin{array}{r} 4 \\ + 4 \\ \hline 8 \end{array} \quad \begin{array}{r} 2 \\ + 2 \\ \hline 4 \end{array} \quad \begin{array}{r} 6 \\ + 6 \\ \hline 12 \end{array} \quad \begin{array}{r} 10 \\ + 10 \\ \hline 20 \end{array} \quad \begin{array}{r} 5 \\ + 5 \\ \hline 10 \end{array}$$

$$\begin{array}{r} 1 \\ + 1 \\ \hline 2 \end{array} \quad \begin{array}{r} 4 \\ + 4 \\ \hline 8 \end{array} \quad \begin{array}{r} 5 \\ + 5 \\ \hline 10 \end{array} \quad \begin{array}{r} 10 \\ + 10 \\ \hline 20 \end{array} \quad \begin{array}{r} 3 \\ + 3 \\ \hline 6 \end{array} \quad \begin{array}{r} 9 \\ + 9 \\ \hline 18 \end{array} \quad \begin{array}{r} 8 \\ + 8 \\ \hline 16 \end{array} \quad \begin{array}{r} 6 \\ + 6 \\ \hline 12 \end{array} \quad \begin{array}{r} 7 \\ + 7 \\ \hline 14 \end{array} \quad \begin{array}{r} 2 \\ + 2 \\ \hline 4 \end{array}$$

$$\begin{array}{r} 8 \\ + 8 \\ \hline 16 \end{array} \quad \begin{array}{r} 2 \\ + 2 \\ \hline 4 \end{array} \quad \begin{array}{r} 3 \\ + 3 \\ \hline 6 \end{array} \quad \begin{array}{r} 9 \\ + 9 \\ \hline 18 \end{array} \quad \begin{array}{r} 1 \\ + 1 \\ \hline 2 \end{array} \quad \begin{array}{r} 7 \\ + 7 \\ \hline 14 \end{array} \quad \begin{array}{r} 6 \\ + 6 \\ \hline 12 \end{array} \quad \begin{array}{r} 10 \\ + 10 \\ \hline 20 \end{array} \quad \begin{array}{r} 5 \\ + 5 \\ \hline 10 \end{array} \quad \begin{array}{r} 4 \\ + 4 \\ \hline 8 \end{array}$$

$$\begin{array}{r} 6 \\ + 6 \\ \hline 12 \end{array} \quad \begin{array}{r} 3 \\ + 3 \\ \hline 6 \end{array} \quad \begin{array}{r} 4 \\ + 4 \\ \hline 8 \end{array} \quad \begin{array}{r} 9 \\ + 9 \\ \hline 18 \end{array} \quad \begin{array}{r} 5 \\ + 5 \\ \hline 10 \end{array} \quad \begin{array}{r} 2 \\ + 2 \\ \hline 4 \end{array} \quad \begin{array}{r} 8 \\ + 8 \\ \hline 16 \end{array} \quad \begin{array}{r} 7 \\ + 7 \\ \hline 14 \end{array} \quad \begin{array}{r} 10 \\ + 10 \\ \hline 20 \end{array} \quad \begin{array}{r} 1 \\ + 1 \\ \hline 2 \end{array}$$

$$\begin{array}{r} 2 \\ + 2 \\ \hline 4 \end{array} \quad \begin{array}{r} 10 \\ + 10 \\ \hline 20 \end{array} \quad \begin{array}{r} 8 \\ + 8 \\ \hline 16 \end{array} \quad \begin{array}{r} 9 \\ + 9 \\ \hline 18 \end{array} \quad \begin{array}{r} 5 \\ + 5 \\ \hline 10 \end{array} \quad \begin{array}{r} 6 \\ + 6 \\ \hline 12 \end{array} \quad \begin{array}{r} 1 \\ + 1 \\ \hline 2 \end{array} \quad \begin{array}{r} 3 \\ + 3 \\ \hline 6 \end{array} \quad \begin{array}{r} 7 \\ + 7 \\ \hline 14 \end{array} \quad \begin{array}{r} 4 \\ + 4 \\ \hline 8 \end{array}$$

$$\begin{array}{r} 7 \\ + 7 \\ \hline 14 \end{array} \quad \begin{array}{r} 1 \\ + 1 \\ \hline 2 \end{array} \quad \begin{array}{r} 6 \\ + 6 \\ \hline 12 \end{array} \quad \begin{array}{r} 2 \\ + 2 \\ \hline 4 \end{array} \quad \begin{array}{r} 4 \\ + 4 \\ \hline 8 \end{array} \quad \begin{array}{r} 9 \\ + 9 \\ \hline 18 \end{array} \quad \begin{array}{r} 8 \\ + 8 \\ \hline 16 \end{array} \quad \begin{array}{r} 5 \\ + 5 \\ \hline 10 \end{array} \quad \begin{array}{r} 10 \\ + 10 \\ \hline 20 \end{array} \quad \begin{array}{r} 3 \\ + 3 \\ \hline 6 \end{array}$$

$$\begin{array}{r} 2 \\ + 2 \\ \hline 4 \end{array} \quad \begin{array}{r} 7 \\ + 7 \\ \hline 14 \end{array} \quad \begin{array}{r} 10 \\ + 10 \\ \hline 20 \end{array} \quad \begin{array}{r} 3 \\ + 3 \\ \hline 6 \end{array} \quad \begin{array}{r} 1 \\ + 1 \\ \hline 2 \end{array} \quad \begin{array}{r} 5 \\ + 5 \\ \hline 10 \end{array} \quad \begin{array}{r} 4 \\ + 4 \\ \hline 8 \end{array} \quad \begin{array}{r} 9 \\ + 9 \\ \hline 18 \end{array} \quad \begin{array}{r} 8 \\ + 8 \\ \hline 16 \end{array} \quad \begin{array}{r} 6 \\ + 6 \\ \hline 12 \end{array}$$

$$\begin{array}{r} 1 \\ + 1 \\ \hline 2 \end{array} \quad \begin{array}{r} 4 \\ + 4 \\ \hline 8 \end{array} \quad \begin{array}{r} 6 \\ + 6 \\ \hline 12 \end{array} \quad \begin{array}{r} 8 \\ + 8 \\ \hline 16 \end{array} \quad \begin{array}{r} 2 \\ + 2 \\ \hline 4 \end{array} \quad \begin{array}{r} 10 \\ + 10 \\ \hline 20 \end{array} \quad \begin{array}{r} 3 \\ + 3 \\ \hline 6 \end{array} \quad \begin{array}{r} 9 \\ + 9 \\ \hline 18 \end{array} \quad \begin{array}{r} 7 \\ + 7 \\ \hline 14 \end{array} \quad \begin{array}{r} 5 \\ + 5 \\ \hline 10 \end{array}$$



3rd – 8th Grade Doubles – Math Fact Practice – Version 2

Directions: Add and find each sum (DOUBLES). Use another sheet of paper to cover the above row after it has been completed. Complete as many of the doubles below in 5 minutes. Good Luck!!!

$$\begin{array}{r} 1 \\ + 1 \\ \hline \end{array} \quad \begin{array}{r} 4 \\ + 4 \\ \hline \end{array} \quad \begin{array}{r} 6 \\ + 6 \\ \hline \end{array} \quad \begin{array}{r} 8 \\ + 8 \\ \hline \end{array} \quad \begin{array}{r} 2 \\ + 2 \\ \hline \end{array} \quad \begin{array}{r} 10 \\ + 10 \\ \hline \end{array} \quad \begin{array}{r} 3 \\ + 3 \\ \hline \end{array} \quad \begin{array}{r} 9 \\ + 9 \\ \hline \end{array} \quad \begin{array}{r} 7 \\ + 7 \\ \hline \end{array} \quad \begin{array}{r} 5 \\ + 5 \\ \hline \end{array}$$

$$\begin{array}{r} 2 \\ + 2 \\ \hline \end{array} \quad \begin{array}{r} 7 \\ + 7 \\ \hline \end{array} \quad \begin{array}{r} 10 \\ + 10 \\ \hline \end{array} \quad \begin{array}{r} 3 \\ + 3 \\ \hline \end{array} \quad \begin{array}{r} 1 \\ + 1 \\ \hline \end{array} \quad \begin{array}{r} 5 \\ + 5 \\ \hline \end{array} \quad \begin{array}{r} 4 \\ + 4 \\ \hline \end{array} \quad \begin{array}{r} 9 \\ + 9 \\ \hline \end{array} \quad \begin{array}{r} 8 \\ + 8 \\ \hline \end{array} \quad \begin{array}{r} 6 \\ + 6 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \\ + 7 \\ \hline \end{array} \quad \begin{array}{r} 1 \\ + 1 \\ \hline \end{array} \quad \begin{array}{r} 6 \\ + 6 \\ \hline \end{array} \quad \begin{array}{r} 2 \\ + 2 \\ \hline \end{array} \quad \begin{array}{r} 4 \\ + 4 \\ \hline \end{array} \quad \begin{array}{r} 9 \\ + 9 \\ \hline \end{array} \quad \begin{array}{r} 8 \\ + 8 \\ \hline \end{array} \quad \begin{array}{r} 5 \\ + 5 \\ \hline \end{array} \quad \begin{array}{r} 10 \\ + 10 \\ \hline \end{array} \quad \begin{array}{r} 3 \\ + 3 \\ \hline \end{array}$$

$$\begin{array}{r} 2 \\ + 2 \\ \hline \end{array} \quad \begin{array}{r} 10 \\ + 10 \\ \hline \end{array} \quad \begin{array}{r} 8 \\ + 8 \\ \hline \end{array} \quad \begin{array}{r} 9 \\ + 9 \\ \hline \end{array} \quad \begin{array}{r} 5 \\ + 5 \\ \hline \end{array} \quad \begin{array}{r} 6 \\ + 6 \\ \hline \end{array} \quad \begin{array}{r} 1 \\ + 1 \\ \hline \end{array} \quad \begin{array}{r} 3 \\ + 3 \\ \hline \end{array} \quad \begin{array}{r} 7 \\ + 7 \\ \hline \end{array} \quad \begin{array}{r} 4 \\ + 4 \\ \hline \end{array}$$

$$\begin{array}{r} 6 \\ + 6 \\ \hline \end{array} \quad \begin{array}{r} 3 \\ + 3 \\ \hline \end{array} \quad \begin{array}{r} 4 \\ + 4 \\ \hline \end{array} \quad \begin{array}{r} 9 \\ + 9 \\ \hline \end{array} \quad \begin{array}{r} 5 \\ + 5 \\ \hline \end{array} \quad \begin{array}{r} 2 \\ + 2 \\ \hline \end{array} \quad \begin{array}{r} 8 \\ + 8 \\ \hline \end{array} \quad \begin{array}{r} 7 \\ + 7 \\ \hline \end{array} \quad \begin{array}{r} 10 \\ + 10 \\ \hline \end{array} \quad \begin{array}{r} 1 \\ + 1 \\ \hline \end{array}$$

$$\begin{array}{r} 6 \\ + 6 \\ \hline \end{array} \quad \begin{array}{r} 2 \\ + 2 \\ \hline \end{array} \quad \begin{array}{r} 3 \\ + 3 \\ \hline \end{array} \quad \begin{array}{r} 9 \\ + 9 \\ \hline \end{array} \quad \begin{array}{r} 1 \\ + 1 \\ \hline \end{array} \quad \begin{array}{r} 10 \\ + 10 \\ \hline \end{array} \quad \begin{array}{r} 8 \\ + 8 \\ \hline \end{array} \quad \begin{array}{r} 5 \\ + 5 \\ \hline \end{array} \quad \begin{array}{r} 7 \\ + 7 \\ \hline \end{array} \quad \begin{array}{r} 4 \\ + 4 \\ \hline \end{array}$$

$$\begin{array}{r} 5 \\ + 5 \\ \hline \end{array} \quad \begin{array}{r} 3 \\ + 3 \\ \hline \end{array} \quad \begin{array}{r} 4 \\ + 4 \\ \hline \end{array} \quad \begin{array}{r} 6 \\ + 6 \\ \hline \end{array} \quad \begin{array}{r} 2 \\ + 2 \\ \hline \end{array} \quad \begin{array}{r} 10 \\ + 10 \\ \hline \end{array} \quad \begin{array}{r} 7 \\ + 7 \\ \hline \end{array} \quad \begin{array}{r} 9 \\ + 9 \\ \hline \end{array} \quad \begin{array}{r} 8 \\ + 8 \\ \hline \end{array} \quad \begin{array}{r} 1 \\ + 1 \\ \hline \end{array}$$

$$\begin{array}{r} 9 \\ + 9 \\ \hline \end{array} \quad \begin{array}{r} 1 \\ + 1 \\ \hline \end{array} \quad \begin{array}{r} 3 \\ + 3 \\ \hline \end{array} \quad \begin{array}{r} 8 \\ + 8 \\ \hline \end{array} \quad \begin{array}{r} 7 \\ + 7 \\ \hline \end{array} \quad \begin{array}{r} 4 \\ + 4 \\ \hline \end{array} \quad \begin{array}{r} 2 \\ + 2 \\ \hline \end{array} \quad \begin{array}{r} 6 \\ + 6 \\ \hline \end{array} \quad \begin{array}{r} 10 \\ + 10 \\ \hline \end{array} \quad \begin{array}{r} 5 \\ + 5 \\ \hline \end{array}$$

$$\begin{array}{r} 1 \\ + 1 \\ \hline \end{array} \quad \begin{array}{r} 4 \\ + 4 \\ \hline \end{array} \quad \begin{array}{r} 5 \\ + 5 \\ \hline \end{array} \quad \begin{array}{r} 10 \\ + 10 \\ \hline \end{array} \quad \begin{array}{r} 3 \\ + 3 \\ \hline \end{array} \quad \begin{array}{r} 9 \\ + 9 \\ \hline \end{array} \quad \begin{array}{r} 8 \\ + 8 \\ \hline \end{array} \quad \begin{array}{r} 6 \\ + 6 \\ \hline \end{array} \quad \begin{array}{r} 7 \\ + 7 \\ \hline \end{array} \quad \begin{array}{r} 2 \\ + 2 \\ \hline \end{array}$$

$$\begin{array}{r} 8 \\ + 8 \\ \hline \end{array} \quad \begin{array}{r} 2 \\ + 2 \\ \hline \end{array} \quad \begin{array}{r} 3 \\ + 3 \\ \hline \end{array} \quad \begin{array}{r} 9 \\ + 9 \\ \hline \end{array} \quad \begin{array}{r} 1 \\ + 1 \\ \hline \end{array} \quad \begin{array}{r} 7 \\ + 7 \\ \hline \end{array} \quad \begin{array}{r} 6 \\ + 6 \\ \hline \end{array} \quad \begin{array}{r} 10 \\ + 10 \\ \hline \end{array} \quad \begin{array}{r} 5 \\ + 5 \\ \hline \end{array} \quad \begin{array}{r} 4 \\ + 4 \\ \hline \end{array}$$

3rd – 8th Grade Doubles – Math Fact Practice – Version 2

Directions: Add and find each sum (DOUBLES). Use another sheet of paper to cover the above row after it has been completed. Complete as many of the doubles below in 5 minutes. Good Luck!!!

$$\begin{array}{r} 1 \\ + 1 \\ \hline 2 \end{array} \quad \begin{array}{r} 4 \\ + 4 \\ \hline 8 \end{array} \quad \begin{array}{r} 6 \\ + 6 \\ \hline 12 \end{array} \quad \begin{array}{r} 8 \\ + 8 \\ \hline 16 \end{array} \quad \begin{array}{r} 2 \\ + 2 \\ \hline 4 \end{array} \quad \begin{array}{r} 10 \\ + 10 \\ \hline 20 \end{array} \quad \begin{array}{r} 3 \\ + 3 \\ \hline 6 \end{array} \quad \begin{array}{r} 9 \\ + 9 \\ \hline 18 \end{array} \quad \begin{array}{r} 7 \\ + 7 \\ \hline 14 \end{array} \quad \begin{array}{r} 5 \\ + 5 \\ \hline 10 \end{array}$$

$$\begin{array}{r} 2 \\ + 2 \\ \hline 4 \end{array} \quad \begin{array}{r} 7 \\ + 7 \\ \hline 14 \end{array} \quad \begin{array}{r} 10 \\ + 10 \\ \hline 20 \end{array} \quad \begin{array}{r} 3 \\ + 3 \\ \hline 6 \end{array} \quad \begin{array}{r} 1 \\ + 1 \\ \hline 2 \end{array} \quad \begin{array}{r} 5 \\ + 5 \\ \hline 10 \end{array} \quad \begin{array}{r} 4 \\ + 4 \\ \hline 8 \end{array} \quad \begin{array}{r} 9 \\ + 9 \\ \hline 18 \end{array} \quad \begin{array}{r} 8 \\ + 8 \\ \hline 16 \end{array} \quad \begin{array}{r} 6 \\ + 6 \\ \hline 12 \end{array}$$

$$\begin{array}{r} 7 \\ + 7 \\ \hline 14 \end{array} \quad \begin{array}{r} 1 \\ + 1 \\ \hline 2 \end{array} \quad \begin{array}{r} 6 \\ + 6 \\ \hline 12 \end{array} \quad \begin{array}{r} 2 \\ + 2 \\ \hline 4 \end{array} \quad \begin{array}{r} 4 \\ + 4 \\ \hline 8 \end{array} \quad \begin{array}{r} 9 \\ + 9 \\ \hline 18 \end{array} \quad \begin{array}{r} 8 \\ + 8 \\ \hline 16 \end{array} \quad \begin{array}{r} 5 \\ + 5 \\ \hline 10 \end{array} \quad \begin{array}{r} 10 \\ + 10 \\ \hline 20 \end{array} \quad \begin{array}{r} 3 \\ + 3 \\ \hline 6 \end{array}$$

$$\begin{array}{r} 2 \\ + 2 \\ \hline 4 \end{array} \quad \begin{array}{r} 10 \\ + 10 \\ \hline 20 \end{array} \quad \begin{array}{r} 8 \\ + 8 \\ \hline 16 \end{array} \quad \begin{array}{r} 9 \\ + 9 \\ \hline 18 \end{array} \quad \begin{array}{r} 5 \\ + 5 \\ \hline 10 \end{array} \quad \begin{array}{r} 6 \\ + 6 \\ \hline 12 \end{array} \quad \begin{array}{r} 1 \\ + 1 \\ \hline 2 \end{array} \quad \begin{array}{r} 3 \\ + 3 \\ \hline 6 \end{array} \quad \begin{array}{r} 7 \\ + 7 \\ \hline 14 \end{array} \quad \begin{array}{r} 4 \\ + 4 \\ \hline 8 \end{array}$$

$$\begin{array}{r} 6 \\ + 6 \\ \hline 12 \end{array} \quad \begin{array}{r} 3 \\ + 3 \\ \hline 6 \end{array} \quad \begin{array}{r} 4 \\ + 4 \\ \hline 8 \end{array} \quad \begin{array}{r} 9 \\ + 9 \\ \hline 18 \end{array} \quad \begin{array}{r} 5 \\ + 5 \\ \hline 10 \end{array} \quad \begin{array}{r} 2 \\ + 2 \\ \hline 4 \end{array} \quad \begin{array}{r} 8 \\ + 8 \\ \hline 16 \end{array} \quad \begin{array}{r} 7 \\ + 7 \\ \hline 14 \end{array} \quad \begin{array}{r} 10 \\ + 10 \\ \hline 20 \end{array} \quad \begin{array}{r} 1 \\ + 1 \\ \hline 2 \end{array}$$

$$\begin{array}{r} 6 \\ + 6 \\ \hline 12 \end{array} \quad \begin{array}{r} 2 \\ + 2 \\ \hline 4 \end{array} \quad \begin{array}{r} 3 \\ + 3 \\ \hline 6 \end{array} \quad \begin{array}{r} 9 \\ + 9 \\ \hline 18 \end{array} \quad \begin{array}{r} 1 \\ + 1 \\ \hline 2 \end{array} \quad \begin{array}{r} 10 \\ + 10 \\ \hline 20 \end{array} \quad \begin{array}{r} 8 \\ + 8 \\ \hline 16 \end{array} \quad \begin{array}{r} 5 \\ + 5 \\ \hline 10 \end{array} \quad \begin{array}{r} 7 \\ + 7 \\ \hline 14 \end{array} \quad \begin{array}{r} 4 \\ + 4 \\ \hline 8 \end{array}$$

$$\begin{array}{r} 5 \\ + 5 \\ \hline 10 \end{array} \quad \begin{array}{r} 3 \\ + 3 \\ \hline 6 \end{array} \quad \begin{array}{r} 4 \\ + 4 \\ \hline 8 \end{array} \quad \begin{array}{r} 6 \\ + 6 \\ \hline 12 \end{array} \quad \begin{array}{r} 2 \\ + 2 \\ \hline 4 \end{array} \quad \begin{array}{r} 10 \\ + 10 \\ \hline 20 \end{array} \quad \begin{array}{r} 7 \\ + 7 \\ \hline 14 \end{array} \quad \begin{array}{r} 9 \\ + 9 \\ \hline 18 \end{array} \quad \begin{array}{r} 8 \\ + 8 \\ \hline 16 \end{array} \quad \begin{array}{r} 1 \\ + 1 \\ \hline 2 \end{array}$$

$$\begin{array}{r} 9 \\ + 9 \\ \hline 18 \end{array} \quad \begin{array}{r} 1 \\ + 1 \\ \hline 2 \end{array} \quad \begin{array}{r} 3 \\ + 3 \\ \hline 6 \end{array} \quad \begin{array}{r} 8 \\ + 8 \\ \hline 16 \end{array} \quad \begin{array}{r} 7 \\ + 7 \\ \hline 14 \end{array} \quad \begin{array}{r} 4 \\ + 4 \\ \hline 8 \end{array} \quad \begin{array}{r} 2 \\ + 2 \\ \hline 4 \end{array} \quad \begin{array}{r} 6 \\ + 6 \\ \hline 12 \end{array} \quad \begin{array}{r} 10 \\ + 10 \\ \hline 20 \end{array} \quad \begin{array}{r} 5 \\ + 5 \\ \hline 10 \end{array}$$

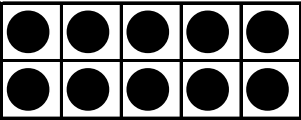
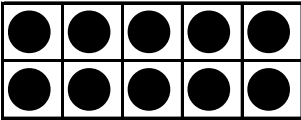
$$\begin{array}{r} 1 \\ + 1 \\ \hline 2 \end{array} \quad \begin{array}{r} 4 \\ + 4 \\ \hline 8 \end{array} \quad \begin{array}{r} 5 \\ + 5 \\ \hline 10 \end{array} \quad \begin{array}{r} 10 \\ + 10 \\ \hline 20 \end{array} \quad \begin{array}{r} 3 \\ + 3 \\ \hline 6 \end{array} \quad \begin{array}{r} 9 \\ + 9 \\ \hline 18 \end{array} \quad \begin{array}{r} 8 \\ + 8 \\ \hline 16 \end{array} \quad \begin{array}{r} 6 \\ + 6 \\ \hline 12 \end{array} \quad \begin{array}{r} 7 \\ + 7 \\ \hline 14 \end{array} \quad \begin{array}{r} 2 \\ + 2 \\ \hline 4 \end{array}$$

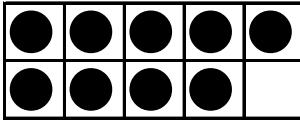
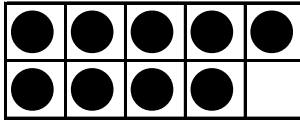
$$\begin{array}{r} 8 \\ + 8 \\ \hline 16 \end{array} \quad \begin{array}{r} 2 \\ + 2 \\ \hline 4 \end{array} \quad \begin{array}{r} 3 \\ + 3 \\ \hline 6 \end{array} \quad \begin{array}{r} 9 \\ + 9 \\ \hline 18 \end{array} \quad \begin{array}{r} 1 \\ + 1 \\ \hline 2 \end{array} \quad \begin{array}{r} 7 \\ + 7 \\ \hline 14 \end{array} \quad \begin{array}{r} 6 \\ + 6 \\ \hline 12 \end{array} \quad \begin{array}{r} 10 \\ + 10 \\ \hline 20 \end{array} \quad \begin{array}{r} 5 \\ + 5 \\ \hline 10 \end{array} \quad \begin{array}{r} 4 \\ + 4 \\ \hline 8 \end{array}$$

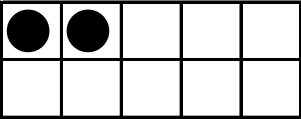
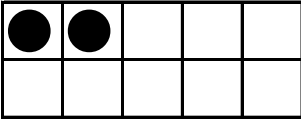


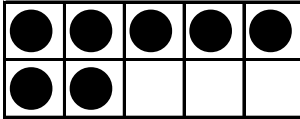
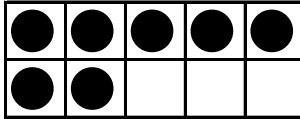
Doubles Plus One

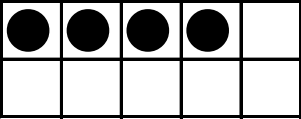
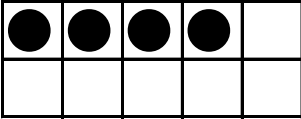
Use Doubles to Learn a new Math Fact by Adding 1 More.

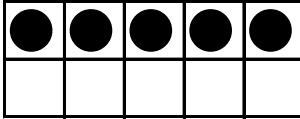
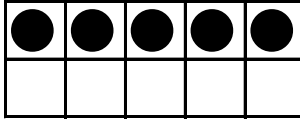
	
$10 + 10 =$	<input type="text" value="20"/>
$10 + 11 =$	<input type="text" value="21"/>



	
$9 + 9 =$	<input type="text"/>
$9 + 10 =$	<input type="text"/>

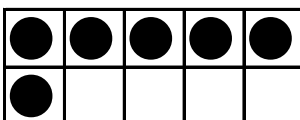
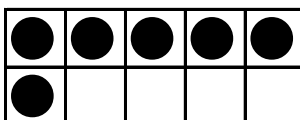
	
$2 + 2 =$	<input type="text"/>
$2 + 3 =$	<input type="text"/>

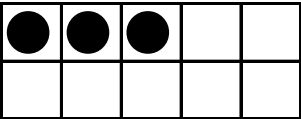
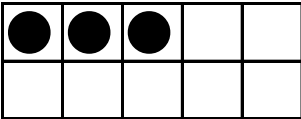
	
$7 + 7 =$	<input type="text"/>
$7 + 8 =$	<input type="text"/>

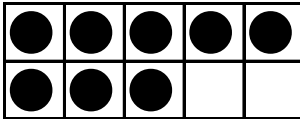
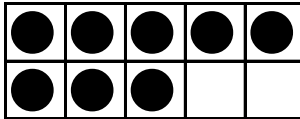
	
$4 + 4 =$	<input type="text"/>
$4 + 5 =$	<input type="text"/>

	
$5 + 5 =$	<input type="text"/>
$5 + 6 =$	<input type="text"/>

	
$1 + 1 =$	<input type="text"/>
$1 + 2 =$	<input type="text"/>

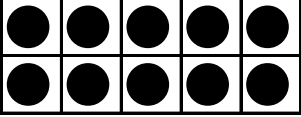
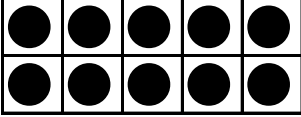
	
$6 + 6 =$	<input type="text"/>
$6 + 7 =$	<input type="text"/>

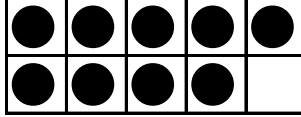
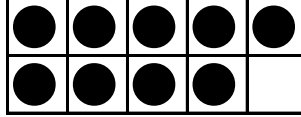
	
$3 + 3 =$	<input type="text"/>
$3 + 4 =$	<input type="text"/>

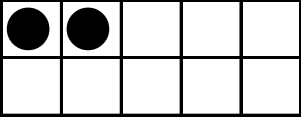
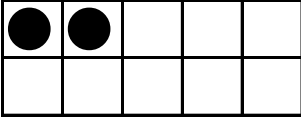
	
$8 + 8 =$	<input type="text"/>
$8 + 9 =$	<input type="text"/>

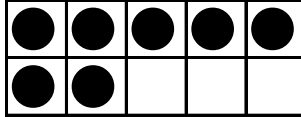
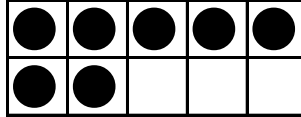
Doubles Plus One

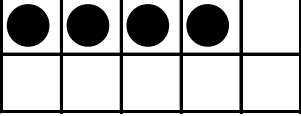
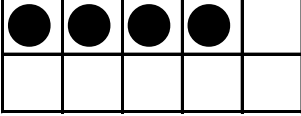
Use Doubles to Learn a new Math Fact by Adding 1 More.

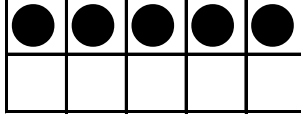
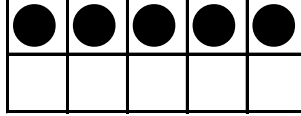
	
$10 + 10 =$	<input type="text" value="20"/>
$10 + 11 =$	<input type="text" value="21"/>

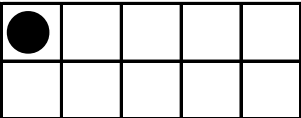
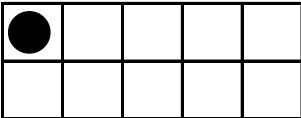
	
$9 + 9 =$	<input type="text" value="18"/>
$9 + 10 =$	<input type="text" value="19"/>

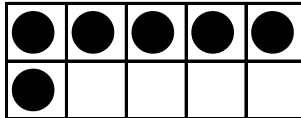
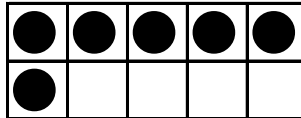
	
$2 + 2 =$	<input type="text" value="4"/>
$2 + 3 =$	<input type="text" value="5"/>

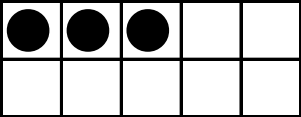
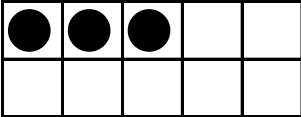
	
$7 + 7 =$	<input type="text" value="14"/>
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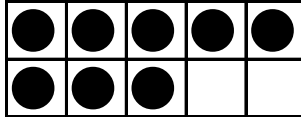
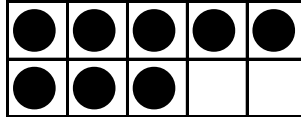
	
$4 + 4 =$	<input type="text" value="8"/>
$4 + 5 =$	<input type="text" value="9"/>

	
$5 + 5 =$	<input type="text" value="10"/>
$5 + 6 =$	<input type="text" value="11"/>

	
$1 + 1 =$	<input type="text" value="2"/>
$1 + 2 =$	<input type="text" value="3"/>

	
$6 + 6 =$	<input type="text" value="12"/>
$6 + 7 =$	<input type="text" value="13"/>

	
$3 + 3 =$	<input type="text" value="6"/>
$3 + 4 =$	<input type="text" value="7"/>

	
$8 + 8 =$	<input type="text" value="16"/>
$8 + 9 =$	<input type="text" value="17"/>

Doubles Plus One

Use Doubles to Learn a new Math Fact by Adding 1 More.

●●●●●	●●●●●
●●	●●

$7 + 7 = \square$
 $7 + 8 = \square$

●●●●●	●●●●●
●●●●●	●●●●●

$10 + 10 = \square$
 $10 + 11 = \square$

●●	●●

$2 + 2 = \square$
 $2 + 3 = \square$

●●●●●	●●●●●
●●●	●●●

$8 + 8 = \square$
 $8 + 9 = \square$

●●●●●	●●●●●

$5 + 5 = \square$
 $5 + 6 = \square$

●●●	●●●

$3 + 3 = \square$
 $3 + 4 = \square$

●●●●	●●●●

$4 + 4 = \square$
 $4 + 5 = \square$

●●●●●	●●●●●
●	●

$6 + 6 = \square$
 $6 + 7 = \square$

●●●●●	●●●●●
●●●●	●●●●

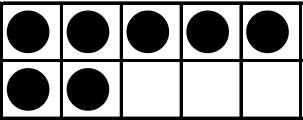
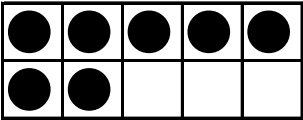
$9 + 9 = \square$
 $9 + 10 = \square$

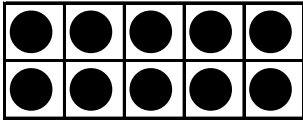
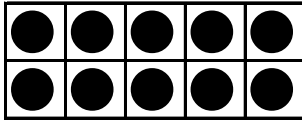
●	

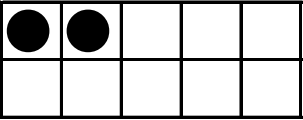
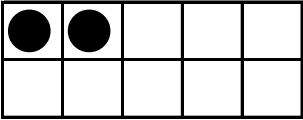
$1 + 1 = \square$
 $1 + 2 = \square$

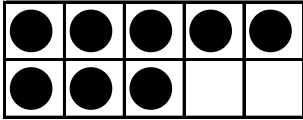
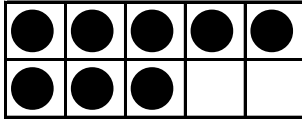
Doubles Plus One

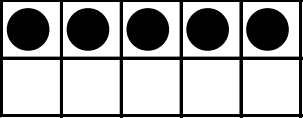
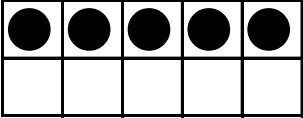
Use Doubles to Learn a new Math Fact by Adding 1 More.

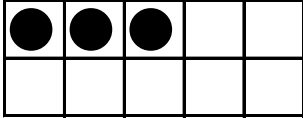
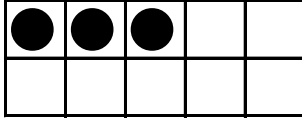
	
$7 + 7 =$	<input type="text" value="14"/>
$7 + 8 =$	<input type="text" value="15"/>

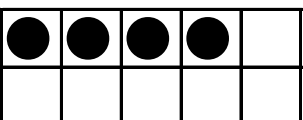
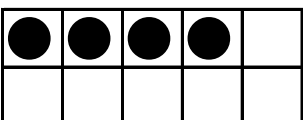
	
$10 + 10 =$	<input type="text" value="20"/>
$10 + 11 =$	<input type="text" value="21"/>

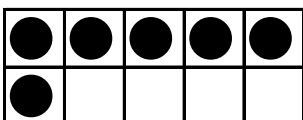
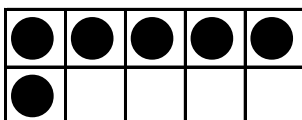
	
$2 + 2 =$	<input type="text" value="4"/>
$2 + 3 =$	<input type="text" value="5"/>

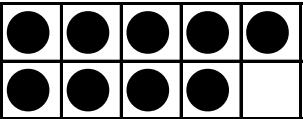
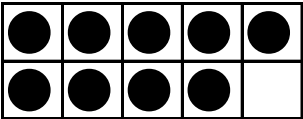
	
$8 + 8 =$	<input type="text" value="16"/>
$8 + 9 =$	<input type="text" value="17"/>

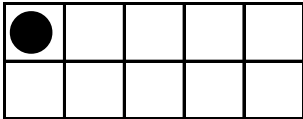
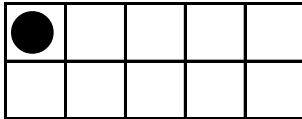
	
$5 + 5 =$	<input type="text" value="10"/>
$5 + 6 =$	<input type="text" value="11"/>

	
$3 + 3 =$	<input type="text" value="6"/>
$3 + 4 =$	<input type="text" value="7"/>

	
$4 + 4 =$	<input type="text" value="8"/>
$4 + 5 =$	<input type="text" value="9"/>

	
$6 + 6 =$	<input type="text" value="12"/>
$6 + 7 =$	<input type="text" value="13"/>

	
$9 + 9 =$	<input type="text" value="18"/>
$9 + 10 =$	<input type="text" value="19"/>

	
$1 + 1 =$	<input type="text" value="2"/>
$1 + 2 =$	<input type="text" value="3"/>

3rd – 8th Grade Doubles Plus 1 – Math Fact Practice – Version 1

Directions: Double the *SMALLER* addend *and add 1* to find each sum (DOUBLES PLUS 1). Use Another sheet of paper to cover the above row after it has been completed. In 5 minutes, complete as many as you can. Good Luck!!!

$$\begin{array}{r} 6 \\ + 7 \\ \hline \end{array} \quad \begin{array}{r} 2 \\ + 3 \\ \hline \end{array} \quad \begin{array}{r} 4 \\ + 3 \\ \hline \end{array} \quad \begin{array}{r} 10 \\ + 9 \\ \hline \end{array} \quad \begin{array}{r} 1 \\ + 2 \\ \hline \end{array} \quad \begin{array}{r} 10 \\ + 11 \\ \hline \end{array} \quad \begin{array}{r} 9 \\ + 8 \\ \hline \end{array} \quad \begin{array}{r} 5 \\ + 6 \\ \hline \end{array} \quad \begin{array}{r} 8 \\ + 7 \\ \hline \end{array} \quad \begin{array}{r} 4 \\ + 5 \\ \hline \end{array}$$

$$\begin{array}{r} 5 \\ + 6 \\ \hline \end{array} \quad \begin{array}{r} 4 \\ + 3 \\ \hline \end{array} \quad \begin{array}{r} 4 \\ + 5 \\ \hline \end{array} \quad \begin{array}{r} 6 \\ + 7 \\ \hline \end{array} \quad \begin{array}{r} 2 \\ + 3 \\ \hline \end{array} \quad \begin{array}{r} 11 \\ + 10 \\ \hline \end{array} \quad \begin{array}{r} 7 \\ + 8 \\ \hline \end{array} \quad \begin{array}{r} 10 \\ + 9 \\ \hline \end{array} \quad \begin{array}{r} 8 \\ + 9 \\ \hline \end{array} \quad \begin{array}{r} 2 \\ + 1 \\ \hline \end{array}$$

$$\begin{array}{r} 9 \\ + 10 \\ \hline \end{array} \quad \begin{array}{r} 1 \\ + 2 \\ \hline \end{array} \quad \begin{array}{r} 4 \\ + 3 \\ \hline \end{array} \quad \begin{array}{r} 8 \\ + 9 \\ \hline \end{array} \quad \begin{array}{r} 8 \\ + 7 \\ \hline \end{array} \quad \begin{array}{r} 4 \\ + 5 \\ \hline \end{array} \quad \begin{array}{r} 3 \\ + 2 \\ \hline \end{array} \quad \begin{array}{r} 6 \\ + 7 \\ \hline \end{array} \quad \begin{array}{r} 11 \\ + 10 \\ \hline \end{array} \quad \begin{array}{r} 6 \\ + 5 \\ \hline \end{array}$$

$$\begin{array}{r} 1 \\ + 2 \\ \hline \end{array} \quad \begin{array}{r} 5 \\ + 4 \\ \hline \end{array} \quad \begin{array}{r} 5 \\ + 6 \\ \hline \end{array} \quad \begin{array}{r} 11 \\ + 10 \\ \hline \end{array} \quad \begin{array}{r} 4 \\ + 3 \\ \hline \end{array} \quad \begin{array}{r} 10 \\ + 9 \\ \hline \end{array} \quad \begin{array}{r} 8 \\ + 9 \\ \hline \end{array} \quad \begin{array}{r} 7 \\ + 6 \\ \hline \end{array} \quad \begin{array}{r} 7 \\ + 8 \\ \hline \end{array} \quad \begin{array}{r} 3 \\ + 2 \\ \hline \end{array}$$

$$\begin{array}{r} 8 \\ + 9 \\ \hline \end{array} \quad \begin{array}{r} 3 \\ + 2 \\ \hline \end{array} \quad \begin{array}{r} 4 \\ + 3 \\ \hline \end{array} \quad \begin{array}{r} 9 \\ + 10 \\ \hline \end{array} \quad \begin{array}{r} 2 \\ + 1 \\ \hline \end{array} \quad \begin{array}{r} 8 \\ + 7 \\ \hline \end{array} \quad \begin{array}{r} 6 \\ + 7 \\ \hline \end{array} \quad \begin{array}{r} 10 \\ + 11 \\ \hline \end{array} \quad \begin{array}{r} 5 \\ + 6 \\ \hline \end{array} \quad \begin{array}{r} 5 \\ + 4 \\ \hline \end{array}$$

$$\begin{array}{r} 6 \\ + 7 \\ \hline \end{array} \quad \begin{array}{r} 4 \\ + 3 \\ \hline \end{array} \quad \begin{array}{r} 5 \\ + 4 \\ \hline \end{array} \quad \begin{array}{r} 9 \\ + 10 \\ \hline \end{array} \quad \begin{array}{r} 6 \\ + 5 \\ \hline \end{array} \quad \begin{array}{r} 2 \\ + 3 \\ \hline \end{array} \quad \begin{array}{r} 9 \\ + 8 \\ \hline \end{array} \quad \begin{array}{r} 7 \\ + 8 \\ \hline \end{array} \quad \begin{array}{r} 11 \\ + 10 \\ \hline \end{array} \quad \begin{array}{r} 2 \\ + 1 \\ \hline \end{array}$$

$$\begin{array}{r} 3 \\ + 2 \\ \hline \end{array} \quad \begin{array}{r} 10 \\ + 11 \\ \hline \end{array} \quad \begin{array}{r} 8 \\ + 9 \\ \hline \end{array} \quad \begin{array}{r} 10 \\ + 9 \\ \hline \end{array} \quad \begin{array}{r} 6 \\ + 5 \\ \hline \end{array} \quad \begin{array}{r} 6 \\ + 7 \\ \hline \end{array} \quad \begin{array}{r} 2 \\ + 1 \\ \hline \end{array} \quad \begin{array}{r} 4 \\ + 3 \\ \hline \end{array} \quad \begin{array}{r} 7 \\ + 8 \\ \hline \end{array} \quad \begin{array}{r} 5 \\ + 4 \\ \hline \end{array}$$

$$\begin{array}{r} 8 \\ + 7 \\ \hline \end{array} \quad \begin{array}{r} 1 \\ + 2 \\ \hline \end{array} \quad \begin{array}{r} 6 \\ + 7 \\ \hline \end{array} \quad \begin{array}{r} 2 \\ + 3 \\ \hline \end{array} \quad \begin{array}{r} 4 \\ + 5 \\ \hline \end{array} \quad \begin{array}{r} 10 \\ + 9 \\ \hline \end{array} \quad \begin{array}{r} 8 \\ + 9 \\ \hline \end{array} \quad \begin{array}{r} 6 \\ + 5 \\ \hline \end{array} \quad \begin{array}{r} 11 \\ + 10 \\ \hline \end{array} \quad \begin{array}{r} 4 \\ + 3 \\ \hline \end{array}$$

$$\begin{array}{r} 3 \\ + 2 \\ \hline \end{array} \quad \begin{array}{r} 7 \\ + 8 \\ \hline \end{array} \quad \begin{array}{r} 10 \\ + 11 \\ \hline \end{array} \quad \begin{array}{r} 3 \\ + 4 \\ \hline \end{array} \quad \begin{array}{r} 2 \\ + 1 \\ \hline \end{array} \quad \begin{array}{r} 5 \\ + 6 \\ \hline \end{array} \quad \begin{array}{r} 5 \\ + 4 \\ \hline \end{array} \quad \begin{array}{r} 10 \\ + 9 \\ \hline \end{array} \quad \begin{array}{r} 8 \\ + 9 \\ \hline \end{array} \quad \begin{array}{r} 6 \\ + 7 \\ \hline \end{array}$$

$$\begin{array}{r} 2 \\ + 1 \\ \hline \end{array} \quad \begin{array}{r} 4 \\ + 5 \\ \hline \end{array} \quad \begin{array}{r} 7 \\ + 6 \\ \hline \end{array} \quad \begin{array}{r} 8 \\ + 9 \\ \hline \end{array} \quad \begin{array}{r} 3 \\ + 2 \\ \hline \end{array} \quad \begin{array}{r} 10 \\ + 11 \\ \hline \end{array} \quad \begin{array}{r} 4 \\ + 3 \\ \hline \end{array} \quad \begin{array}{r} 9 \\ + 10 \\ \hline \end{array} \quad \begin{array}{r} 7 \\ + 8 \\ \hline \end{array} \quad \begin{array}{r} 6 \\ + 5 \\ \hline \end{array}$$

3rd – 8th Grade Doubles Plus 1 – Math Fact Practice – Version 1

Directions: Double the *SMALLER* addend *and add 1* to find each sum (DOUBLES PLUS 1). Use Another sheet of paper to cover the above row after it has been completed. In 5 minutes, complete as many as you can. Good Luck!!!

$$\begin{array}{r} 6 \\ + 7 \\ \hline 13 \end{array} \quad \begin{array}{r} 2 \\ + 3 \\ \hline 5 \end{array} \quad \begin{array}{r} 4 \\ + 3 \\ \hline 7 \end{array} \quad \begin{array}{r} 10 \\ + 9 \\ \hline 19 \end{array} \quad \begin{array}{r} 1 \\ + 2 \\ \hline 3 \end{array} \quad \begin{array}{r} 10 \\ + 11 \\ \hline 21 \end{array} \quad \begin{array}{r} 9 \\ + 8 \\ \hline 17 \end{array} \quad \begin{array}{r} 5 \\ + 6 \\ \hline 11 \end{array} \quad \begin{array}{r} 8 \\ + 7 \\ \hline 15 \end{array} \quad \begin{array}{r} 4 \\ + 5 \\ \hline 9 \end{array}$$

$$\begin{array}{r} 5 \\ + 6 \\ \hline 11 \end{array} \quad \begin{array}{r} 4 \\ + 3 \\ \hline 7 \end{array} \quad \begin{array}{r} 4 \\ + 5 \\ \hline 9 \end{array} \quad \begin{array}{r} 6 \\ + 7 \\ \hline 13 \end{array} \quad \begin{array}{r} 2 \\ + 3 \\ \hline 5 \end{array} \quad \begin{array}{r} 11 \\ + 10 \\ \hline 21 \end{array} \quad \begin{array}{r} 7 \\ + 8 \\ \hline 15 \end{array} \quad \begin{array}{r} 10 \\ + 9 \\ \hline 19 \end{array} \quad \begin{array}{r} 8 \\ + 9 \\ \hline 17 \end{array} \quad \begin{array}{r} 2 \\ + 1 \\ \hline 3 \end{array}$$

$$\begin{array}{r} 9 \\ + 10 \\ \hline 19 \end{array} \quad \begin{array}{r} 1 \\ + 2 \\ \hline 3 \end{array} \quad \begin{array}{r} 4 \\ + 3 \\ \hline 7 \end{array} \quad \begin{array}{r} 8 \\ + 9 \\ \hline 17 \end{array} \quad \begin{array}{r} 8 \\ + 7 \\ \hline 15 \end{array} \quad \begin{array}{r} 4 \\ + 5 \\ \hline 9 \end{array} \quad \begin{array}{r} 3 \\ + 2 \\ \hline 5 \end{array} \quad \begin{array}{r} 6 \\ + 7 \\ \hline 13 \end{array} \quad \begin{array}{r} 11 \\ + 10 \\ \hline 21 \end{array} \quad \begin{array}{r} 6 \\ + 5 \\ \hline 11 \end{array}$$

$$\begin{array}{r} 1 \\ + 2 \\ \hline 3 \end{array} \quad \begin{array}{r} 5 \\ + 4 \\ \hline 9 \end{array} \quad \begin{array}{r} 5 \\ + 6 \\ \hline 11 \end{array} \quad \begin{array}{r} 11 \\ + 10 \\ \hline 21 \end{array} \quad \begin{array}{r} 4 \\ + 3 \\ \hline 7 \end{array} \quad \begin{array}{r} 10 \\ + 9 \\ \hline 19 \end{array} \quad \begin{array}{r} 8 \\ + 9 \\ \hline 17 \end{array} \quad \begin{array}{r} 7 \\ + 6 \\ \hline 13 \end{array} \quad \begin{array}{r} 7 \\ + 8 \\ \hline 15 \end{array} \quad \begin{array}{r} 3 \\ + 2 \\ \hline 5 \end{array}$$

$$\begin{array}{r} 8 \\ + 9 \\ \hline 17 \end{array} \quad \begin{array}{r} 3 \\ + 2 \\ \hline 5 \end{array} \quad \begin{array}{r} 4 \\ + 3 \\ \hline 7 \end{array} \quad \begin{array}{r} 9 \\ + 10 \\ \hline 19 \end{array} \quad \begin{array}{r} 2 \\ + 1 \\ \hline 3 \end{array} \quad \begin{array}{r} 8 \\ + 7 \\ \hline 15 \end{array} \quad \begin{array}{r} 6 \\ + 7 \\ \hline 13 \end{array} \quad \begin{array}{r} 10 \\ + 11 \\ \hline 21 \end{array} \quad \begin{array}{r} 5 \\ + 6 \\ \hline 11 \end{array} \quad \begin{array}{r} 5 \\ + 4 \\ \hline 9 \end{array}$$

$$\begin{array}{r} 6 \\ + 7 \\ \hline 13 \end{array} \quad \begin{array}{r} 4 \\ + 3 \\ \hline 7 \end{array} \quad \begin{array}{r} 5 \\ + 4 \\ \hline 9 \end{array} \quad \begin{array}{r} 9 \\ + 10 \\ \hline 19 \end{array} \quad \begin{array}{r} 6 \\ + 5 \\ \hline 11 \end{array} \quad \begin{array}{r} 2 \\ + 3 \\ \hline 5 \end{array} \quad \begin{array}{r} 9 \\ + 8 \\ \hline 17 \end{array} \quad \begin{array}{r} 7 \\ + 8 \\ \hline 15 \end{array} \quad \begin{array}{r} 11 \\ + 10 \\ \hline 21 \end{array} \quad \begin{array}{r} 2 \\ + 1 \\ \hline 3 \end{array}$$

$$\begin{array}{r} 3 \\ + 2 \\ \hline 5 \end{array} \quad \begin{array}{r} 10 \\ + 11 \\ \hline 21 \end{array} \quad \begin{array}{r} 8 \\ + 9 \\ \hline 17 \end{array} \quad \begin{array}{r} 10 \\ + 9 \\ \hline 19 \end{array} \quad \begin{array}{r} 6 \\ + 5 \\ \hline 11 \end{array} \quad \begin{array}{r} 6 \\ + 7 \\ \hline 13 \end{array} \quad \begin{array}{r} 2 \\ + 1 \\ \hline 3 \end{array} \quad \begin{array}{r} 4 \\ + 3 \\ \hline 7 \end{array} \quad \begin{array}{r} 7 \\ + 8 \\ \hline 15 \end{array} \quad \begin{array}{r} 5 \\ + 4 \\ \hline 9 \end{array}$$

$$\begin{array}{r} 8 \\ + 7 \\ \hline 15 \end{array} \quad \begin{array}{r} 1 \\ + 2 \\ \hline 3 \end{array} \quad \begin{array}{r} 6 \\ + 7 \\ \hline 13 \end{array} \quad \begin{array}{r} 2 \\ + 3 \\ \hline 5 \end{array} \quad \begin{array}{r} 4 \\ + 5 \\ \hline 9 \end{array} \quad \begin{array}{r} 10 \\ + 9 \\ \hline 19 \end{array} \quad \begin{array}{r} 8 \\ + 9 \\ \hline 17 \end{array} \quad \begin{array}{r} 6 \\ + 5 \\ \hline 11 \end{array} \quad \begin{array}{r} 11 \\ + 10 \\ \hline 21 \end{array} \quad \begin{array}{r} 4 \\ + 3 \\ \hline 7 \end{array}$$

$$\begin{array}{r} 3 \\ + 2 \\ \hline 5 \end{array} \quad \begin{array}{r} 7 \\ + 8 \\ \hline 15 \end{array} \quad \begin{array}{r} 10 \\ + 11 \\ \hline 21 \end{array} \quad \begin{array}{r} 3 \\ + 4 \\ \hline 7 \end{array} \quad \begin{array}{r} 2 \\ + 1 \\ \hline 3 \end{array} \quad \begin{array}{r} 5 \\ + 6 \\ \hline 11 \end{array} \quad \begin{array}{r} 5 \\ + 4 \\ \hline 9 \end{array} \quad \begin{array}{r} 10 \\ + 9 \\ \hline 19 \end{array} \quad \begin{array}{r} 8 \\ + 9 \\ \hline 17 \end{array} \quad \begin{array}{r} 6 \\ + 7 \\ \hline 13 \end{array}$$

$$\begin{array}{r} 2 \\ + 1 \\ \hline 3 \end{array} \quad \begin{array}{r} 4 \\ + 5 \\ \hline 9 \end{array} \quad \begin{array}{r} 7 \\ + 6 \\ \hline 13 \end{array} \quad \begin{array}{r} 8 \\ + 9 \\ \hline 17 \end{array} \quad \begin{array}{r} 3 \\ + 2 \\ \hline 5 \end{array} \quad \begin{array}{r} 10 \\ + 11 \\ \hline 21 \end{array} \quad \begin{array}{r} 4 \\ + 3 \\ \hline 7 \end{array} \quad \begin{array}{r} 9 \\ + 10 \\ \hline 19 \end{array} \quad \begin{array}{r} 7 \\ + 8 \\ \hline 15 \end{array} \quad \begin{array}{r} 6 \\ + 5 \\ \hline 11 \end{array}$$



3rd – 8th Grade Doubles Plus 1 – Math Fact Practice – Version 2

Directions: Double the *SMALLER* addend *and add 1* to find each sum (DOUBLES PLUS 1). Use Another sheet of paper to cover the above row after it has been completed. In 5 minutes, complete as many as you can. Good Luck!!!

$$\begin{array}{r} 2 \\ + 1 \\ \hline \end{array} \quad \begin{array}{r} 4 \\ + 5 \\ \hline \end{array} \quad \begin{array}{r} 7 \\ + 6 \\ \hline \end{array} \quad \begin{array}{r} 8 \\ + 9 \\ \hline \end{array} \quad \begin{array}{r} 3 \\ + 2 \\ \hline \end{array} \quad \begin{array}{r} 10 \\ + 11 \\ \hline \end{array} \quad \begin{array}{r} 4 \\ + 3 \\ \hline \end{array} \quad \begin{array}{r} 9 \\ + 10 \\ \hline \end{array} \quad \begin{array}{r} 7 \\ + 8 \\ \hline \end{array} \quad \begin{array}{r} 6 \\ + 5 \\ \hline \end{array}$$

$$\begin{array}{r} 3 \\ + 2 \\ \hline \end{array} \quad \begin{array}{r} 7 \\ + 8 \\ \hline \end{array} \quad \begin{array}{r} 10 \\ + 11 \\ \hline \end{array} \quad \begin{array}{r} 3 \\ + 4 \\ \hline \end{array} \quad \begin{array}{r} 2 \\ + 1 \\ \hline \end{array} \quad \begin{array}{r} 5 \\ + 6 \\ \hline \end{array} \quad \begin{array}{r} 5 \\ + 4 \\ \hline \end{array} \quad \begin{array}{r} 10 \\ + 9 \\ \hline \end{array} \quad \begin{array}{r} 8 \\ + 9 \\ \hline \end{array} \quad \begin{array}{r} 6 \\ + 7 \\ \hline \end{array}$$

$$\begin{array}{r} 8 \\ + 7 \\ \hline \end{array} \quad \begin{array}{r} 1 \\ + 2 \\ \hline \end{array} \quad \begin{array}{r} 6 \\ + 7 \\ \hline \end{array} \quad \begin{array}{r} 2 \\ + 3 \\ \hline \end{array} \quad \begin{array}{r} 4 \\ + 5 \\ \hline \end{array} \quad \begin{array}{r} 10 \\ + 9 \\ \hline \end{array} \quad \begin{array}{r} 8 \\ + 9 \\ \hline \end{array} \quad \begin{array}{r} 6 \\ + 5 \\ \hline \end{array} \quad \begin{array}{r} 11 \\ + 10 \\ \hline \end{array} \quad \begin{array}{r} 4 \\ + 3 \\ \hline \end{array}$$

$$\begin{array}{r} 3 \\ + 2 \\ \hline \end{array} \quad \begin{array}{r} 10 \\ + 11 \\ \hline \end{array} \quad \begin{array}{r} 8 \\ + 9 \\ \hline \end{array} \quad \begin{array}{r} 10 \\ + 9 \\ \hline \end{array} \quad \begin{array}{r} 6 \\ + 5 \\ \hline \end{array} \quad \begin{array}{r} 6 \\ + 7 \\ \hline \end{array} \quad \begin{array}{r} 2 \\ + 1 \\ \hline \end{array} \quad \begin{array}{r} 4 \\ + 3 \\ \hline \end{array} \quad \begin{array}{r} 7 \\ + 8 \\ \hline \end{array} \quad \begin{array}{r} 5 \\ + 4 \\ \hline \end{array}$$

$$\begin{array}{r} 6 \\ + 7 \\ \hline \end{array} \quad \begin{array}{r} 4 \\ + 3 \\ \hline \end{array} \quad \begin{array}{r} 5 \\ + 4 \\ \hline \end{array} \quad \begin{array}{r} 9 \\ + 10 \\ \hline \end{array} \quad \begin{array}{r} 6 \\ + 5 \\ \hline \end{array} \quad \begin{array}{r} 2 \\ + 3 \\ \hline \end{array} \quad \begin{array}{r} 9 \\ + 8 \\ \hline \end{array} \quad \begin{array}{r} 7 \\ + 8 \\ \hline \end{array} \quad \begin{array}{r} 11 \\ + 10 \\ \hline \end{array} \quad \begin{array}{r} 2 \\ + 1 \\ \hline \end{array}$$

$$\begin{array}{r} 8 \\ + 9 \\ \hline \end{array} \quad \begin{array}{r} 3 \\ + 2 \\ \hline \end{array} \quad \begin{array}{r} 4 \\ + 3 \\ \hline \end{array} \quad \begin{array}{r} 9 \\ + 10 \\ \hline \end{array} \quad \begin{array}{r} 2 \\ + 1 \\ \hline \end{array} \quad \begin{array}{r} 8 \\ + 7 \\ \hline \end{array} \quad \begin{array}{r} 6 \\ + 7 \\ \hline \end{array} \quad \begin{array}{r} 10 \\ + 11 \\ \hline \end{array} \quad \begin{array}{r} 5 \\ + 6 \\ \hline \end{array} \quad \begin{array}{r} 5 \\ + 4 \\ \hline \end{array}$$

$$\begin{array}{r} 1 \\ + 2 \\ \hline \end{array} \quad \begin{array}{r} 5 \\ + 4 \\ \hline \end{array} \quad \begin{array}{r} 5 \\ + 6 \\ \hline \end{array} \quad \begin{array}{r} 11 \\ + 10 \\ \hline \end{array} \quad \begin{array}{r} 4 \\ + 3 \\ \hline \end{array} \quad \begin{array}{r} 10 \\ + 9 \\ \hline \end{array} \quad \begin{array}{r} 8 \\ + 9 \\ \hline \end{array} \quad \begin{array}{r} 7 \\ + 6 \\ \hline \end{array} \quad \begin{array}{r} 7 \\ + 8 \\ \hline \end{array} \quad \begin{array}{r} 3 \\ + 2 \\ \hline \end{array}$$

$$\begin{array}{r} 9 \\ + 10 \\ \hline \end{array} \quad \begin{array}{r} 1 \\ + 2 \\ \hline \end{array} \quad \begin{array}{r} 4 \\ + 3 \\ \hline \end{array} \quad \begin{array}{r} 8 \\ + 9 \\ \hline \end{array} \quad \begin{array}{r} 8 \\ + 7 \\ \hline \end{array} \quad \begin{array}{r} 4 \\ + 5 \\ \hline \end{array} \quad \begin{array}{r} 3 \\ + 2 \\ \hline \end{array} \quad \begin{array}{r} 6 \\ + 7 \\ \hline \end{array} \quad \begin{array}{r} 11 \\ + 10 \\ \hline \end{array} \quad \begin{array}{r} 6 \\ + 5 \\ \hline \end{array}$$

$$\begin{array}{r} 5 \\ + 6 \\ \hline \end{array} \quad \begin{array}{r} 4 \\ + 3 \\ \hline \end{array} \quad \begin{array}{r} 4 \\ + 5 \\ \hline \end{array} \quad \begin{array}{r} 6 \\ + 7 \\ \hline \end{array} \quad \begin{array}{r} 2 \\ + 3 \\ \hline \end{array} \quad \begin{array}{r} 11 \\ + 10 \\ \hline \end{array} \quad \begin{array}{r} 7 \\ + 8 \\ \hline \end{array} \quad \begin{array}{r} 10 \\ + 9 \\ \hline \end{array} \quad \begin{array}{r} 8 \\ + 9 \\ \hline \end{array} \quad \begin{array}{r} 2 \\ + 1 \\ \hline \end{array}$$

$$\begin{array}{r} 6 \\ + 7 \\ \hline \end{array} \quad \begin{array}{r} 2 \\ + 3 \\ \hline \end{array} \quad \begin{array}{r} 4 \\ + 3 \\ \hline \end{array} \quad \begin{array}{r} 10 \\ + 9 \\ \hline \end{array} \quad \begin{array}{r} 1 \\ + 2 \\ \hline \end{array} \quad \begin{array}{r} 10 \\ + 11 \\ \hline \end{array} \quad \begin{array}{r} 9 \\ + 8 \\ \hline \end{array} \quad \begin{array}{r} 5 \\ + 6 \\ \hline \end{array} \quad \begin{array}{r} 8 \\ + 7 \\ \hline \end{array} \quad \begin{array}{r} 4 \\ + 5 \\ \hline \end{array}$$

3rd – 8th Grade Doubles Plus 1 – Math Fact Practice – Version 2

Directions: Double the *SMALLER* addend *and add 1* to find each sum (DOUBLES PLUS 1). Use Another sheet of paper to cover the above row after it has been completed. In 5 minutes, complete as many as you can. Good Luck!!!

$$\begin{array}{r} 2 \\ + 1 \\ \hline 3 \end{array} \quad \begin{array}{r} 4 \\ + 5 \\ \hline 9 \end{array} \quad \begin{array}{r} 7 \\ + 6 \\ \hline 13 \end{array} \quad \begin{array}{r} 8 \\ + 9 \\ \hline 17 \end{array} \quad \begin{array}{r} 3 \\ + 2 \\ \hline 5 \end{array} \quad \begin{array}{r} 10 \\ + 11 \\ \hline 21 \end{array} \quad \begin{array}{r} 4 \\ + 3 \\ \hline 7 \end{array} \quad \begin{array}{r} 9 \\ + 10 \\ \hline 19 \end{array} \quad \begin{array}{r} 7 \\ + 8 \\ \hline 15 \end{array} \quad \begin{array}{r} 6 \\ + 5 \\ \hline 11 \end{array}$$

$$\begin{array}{r} 3 \\ + 2 \\ \hline 5 \end{array} \quad \begin{array}{r} 7 \\ + 8 \\ \hline 15 \end{array} \quad \begin{array}{r} 10 \\ + 11 \\ \hline 21 \end{array} \quad \begin{array}{r} 3 \\ + 4 \\ \hline 7 \end{array} \quad \begin{array}{r} 2 \\ + 1 \\ \hline 3 \end{array} \quad \begin{array}{r} 5 \\ + 6 \\ \hline 11 \end{array} \quad \begin{array}{r} 5 \\ + 4 \\ \hline 9 \end{array} \quad \begin{array}{r} 10 \\ + 9 \\ \hline 19 \end{array} \quad \begin{array}{r} 8 \\ + 9 \\ \hline 17 \end{array} \quad \begin{array}{r} 6 \\ + 7 \\ \hline 13 \end{array}$$

$$\begin{array}{r} 8 \\ + 7 \\ \hline 15 \end{array} \quad \begin{array}{r} 1 \\ + 2 \\ \hline 3 \end{array} \quad \begin{array}{r} 6 \\ + 7 \\ \hline 13 \end{array} \quad \begin{array}{r} 2 \\ + 3 \\ \hline 5 \end{array} \quad \begin{array}{r} 4 \\ + 5 \\ \hline 9 \end{array} \quad \begin{array}{r} 10 \\ + 9 \\ \hline 19 \end{array} \quad \begin{array}{r} 8 \\ + 9 \\ \hline 17 \end{array} \quad \begin{array}{r} 6 \\ + 5 \\ \hline 11 \end{array} \quad \begin{array}{r} 11 \\ + 10 \\ \hline 21 \end{array} \quad \begin{array}{r} 4 \\ + 3 \\ \hline 7 \end{array}$$

$$\begin{array}{r} 3 \\ + 2 \\ \hline 5 \end{array} \quad \begin{array}{r} 10 \\ + 11 \\ \hline 21 \end{array} \quad \begin{array}{r} 8 \\ + 9 \\ \hline 17 \end{array} \quad \begin{array}{r} 10 \\ + 9 \\ \hline 19 \end{array} \quad \begin{array}{r} 6 \\ + 5 \\ \hline 11 \end{array} \quad \begin{array}{r} 6 \\ + 7 \\ \hline 13 \end{array} \quad \begin{array}{r} 2 \\ + 1 \\ \hline 3 \end{array} \quad \begin{array}{r} 4 \\ + 3 \\ \hline 7 \end{array} \quad \begin{array}{r} 7 \\ + 8 \\ \hline 15 \end{array} \quad \begin{array}{r} 5 \\ + 4 \\ \hline 9 \end{array}$$

$$\begin{array}{r} 6 \\ + 7 \\ \hline 13 \end{array} \quad \begin{array}{r} 4 \\ + 3 \\ \hline 7 \end{array} \quad \begin{array}{r} 5 \\ + 4 \\ \hline 9 \end{array} \quad \begin{array}{r} 9 \\ + 10 \\ \hline 19 \end{array} \quad \begin{array}{r} 6 \\ + 5 \\ \hline 11 \end{array} \quad \begin{array}{r} 2 \\ + 3 \\ \hline 5 \end{array} \quad \begin{array}{r} 9 \\ + 8 \\ \hline 17 \end{array} \quad \begin{array}{r} 7 \\ + 8 \\ \hline 15 \end{array} \quad \begin{array}{r} 11 \\ + 10 \\ \hline 21 \end{array} \quad \begin{array}{r} 2 \\ + 1 \\ \hline 3 \end{array}$$

$$\begin{array}{r} 8 \\ + 9 \\ \hline 17 \end{array} \quad \begin{array}{r} 3 \\ + 2 \\ \hline 5 \end{array} \quad \begin{array}{r} 4 \\ + 3 \\ \hline 7 \end{array} \quad \begin{array}{r} 9 \\ + 10 \\ \hline 19 \end{array} \quad \begin{array}{r} 2 \\ + 1 \\ \hline 3 \end{array} \quad \begin{array}{r} 8 \\ + 7 \\ \hline 15 \end{array} \quad \begin{array}{r} 6 \\ + 7 \\ \hline 13 \end{array} \quad \begin{array}{r} 10 \\ + 11 \\ \hline 21 \end{array} \quad \begin{array}{r} 5 \\ + 6 \\ \hline 11 \end{array} \quad \begin{array}{r} 5 \\ + 4 \\ \hline 9 \end{array}$$

$$\begin{array}{r} 1 \\ + 2 \\ \hline 3 \end{array} \quad \begin{array}{r} 5 \\ + 4 \\ \hline 9 \end{array} \quad \begin{array}{r} 5 \\ + 6 \\ \hline 11 \end{array} \quad \begin{array}{r} 11 \\ + 10 \\ \hline 21 \end{array} \quad \begin{array}{r} 4 \\ + 3 \\ \hline 7 \end{array} \quad \begin{array}{r} 10 \\ + 9 \\ \hline 19 \end{array} \quad \begin{array}{r} 8 \\ + 9 \\ \hline 17 \end{array} \quad \begin{array}{r} 7 \\ + 6 \\ \hline 13 \end{array} \quad \begin{array}{r} 7 \\ + 8 \\ \hline 15 \end{array} \quad \begin{array}{r} 3 \\ + 2 \\ \hline 5 \end{array}$$

$$\begin{array}{r} 9 \\ + 10 \\ \hline 19 \end{array} \quad \begin{array}{r} 1 \\ + 2 \\ \hline 3 \end{array} \quad \begin{array}{r} 4 \\ + 3 \\ \hline 7 \end{array} \quad \begin{array}{r} 8 \\ + 9 \\ \hline 17 \end{array} \quad \begin{array}{r} 8 \\ + 7 \\ \hline 15 \end{array} \quad \begin{array}{r} 4 \\ + 5 \\ \hline 9 \end{array} \quad \begin{array}{r} 3 \\ + 2 \\ \hline 5 \end{array} \quad \begin{array}{r} 6 \\ + 7 \\ \hline 13 \end{array} \quad \begin{array}{r} 11 \\ + 10 \\ \hline 21 \end{array} \quad \begin{array}{r} 6 \\ + 5 \\ \hline 11 \end{array}$$

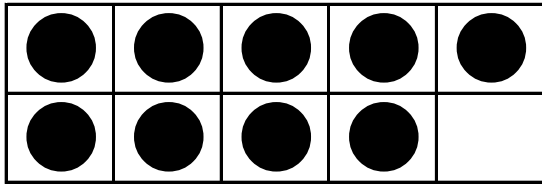
$$\begin{array}{r} 5 \\ + 6 \\ \hline 11 \end{array} \quad \begin{array}{r} 4 \\ + 3 \\ \hline 7 \end{array} \quad \begin{array}{r} 4 \\ + 5 \\ \hline 9 \end{array} \quad \begin{array}{r} 6 \\ + 7 \\ \hline 13 \end{array} \quad \begin{array}{r} 2 \\ + 3 \\ \hline 5 \end{array} \quad \begin{array}{r} 11 \\ + 10 \\ \hline 21 \end{array} \quad \begin{array}{r} 7 \\ + 8 \\ \hline 15 \end{array} \quad \begin{array}{r} 10 \\ + 9 \\ \hline 19 \end{array} \quad \begin{array}{r} 8 \\ + 9 \\ \hline 17 \end{array} \quad \begin{array}{r} 2 \\ + 1 \\ \hline 3 \end{array}$$

$$\begin{array}{r} 6 \\ + 7 \\ \hline 13 \end{array} \quad \begin{array}{r} 2 \\ + 3 \\ \hline 5 \end{array} \quad \begin{array}{r} 4 \\ + 3 \\ \hline 7 \end{array} \quad \begin{array}{r} 10 \\ + 9 \\ \hline 19 \end{array} \quad \begin{array}{r} 1 \\ + 2 \\ \hline 3 \end{array} \quad \begin{array}{r} 10 \\ + 11 \\ \hline 21 \end{array} \quad \begin{array}{r} 9 \\ + 8 \\ \hline 17 \end{array} \quad \begin{array}{r} 5 \\ + 6 \\ \hline 11 \end{array} \quad \begin{array}{r} 8 \\ + 7 \\ \hline 15 \end{array} \quad \begin{array}{r} 4 \\ + 5 \\ \hline 9 \end{array}$$

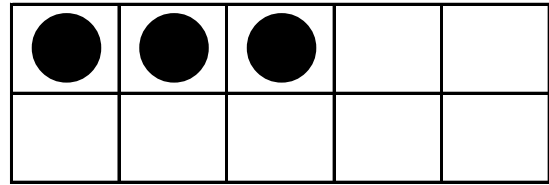


Making 10

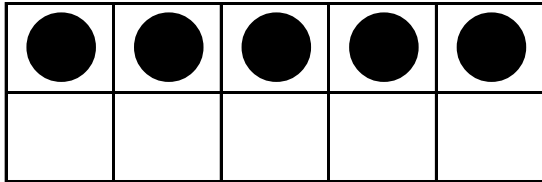
Directions: Calculate the number of dots needed to "Make 10" or sum to 10.



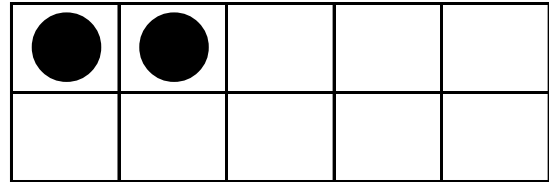
$$\underline{9} + \underline{\quad} = 10$$



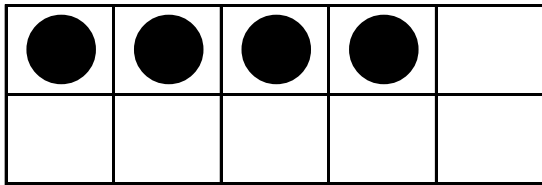
$$\underline{3} + \underline{\quad} = 10$$



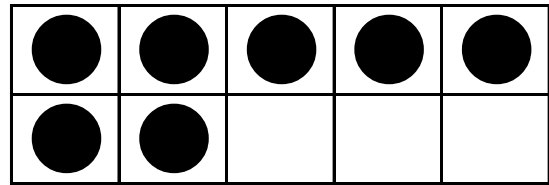
$$\underline{5} + \underline{\quad} = 10$$



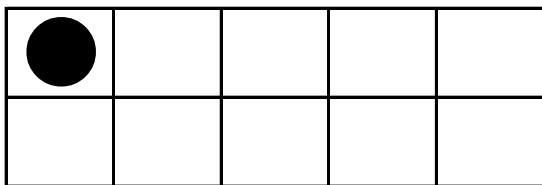
$$\underline{2} + \underline{\quad} = 10$$



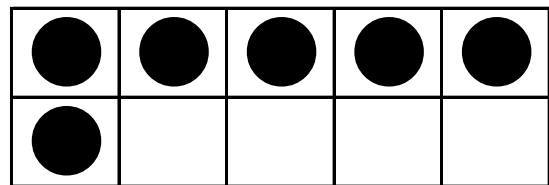
$$\underline{4} + \underline{\quad} = 10$$



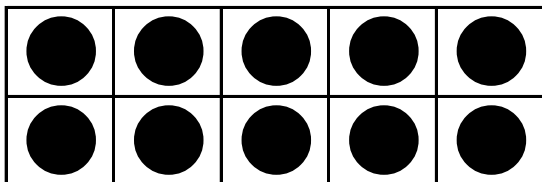
$$\underline{7} + \underline{\quad} = 10$$



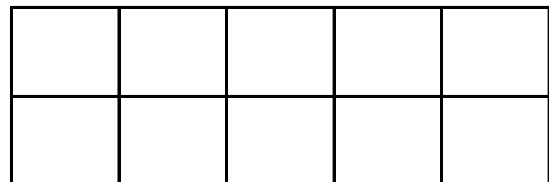
$$\underline{1} + \underline{\quad} = 10$$



$$\underline{6} + \underline{\quad} = 10$$



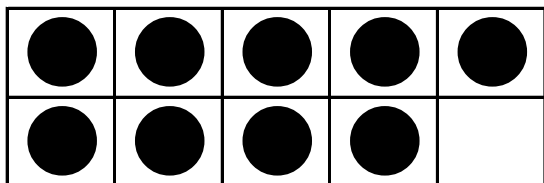
$$\underline{10} + \underline{\quad} = 10$$



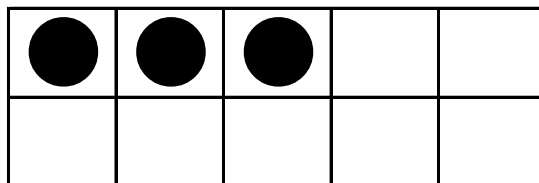
$$\underline{0} + \underline{\quad} = 10$$

Making 10

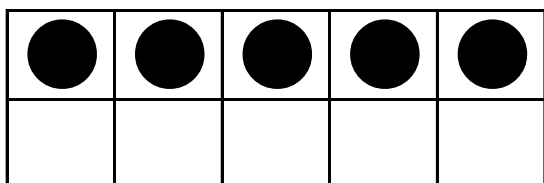
Directions: Calculate the number of dots needed to "Make 10" or sum to 10.



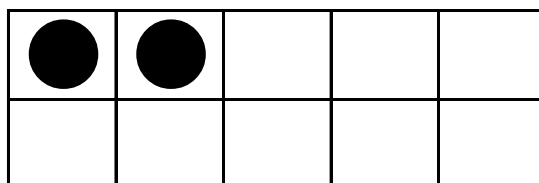
$$\underline{9} + \underline{1} = 10$$



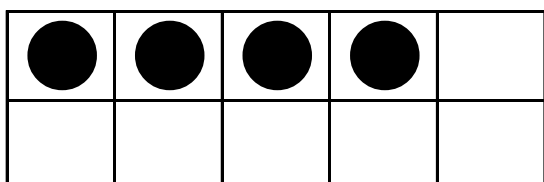
$$\underline{3} + \underline{7} = 10$$



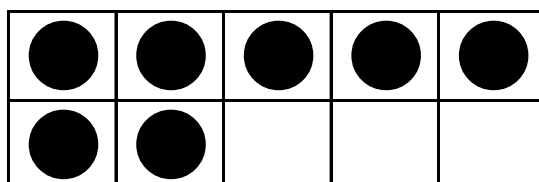
$$\underline{5} + \underline{5} = 10$$



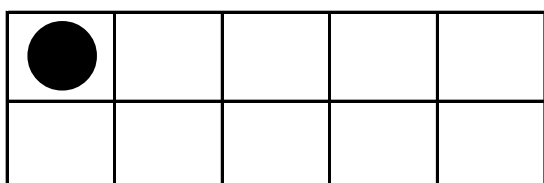
$$\underline{2} + \underline{8} = 10$$



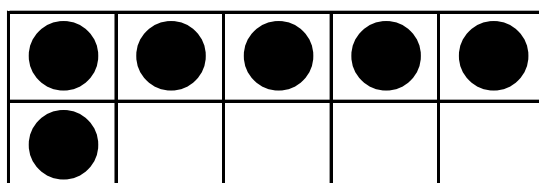
$$\underline{4} + \underline{6} = 10$$



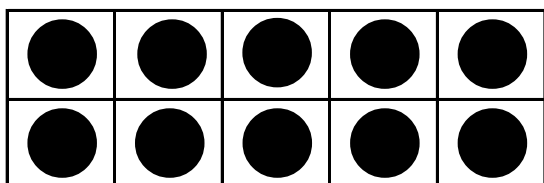
$$\underline{7} + \underline{3} = 10$$



$$\underline{1} + \underline{9} = 10$$



$$\underline{6} + \underline{4} = 10$$



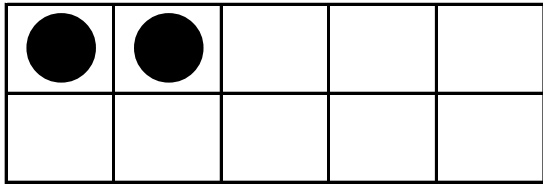
$$\underline{10} + \underline{0} = 10$$



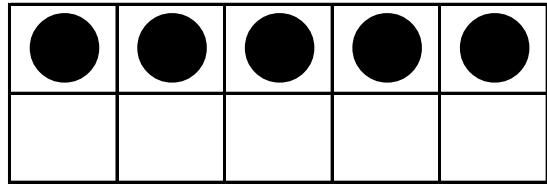
$$\underline{0} + \underline{10} = 10$$

Making 10

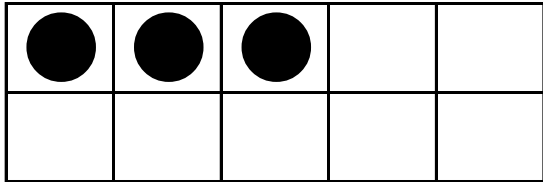
Directions: Calculate the number of dots needed to "Make 10" or sum to 10.



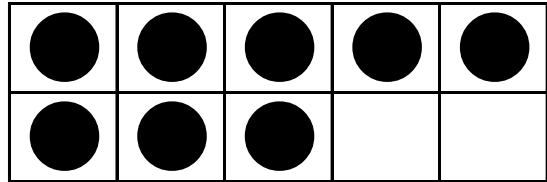
$$\underline{2} + \underline{\quad} = 10$$



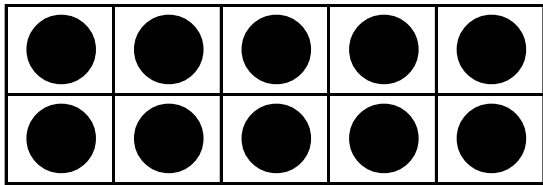
$$\underline{5} + \underline{\quad} = 10$$



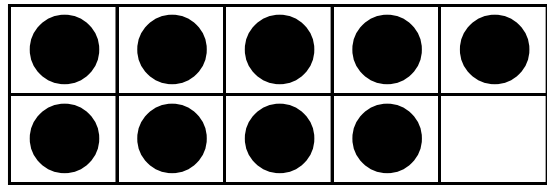
$$\underline{3} + \underline{\quad} = 10$$



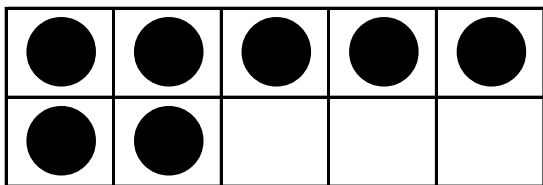
$$\underline{8} + \underline{\quad} = 10$$



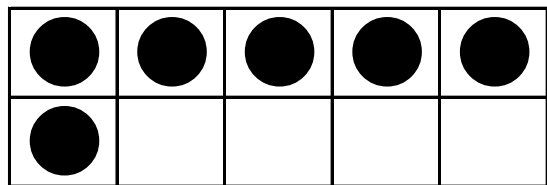
$$\underline{10} + \underline{\quad} = 10$$



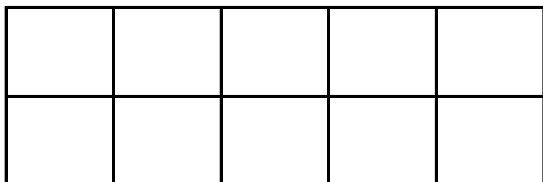
$$\underline{9} + \underline{\quad} = 10$$



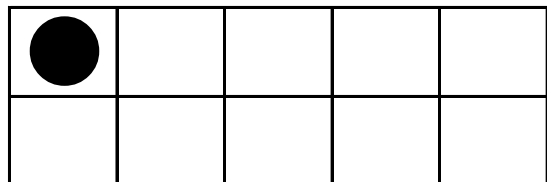
$$\underline{7} + \underline{\quad} = 10$$



$$\underline{6} + \underline{\quad} = 10$$



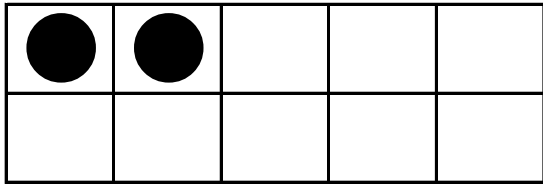
$$\underline{0} + \underline{\quad} = 10$$



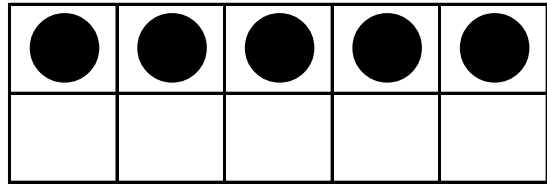
$$\underline{1} + \underline{\quad} = 10$$

Making 10

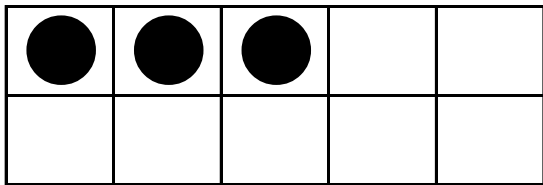
Directions: Calculate the number of dots needed to "Make 10" or sum to 10.



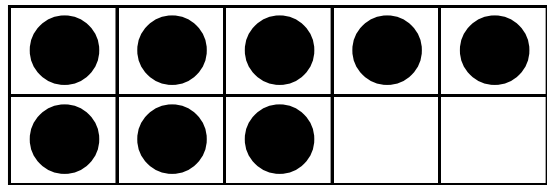
$$\underline{2} + \underline{8} = 10$$



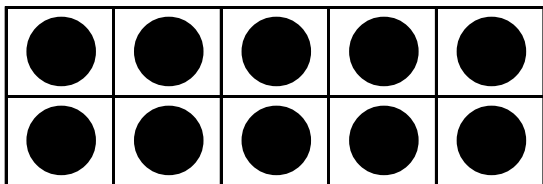
$$\underline{5} + \underline{5} = 10$$



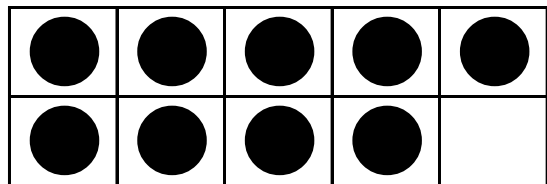
$$\underline{3} + \underline{7} = 10$$



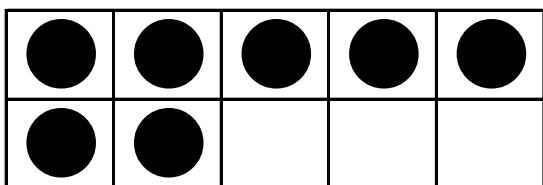
$$\underline{8} + \underline{2} = 10$$



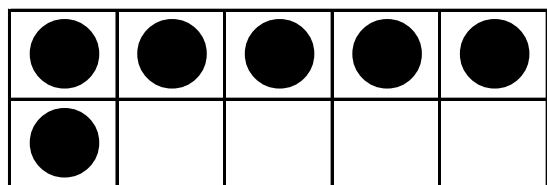
$$\underline{10} + \underline{0} = 10$$



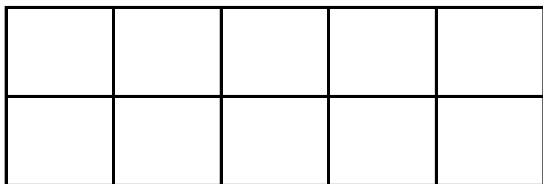
$$\underline{9} + \underline{1} = 10$$



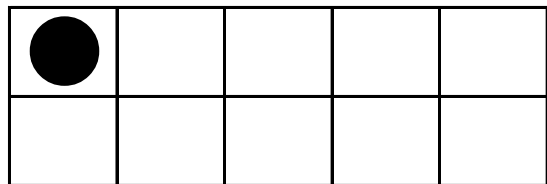
$$\underline{7} + \underline{3} = 10$$



$$\underline{6} + \underline{4} = 10$$



$$\underline{0} + \underline{10} = 10$$



$$\underline{1} + \underline{9} = 10$$

Making 10 – Level 1

Making 10 Directions: Fill in each box so the two numbers SUM to a total of 10.

1.) $3 + \boxed{7} = 10$

2.) $\boxed{9} + 1 = 10$

3.) $2 + \boxed{} = 10$

4.) $5 + \boxed{} = 10$

5.) $10 + \boxed{} = 10$

6.) $7 + \boxed{} = 10$

7.) $\boxed{} + 9 = 10$

8.) $\boxed{} + 6 = 10$

9.) $2 + \boxed{} = 10$

10.) $10 + \boxed{} = 10$

11.) $7 + \boxed{} = 10$

12.) $\boxed{} + 9 = 10$

13.) $\boxed{} + 2 = 10$

14.) $\boxed{} + 6 = 10$

15.) $5 + \boxed{} = 10$

16.) $3 + \boxed{} = 10$

17.) $2 + \boxed{} = 10$

18.) $\boxed{} + 9 = 10$

Making 10 – Level 1

Making 10 Directions: Fill in each box so the two numbers SUM to a total of 10.

1.) $3 + \boxed{7} = 10$

2.) $\boxed{9} + 1 = 10$

3.) $2 + \boxed{8} = 10$

4.) $5 + \boxed{5} = 10$

5.) $10 + \boxed{0} = 10$

6.) $7 + \boxed{3} = 10$

7.) $\boxed{1} + 9 = 10$

8.) $\boxed{4} + 6 = 10$

9.) $2 + \boxed{8} = 10$

10.) $10 + \boxed{0} = 10$

11.) $7 + \boxed{3} = 10$

12.) $\boxed{1} + 9 = 10$

13.) $\boxed{8} + 2 = 10$

14.) $\boxed{4} + 6 = 10$

15.) ★ $5 + \boxed{5} = 10$

16.) $3 + \boxed{7} = 10$

17.) $2 + \boxed{8} = 10$

18.) $\boxed{1} + 9 = 10$

Making 10 – Level 1

Making 10 Directions: Fill in each box so the two numbers SUM to a total of 10.

1.) $6 + \boxed{4} = 10$

2.) $\boxed{1} + 9 = 10$

3.) $4 + \boxed{} = 10$

4.) $8 + \boxed{} = 10$

5.) $10 + \boxed{} = 10$

6.) $6 + \boxed{} = 10$

7.) $\boxed{} + 5 = 10$

8.) $\boxed{} + 7 = 10$

9.) $8 + \boxed{} = 10$

10.) $10 + \boxed{} = 10$

11.) $7 + \boxed{} = 10$

12.) $\boxed{} + 1 = 10$

13.) $\boxed{} + 8 = 10$

14.) $\boxed{} + 4 = 10$

15.) $5 + \boxed{} = 10$

16.) $7 + \boxed{} = 10$

17.) $8 + \boxed{} = 10$

18.) $\boxed{} + 6 = 10$

Making 10 – Level 1

Making 10 Directions: Fill in each box so the two numbers SUM to a total of 10.

1.) $6 + \boxed{4} = 10$

2.) $\boxed{1} + 9 = 10$

3.) $4 + \boxed{6} = 10$

4.) $8 + \boxed{2} = 10$

5.) $10 + \boxed{0} = 10$

6.) $6 + \boxed{4} = 10$

7.) $\boxed{5} + 5 = 10$

8.) $\boxed{3} + 7 = 10$

9.) $8 + \boxed{2} = 10$


10.) $10 + \boxed{0} = 10$

11.) $7 + \boxed{3} = 10$

12.) $\boxed{9} + 1 = 10$

13.) $\boxed{2} + 8 = 10$

14.) $\boxed{6} + 4 = 10$

15.)  $5 + \boxed{5} = 10$

16.) $7 + \boxed{3} = 10$

17.) $8 + \boxed{2} = 10$

18.) $\boxed{4} + 6 = 10$

1st Grade - Making 10 – Mental Math – V1

Making 10 Directions: Fill in each box so the two numbers SUM to a total of 10.

10	0
5	5
8	2
4	6
2	
5	
3	
1	
8	
0	

8	
4	
3	
5	
2	
4	
9	
3	
7	
4	

7	
6	
8	
2	
5	
0	
8	
2	
5	
3	

6	
7	
5	
4	
10	
9	
2	
6	
3	
8	

1st Grade - Making 10 – Mental Math – V1

Making 10 Directions: Fill in each box so the two numbers SUM to a total of 10.

10	0
5	5
8	2
4	6
2	<u>8</u>
5	<u>5</u>
3	<u>7</u>
1	<u>9</u>
8	<u>2</u>
0	<u>10</u>

8	<u>2</u>
4	<u>6</u>
3	<u>7</u>
5	<u>5</u>
2	<u>8</u>
4	<u>6</u>
9	<u>1</u>
3	<u>7</u>
7	<u>3</u>
4	<u>6</u>

7	<u>3</u>
6	<u>4</u>
8	<u>2</u>
2	<u>8</u>
5	<u>5</u>
0	<u>10</u>
8	<u>2</u>
2	<u>8</u>
5	<u>5</u>
3	<u>7</u>

6	<u>4</u>
7	<u>3</u>
5	<u>5</u>
4	<u>6</u>
10	<u>0</u>
9	<u>1</u>
2	<u>8</u>
6	<u>4</u>
3	<u>7</u>
8	<u>2</u>



1st Grade - Making 10 – Mental Math – V2

Making 10 Directions: Fill in each box so the two numbers SUM to a total of 10.

0	10
3	7
8	2
4	6
6	
2	
10	
3	
5	
1	

7	
5	
2	
8	
1	
3	
0	
4	
6	
5	

6	
4	
9	
2	
5	
1	
8	
2	
0	
2	

2	
7	
1	
3	
9	
2	
0	
5	
9	
3	

1st Grade - Making 10 – Mental Math – V2

Making 10 Directions: Fill in each box so the two numbers SUM to a total of 10.

0	10
3	7
8	2
4	6
6	<u>4</u>
2	<u>8</u>
10	<u>0</u>
3	<u>7</u>
5	<u>5</u>
1	<u>9</u>

7	<u>3</u>
5	<u>5</u>
2	<u>8</u>
8	<u>2</u>
1	<u>9</u>
3	<u>7</u>
0	<u>10</u>
4	<u>6</u>
6	<u>4</u>
5	<u>5</u>

6	<u>4</u>
4	<u>6</u>
9	<u>1</u>
2	<u>8</u>
5	<u>5</u>
1	<u>9</u>
8	<u>2</u>
2	<u>8</u>
0	<u>10</u>
2	<u>8</u>

2	<u>8</u>
7	<u>3</u>
1	<u>9</u>
3	<u>7</u>
9	<u>1</u>
2	<u>8</u>
0	<u>10</u>
5	<u>5</u>
9	<u>1</u>
3	<u>7</u>



2nd Grade - Making 10 – Mental Math – V1

Making 10 Directions: Fill in each box so the two numbers SUM to a total of 10.

10	0
2	8
6	4
7	3
1	
5	
4	
3	
2	
1	
2	
1	
5	
0	
2	
4	
7	

7	
0	
3	
5	
2	
1	
9	
3	
7	
4	
3	
1	
9	
4	
5	
6	
9	

1	
6	
10	
2	
5	
1	
8	
2	
0	
3	
5	
3	
7	
2	
6	
4	
8	

4	
7	
1	
4	
10	
9	
2	
6	
3	
8	
5	
1	
7	
2	
9	
2	
4	

2nd Grade - Making 10 – Mental Math – V1

Making 10 Directions: Fill in each box so the two numbers SUM to a total of 10.

10	0
2	8
6	4
7	3
1	<u>9</u>
5	<u>5</u>
4	<u>6</u>
3	<u>7</u>
2	<u>8</u>
1	<u>9</u>
2	<u>8</u>
1	<u>9</u>
5	<u>5</u>
0	<u>10</u>
2	<u>8</u>
4	<u>6</u>
7	<u>3</u>

7	<u>3</u>
0	<u>10</u>
3	<u>7</u>
5	<u>5</u>
2	<u>8</u>
1	<u>9</u>
9	<u>1</u>
3	<u>7</u>
7	<u>3</u>
4	<u>6</u>
3	<u>7</u>
1	<u>9</u>
9	<u>1</u>
4	<u>6</u>
5	<u>5</u>
6	<u>4</u>
9	<u>1</u>

1	<u>9</u>
6	<u>4</u>
10	<u>0</u>
2	<u>8</u>
5	<u>5</u>
1	<u>9</u>
8	<u>2</u>
2	<u>8</u>
0	<u>10</u>
3	<u>7</u>
5	<u>5</u>
3	<u>7</u>
7	<u>3</u>
2	<u>8</u>
6	<u>4</u>
4	<u>6</u>
8	<u>2</u>

4	<u>6</u>
7	<u>3</u>
1	<u>9</u>
4	<u>6</u>
10	<u>0</u>
9	<u>1</u>
2	<u>8</u>
6	<u>4</u> ★
3	<u>7</u>
8	<u>2</u>
5	<u>5</u>
1	<u>9</u>
7	<u>3</u>
2	<u>8</u>
9	<u>1</u>
2	<u>8</u>
4	<u>6</u>

2nd Grade - Making 10 – Mental Math – V2

Making 10 Directions: Fill in each box so the two numbers SUM to a total of 10.

10	0
6	4
8	2
3	7
6	
5	
2	
3	
2	
1	
0	
2	
8	
5	
9	
2	
5	

8	
5	
2	
8	
1	
9	
0	
4	
6	
5	
8	
0	
3	
9	
2	
4	
6	

1	
4	
7	
2	
5	
1	
8	
2	
0	
3	
5	
7	
6	
2	
6	
4	
8	

4	
7	
1	
3	
9	
1	
0	
2	
9	
3	
1	
5	
6	
1	
2	
3	
6	

2nd Grade - Making 10 – Mental Math – V2

Making 10 Directions: Fill in each box so the two numbers SUM to a total of 10.

10	0
6	4
8	2
3	7
6	<u>4</u>
5	<u>5</u>
2	<u>8</u>
3	<u>7</u>
2	<u>8</u>
1	<u>9</u>
0	<u>10</u>
2	<u>8</u>
8	<u>2</u>
5	<u>5</u>
9	<u>1</u>
2	<u>8</u>
5	<u>5</u>

8	<u>2</u>
5	<u>5</u>
2	<u>8</u>
8	<u>2</u>
1	<u>9</u>
9	<u>1</u>
0	<u>10</u>
4	<u>6</u>
6	<u>4</u>
5	<u>5</u>
8	<u>2</u>
0	<u>10</u>
3	<u>7</u>
9	<u>1</u>
2	<u>8</u>
4	<u>6</u>
6	<u>4</u>

1	<u>9</u>
4	<u>6</u>
7	<u>3</u>
2	<u>8</u>
5	<u>5</u>
1	<u>9</u>
8	<u>2</u>
2	<u>8</u>
0	<u>10</u>
3	<u>7</u>
5	<u>5</u>
7	<u>3</u>
6	<u>4</u>
2	<u>8</u>
6	<u>4</u>
4	<u>6</u>
8	<u>2</u>

4	<u>6</u>
7	<u>3</u>
1	<u>9</u>
3	<u>7</u>
9	<u>1</u>
1	<u>9</u>
0	<u>10</u>
2	<u>8</u> ★
9	<u>1</u>
3	<u>7</u>
1	<u>9</u>
5	<u>5</u>
6	<u>4</u>
1	<u>9</u>
2	<u>8</u>
3	<u>7</u>
6	<u>4</u>

MAKING 10

Directions: Fill in each box so the two numbers SUM to 10.

10	0
9	1
8	2
7	3
6	
0	
1	
3	
8	
1	
10	
3	
4	
9	
1	
5	
8	
2	
1	
5	
0	
2	
4	

4	
5	
3	
5	
2	
1	
9	
3	
7	
4	
5	
2	
6	
8	
0	
2	
7	
3	
1	
9	
4	
5	
6	

9	
6	
8	
2	
5	
1	
8	
2	
0	
3	
5	
7	
6	
4	
8	
1	
0	
5	
3	
7	
2	
6	
4	

0	
7	
1	
4	
10	
9	
2	
6	
3	
8	
1	
7	
5	
2	
0	
8	
2	
5	
1	
7	
2	
9	
2	

MAKING 10

Directions: Fill in each box so the two numbers SUM to 10.

10	0
9	1
8	2
7	3
6	<u>4</u>
0	<u>10</u>
1	<u>9</u>
3	<u>7</u>
8	<u>2</u>
1	<u>9</u>
10	<u>0</u>
3	<u>7</u>
4	<u>6</u>
9	<u>1</u>
1	<u>9</u>
5	<u>5</u>
8	<u>2</u>
2	<u>8</u>
1	<u>9</u>
5	<u>5</u>
0	<u>10</u>
2	<u>8</u>
4	<u>6</u>

4	<u>6</u>
5	<u>5</u>
3	<u>7</u>
5	<u>5</u>
2	<u>8</u>
1	<u>9</u>
9	<u>1</u>
3	<u>7</u>
7	<u>3</u>
4	<u>6</u>
5	<u>5</u>
2	<u>8</u>
6	<u>4</u>
8	<u>2</u>
0	<u>10</u>
2	<u>8</u>
7	<u>3</u>
3	<u>7</u>
1	<u>9</u>
9	<u>1</u>
4	<u>6</u>
5	<u>5</u>
6	<u>4</u>

9	<u>1</u>
6	<u>4</u>
8	<u>2</u>
2	<u>8</u>
5	<u>5</u>
1	<u>9</u>
8	<u>2</u>
2	<u>8</u>
0	<u>10</u>
3	<u>7</u>
5	<u>5</u>
7	<u>3</u>
6	<u>4</u>
4	<u>6</u>
8	<u>2</u>
1	<u>9</u>
0	<u>10</u>
5	<u>5</u>
3	<u>7</u>
7	<u>3</u>
2	<u>8</u>
6	<u>4</u>
4	<u>6</u>

0	<u>10</u>
7	<u>3</u>
1	<u>9</u>
4	<u>6</u>
10	<u>0</u>
9	<u>1</u>
2	<u>8</u>
6	<u>4</u>
3	<u>7</u>
8	<u>2</u>
1	<u>9</u>
7	<u>3</u>
5	<u>5</u>
2	<u>8</u>
0	<u>10</u>
8	<u>2</u>
2	<u>8</u>
5	<u>5</u>
1	<u>9</u>
7	<u>3</u>
2	<u>8</u>
9	<u>1</u>
2	<u>8</u> ★

Multiples Challenge 1 – (1 through 12)

Directions: In 5 minutes, fill in the table with the correct multiples by skip counting downward.

1	2	3	4	5	6	7	8	9	10	11	12
0	0	0	0	0	0						
1	2	3	4								
2	4	6									
3	6										
4											
5											
6											
7											
8											
9											
10											
11											
12											

Multiples Challenge 1 – (1 through 12)

Directions: In 5 minutes, fill in the table with the correct multiples by skip counting downward.

1	2	3	4	5	6	7	8	9	10	11	12
0	0	0	0	0	0	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
1	2	3	4	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>	<u>11</u>	<u>12</u>
2	4	6	<u>8</u>	<u>10</u>	<u>12</u>	<u>14</u>	<u>16</u>	<u>18</u>	<u>20</u>	<u>22</u>	<u>24</u>
3	6	<u>9</u>	<u>12</u>	<u>15</u>	<u>18</u>	<u>21</u>	<u>24</u>	<u>27</u>	<u>30</u>	<u>33</u>	<u>36</u>
4	<u>8</u>	<u>12</u>	<u>16</u>	<u>20</u>	<u>24</u>	<u>28</u>	<u>32</u>	<u>36</u>	<u>40</u>	<u>44</u>	<u>48</u>
5	<u>10</u>	<u>15</u>	<u>20</u>	<u>25</u>	<u>30</u>	<u>35</u>	<u>40</u>	<u>45</u>	<u>50</u>	<u>55</u>	<u>60</u>
6	<u>12</u>	<u>18</u>	<u>24</u>	<u>30</u>	<u>36</u>	<u>42</u>	<u>48</u>	<u>54</u>	<u>60</u>	<u>66</u>	<u>72</u>
7	<u>14</u>	<u>21</u>	<u>28</u>	<u>35</u>	<u>42</u>	<u>49</u>	<u>56</u>	<u>63</u>	<u>70</u>	<u>77</u>	<u>84</u>
8	<u>16</u>	<u>24</u>	<u>32</u>	<u>40</u>	<u>48</u>	<u>56</u>	<u>64</u>	<u>72</u>	<u>80</u>	<u>88</u>	<u>96</u>
9	<u>18</u>	<u>27</u>	<u>36</u>	<u>45</u>	<u>54</u>	<u>63</u>	<u>72</u>	<u>81</u>	<u>90</u>	<u>99</u>	<u>108</u>
10	<u>20</u>	<u>30</u>	<u>40</u>	<u>50</u>	<u>60</u>	<u>70</u>	<u>80</u>	<u>90</u>	<u>100</u>	<u>110</u>	<u>120</u>
11	<u>22</u>	<u>33</u>	<u>44</u>	<u>55</u>	<u>66</u>	<u>77</u>	<u>88</u>	<u>99</u>	<u>110</u>	<u>121</u>	<u>132</u>
12	<u>24</u>	<u>36</u>	<u>48</u>	<u>60</u>	<u>72</u>	<u>84</u>	<u>96</u>	<u>108</u>	<u>120</u>	<u>132</u>	<u>144</u> ★

MULTIPLES 1-12

Name _____

1	2	3	4	5	6	7	8	9	10	11	12
0	0	0	0	0	0	0					
1	2	3	4	5							
2	4	6									
3	6										
4											
5											
6											
7											
8											
9											
10											
11											
12											

MULTIPLES 1-12

Name _____

1	2	3	4	5	6	7	8	9	10	11	12
0	0	0	0	0	0	0					
1	2	3	4	5							
2	4	6									
3	6										
4											
5											
6											
7											
8											
9											
10											
11											
12											

MULTIPLIES 1-12 Homework or Quick Classroom Assessment

X	2	3	4	5	6	7	8	9	10	11	12
1	2	3	4								
2	4	6									
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											

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MULTIPLIES 1-12 Homework or Quick Classroom Assessment

X	2	3	4	5	6	7	8	9	10	11	12
1	2	3	4								
2	4	6									
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											

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MULTIPLIES 1-12 Homework or Quick Classroom Assessment

X	2	3	4	5	6	7	8	9	10	11	12
1	2	3	4								
2	4	6									
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											

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MULTIPLIES 1-12 Homework or Quick Classroom Assessment

X	2	3	4	5	6	7	8	9	10	11	12
1	2	3	4								
2	4	6									
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											

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3rd – 8th Grade Multiplication – Perfect Squares – Version 1

Directions: Multiplication – Perfect Square Practice! Use another sheet of paper to cover the above row after it has been completed. Complete as many of the doubles below in 5 minutes. Good Luck!!!

$$\begin{array}{r} 6 \\ \times 6 \\ \hline 36 \end{array}$$

$$\begin{array}{r} 2 \\ \times 2 \\ \hline 4 \end{array}$$

$$\begin{array}{r} 3 \\ \times 3 \\ \hline 9 \end{array}$$

$$\begin{array}{r} 9 \\ \times 9 \\ \hline 81 \end{array}$$

$$\begin{array}{r} 1 \\ \times 1 \\ \hline 1 \end{array}$$

$$\begin{array}{r} 10 \\ \times 10 \\ \hline 100 \end{array}$$

$$\begin{array}{r} 8 \\ \times 8 \\ \hline 64 \end{array}$$

$$\begin{array}{r} 5 \\ \times 5 \\ \hline 25 \end{array}$$

$$\begin{array}{r} 7 \\ \times 7 \\ \hline 49 \end{array}$$

$$\begin{array}{r} 4 \\ \times 4 \\ \hline 16 \end{array}$$

$$\begin{array}{r} 5 \\ \times 5 \\ \hline 25 \end{array}$$

$$\begin{array}{r} 3 \\ \times 3 \\ \hline 9 \end{array}$$

$$\begin{array}{r} 4 \\ \times 4 \\ \hline 16 \end{array}$$

$$\begin{array}{r} 6 \\ \times 6 \\ \hline 36 \end{array}$$

$$\begin{array}{r} 2 \\ \times 2 \\ \hline 4 \end{array}$$

$$\begin{array}{r} 10 \\ \times 10 \\ \hline 100 \end{array}$$

$$\begin{array}{r} 7 \\ \times 7 \\ \hline 49 \end{array}$$

$$\begin{array}{r} 9 \\ \times 9 \\ \hline 81 \end{array}$$

$$\begin{array}{r} 8 \\ \times 8 \\ \hline 64 \end{array}$$

$$\begin{array}{r} 1 \\ \times 1 \\ \hline 1 \end{array}$$

$$\begin{array}{r} 9 \\ \times 9 \\ \hline 81 \end{array}$$

$$\begin{array}{r} 1 \\ \times 1 \\ \hline 1 \end{array}$$

$$\begin{array}{r} 3 \\ \times 3 \\ \hline 9 \end{array}$$

$$\begin{array}{r} 8 \\ \times 8 \\ \hline 64 \end{array}$$

$$\begin{array}{r} 7 \\ \times 7 \\ \hline 49 \end{array}$$

$$\begin{array}{r} 4 \\ \times 4 \\ \hline 16 \end{array}$$

$$\begin{array}{r} 2 \\ \times 2 \\ \hline 4 \end{array}$$

$$\begin{array}{r} 6 \\ \times 6 \\ \hline 36 \end{array}$$

$$\begin{array}{r} 10 \\ \times 10 \\ \hline 100 \end{array}$$

$$\begin{array}{r} 5 \\ \times 5 \\ \hline 25 \end{array}$$

$$\begin{array}{r} 1 \\ \times 1 \\ \hline 1 \end{array}$$

$$\begin{array}{r} 4 \\ \times 4 \\ \hline 16 \end{array}$$

$$\begin{array}{r} 5 \\ \times 5 \\ \hline 25 \end{array}$$

$$\begin{array}{r} 10 \\ \times 10 \\ \hline 100 \end{array}$$

$$\begin{array}{r} 3 \\ \times 3 \\ \hline 9 \end{array}$$

$$\begin{array}{r} 9 \\ \times 9 \\ \hline 81 \end{array}$$

$$\begin{array}{r} 8 \\ \times 8 \\ \hline 64 \end{array}$$

$$\begin{array}{r} 6 \\ \times 6 \\ \hline 36 \end{array}$$

$$\begin{array}{r} 7 \\ \times 7 \\ \hline 49 \end{array}$$

$$\begin{array}{r} 2 \\ \times 2 \\ \hline 4 \end{array}$$

$$\begin{array}{r} 8 \\ \times 8 \\ \hline 64 \end{array}$$

$$\begin{array}{r} 2 \\ \times 2 \\ \hline 4 \end{array}$$

$$\begin{array}{r} 3 \\ \times 3 \\ \hline 9 \end{array}$$

$$\begin{array}{r} 9 \\ \times 9 \\ \hline 81 \end{array}$$

$$\begin{array}{r} 1 \\ \times 1 \\ \hline 1 \end{array}$$

$$\begin{array}{r} 7 \\ \times 7 \\ \hline 49 \end{array}$$

$$\begin{array}{r} 6 \\ \times 6 \\ \hline 36 \end{array}$$

$$\begin{array}{r} 10 \\ \times 10 \\ \hline 100 \end{array}$$

$$\begin{array}{r} 5 \\ \times 5 \\ \hline 25 \end{array}$$

$$\begin{array}{r} 4 \\ \times 4 \\ \hline 16 \end{array}$$

$$\begin{array}{r} 6 \\ \times 6 \\ \hline 36 \end{array}$$

$$\begin{array}{r} 3 \\ \times 3 \\ \hline 9 \end{array}$$

$$\begin{array}{r} 4 \\ \times 4 \\ \hline 16 \end{array}$$

$$\begin{array}{r} 9 \\ \times 9 \\ \hline 81 \end{array}$$

$$\begin{array}{r} 5 \\ \times 5 \\ \hline 25 \end{array}$$

$$\begin{array}{r} 2 \\ \times 2 \\ \hline 4 \end{array}$$

$$\begin{array}{r} 8 \\ \times 8 \\ \hline 64 \end{array}$$

$$\begin{array}{r} 7 \\ \times 7 \\ \hline 49 \end{array}$$

$$\begin{array}{r} 10 \\ \times 10 \\ \hline 100 \end{array}$$

$$\begin{array}{r} 1 \\ \times 1 \\ \hline 1 \end{array}$$

$$\begin{array}{r} 2 \\ \times 2 \\ \hline 4 \end{array}$$

$$\begin{array}{r} 10 \\ \times 10 \\ \hline 100 \end{array}$$

$$\begin{array}{r} 8 \\ \times 8 \\ \hline 64 \end{array}$$

$$\begin{array}{r} 9 \\ \times 9 \\ \hline 81 \end{array}$$

$$\begin{array}{r} 5 \\ \times 5 \\ \hline 25 \end{array}$$

$$\begin{array}{r} 6 \\ \times 6 \\ \hline 36 \end{array}$$

$$\begin{array}{r} 1 \\ \times 1 \\ \hline 1 \end{array}$$

$$\begin{array}{r} 3 \\ \times 3 \\ \hline 9 \end{array}$$

$$\begin{array}{r} 7 \\ \times 7 \\ \hline 49 \end{array}$$

$$\begin{array}{r} 4 \\ \times 4 \\ \hline 16 \end{array}$$

$$\begin{array}{r} 7 \\ \times 7 \\ \hline 49 \end{array}$$

$$\begin{array}{r} 1 \\ \times 1 \\ \hline 1 \end{array}$$

$$\begin{array}{r} 6 \\ \times 6 \\ \hline 36 \end{array}$$

$$\begin{array}{r} 2 \\ \times 2 \\ \hline 4 \end{array}$$

$$\begin{array}{r} 4 \\ \times 4 \\ \hline 16 \end{array}$$

$$\begin{array}{r} 9 \\ \times 9 \\ \hline 81 \end{array}$$

$$\begin{array}{r} 8 \\ \times 8 \\ \hline 64 \end{array}$$

$$\begin{array}{r} 5 \\ \times 5 \\ \hline 25 \end{array}$$

$$\begin{array}{r} 10 \\ \times 10 \\ \hline 100 \end{array}$$

$$\begin{array}{r} 3 \\ \times 3 \\ \hline 9 \end{array}$$

$$\begin{array}{r} 2 \\ \times 2 \\ \hline 4 \end{array}$$

$$\begin{array}{r} 7 \\ \times 7 \\ \hline 49 \end{array}$$

$$\begin{array}{r} 10 \\ \times 10 \\ \hline 100 \end{array}$$

$$\begin{array}{r} 3 \\ \times 3 \\ \hline 9 \end{array}$$

$$\begin{array}{r} 1 \\ \times 1 \\ \hline 1 \end{array}$$

$$\begin{array}{r} 5 \\ \times 5 \\ \hline 25 \end{array}$$

$$\begin{array}{r} 4 \\ \times 4 \\ \hline 16 \end{array}$$

$$\begin{array}{r} 9 \\ \times 9 \\ \hline 81 \end{array}$$

$$\begin{array}{r} 8 \\ \times 8 \\ \hline 64 \end{array}$$

$$\begin{array}{r} 6 \\ \times 6 \\ \hline 36 \end{array}$$

$$\begin{array}{r} 1 \\ \times 1 \\ \hline 1 \end{array}$$

$$\begin{array}{r} 4 \\ \times 4 \\ \hline 16 \end{array}$$

$$\begin{array}{r} 6 \\ \times 6 \\ \hline 36 \end{array}$$

$$\begin{array}{r} 8 \\ \times 8 \\ \hline 64 \end{array}$$

$$\begin{array}{r} 2 \\ \times 2 \\ \hline 4 \end{array}$$

$$\begin{array}{r} 10 \\ \times 10 \\ \hline 100 \end{array}$$

$$\begin{array}{r} 3 \\ \times 3 \\ \hline 9 \end{array}$$

$$\begin{array}{r} 9 \\ \times 9 \\ \hline 81 \end{array}$$

$$\begin{array}{r} 7 \\ \times 7 \\ \hline 49 \end{array}$$

$$\begin{array}{r} 5 \\ \times 5 \\ \hline 25 \end{array}$$



FIND THE MISSING FACTOR – 1, 2, and 3

Directions: Fill in the factor that makes the number sentence mathematically correct.

$1 \times \underline{\quad} = 3$

$2 \times \underline{\quad} = 2$

$2 \times \underline{\quad} = 12$

$2 \times \underline{\quad} = 6$

$2 \times \underline{\quad} = 4$

$3 \times \underline{\quad} = 24$

$2 \times \underline{\quad} = 6$

$3 \times \underline{\quad} = 30$

$3 \times \underline{\quad} = 12$

$2 \times \underline{\quad} = 20$

$2 \times \underline{\quad} = 8$

$2 \times \underline{\quad} = 18$

$2 \times \underline{\quad} = 18$

$3 \times \underline{\quad} = 18$

$3 \times \underline{\quad} = 24$

$3 \times \underline{\quad} = 15$

$3 \times \underline{\quad} = 9$

$3 \times \underline{\quad} = 30$

$3 \times \underline{\quad} = 27$

$2 \times \underline{\quad} = 12$

$1 \times \underline{\quad} = 2$

$2 \times \underline{\quad} = 14$

$1 \times \underline{\quad} = 2$

$3 \times \underline{\quad} = 15$

$3 \times \underline{\quad} = 15$

$3 \times \underline{\quad} = 24$

$3 \times \underline{\quad} = 12$

$3 \times \underline{\quad} = 27$

$2 \times \underline{\quad} = 12$

$2 \times \underline{\quad} = 8$

$2 \times \underline{\quad} = 16$

$2 \times \underline{\quad} = 4$

$3 \times \underline{\quad} = 21$

$3 \times \underline{\quad} = 30$

$3 \times \underline{\quad} = 18$

$3 \times \underline{\quad} = 24$

$2 \times \underline{\quad} = 10$

$2 \times \underline{\quad} = 12$

$2 \times \underline{\quad} = 6$

$2 \times \underline{\quad} = 2$

$1 \times \underline{\quad} = 1$

$1 \times \underline{\quad} = 3$

$2 \times \underline{\quad} = 10$

$2 \times \underline{\quad} = 14$

$2 \times \underline{\quad} = 18$

$2 \times \underline{\quad} = 22$

$2 \times \underline{\quad} = 20$

$3 \times \underline{\quad} = 12$

$3 \times \underline{\quad} = 24$

$2 \times \underline{\quad} = 20$

$2 \times \underline{\quad} = 24$

$2 \times \underline{\quad} = 16$

$2 \times \underline{\quad} = 6$

$2 \times \underline{\quad} = 8$

$3 \times \underline{\quad} = 6$

$2 \times \underline{\quad} = 10$

$3 \times \underline{\quad} = 15$

$3 \times \underline{\quad} = 12$

$3 \times \underline{\quad} = 21$

$3 \times \underline{\quad} = 21$

$2 \times \underline{\quad} = 8$

$2 \times \underline{\quad} = 4$

$2 \times \underline{\quad} = 24$

$2 \times \underline{\quad} = 10$

$3 \times \underline{\quad} = 3$

$1 \times \underline{\quad} = 2$

$2 \times \underline{\quad} = 2$

$1 \times \underline{\quad} = 3$

$2 \times \underline{\quad} = 4$

$2 \times \underline{\quad} = 16$

$2 \times \underline{\quad} = 8$

$2 \times \underline{\quad} = 12$

$1 \times \underline{\quad} = 2$

$3 \times \underline{\quad} = 9$

$1 \times \underline{\quad} = 2$

$3 \times \underline{\quad} = 12$

$2 \times \underline{\quad} = 14$

$1 \times \underline{\quad} = 1$

$2 \times \underline{\quad} = 2$

$3 \times \underline{\quad} = 24$

$3 \times \underline{\quad} = 27$

$2 \times \underline{\quad} = 24$

$3 \times \underline{\quad} = 30$

$2 \times \underline{\quad} = 24$

$3 \times \underline{\quad} = 30$

$3 \times \underline{\quad} = 27$

$2 \times \underline{\quad} = 24$

$3 \times \underline{\quad} = 27$

$2 \times \underline{\quad} = 16$

$2 \times \underline{\quad} = 18$

$2 \times \underline{\quad} = 14$

$2 \times \underline{\quad} = 12$

$1 \times \underline{\quad} = 3$

$2 \times \underline{\quad} = 20$

$3 \times \underline{\quad} = 9$

$2 \times \underline{\quad} = 20$

FIND THE MISSING FACTOR – 1, 2, and 3

Directions: Fill in the factor that makes the number sentence mathematically correct.

$1 \times \underline{3} = 3$

$2 \times \underline{1} = 2$

$2 \times \underline{6} = 12$

$2 \times \underline{3} = 6$

$2 \times \underline{2} = 4$

$3 \times \underline{8} = 24$

$2 \times \underline{3} = 6$

$3 \times \underline{10} = 30$

$3 \times \underline{4} = 12$

$2 \times \underline{10} = 20$

$2 \times \underline{4} = 8$

$2 \times \underline{9} = 18$

$2 \times \underline{9} = 18$

$3 \times \underline{6} = 18$

$3 \times \underline{8} = 24$

$3 \times \underline{5} = 15$

$3 \times \underline{3} = 9$

$3 \times \underline{10} = 30$

$3 \times \underline{9} = 27$

$2 \times \underline{6} = 12$

$1 \times \underline{4} = 4$

$2 \times \underline{7} = 14$

$1 \times \underline{2} = 2$

$3 \times \underline{5} = 15$

$3 \times \underline{5} = 15$

$3 \times \underline{8} = 24$

$3 \times \underline{4} = 12$

$3 \times \underline{9} = 27$

$2 \times \underline{6} = 12$

$2 \times \underline{4} = 8$

$2 \times \underline{8} = 16$

$2 \times \underline{2} = 4$

$3 \times \underline{7} = 21$

$3 \times \underline{10} = 30$

$3 \times \underline{6} = 18$

$3 \times \underline{8} = 24$

$2 \times \underline{5} = 10$

$2 \times \underline{6} = 12$

$2 \times \underline{3} = 6$

$2 \times \underline{1} = 2$

$1 \times \underline{4} = 4$

$1 \times \underline{3} = 3$

$2 \times \underline{5} = 10$

$2 \times \underline{7} = 14$

$2 \times \underline{9} = 18$

$2 \times \underline{11} = 22$

$2 \times \underline{10} = 20$

$3 \times \underline{4} = 12$

$3 \times \underline{8} = 24$

$2 \times \underline{10} = 20$

$2 \times \underline{12} = 24$

$2 \times \underline{8} = 16$

$2 \times \underline{3} = 6$

$2 \times \underline{4} = 8$

$3 \times \underline{2} = 6$

$2 \times \underline{5} = 10$

$3 \times \underline{5} = 15$

$3 \times \underline{4} = 12$

$3 \times \underline{7} = 21$

$3 \times \underline{7} = 21$

$2 \times \underline{4} = 8$

$2 \times \underline{2} = 4$

$2 \times \underline{12} = 24$

$2 \times \underline{5} = 10$

$3 \times \underline{1} = 3$

$1 \times \underline{2} = 2$

$2 \times \underline{1} = 2$

$1 \times \underline{3} = 3$

$2 \times \underline{2} = 4$

$2 \times \underline{8} = 16$

$2 \times \underline{4} = 8$

$2 \times \underline{6} = 12$

$1 \times \underline{2} = 2$

$3 \times \underline{3} = 9$

$1 \times \underline{2} = 2$

$3 \times \underline{4} = 12$

$2 \times \underline{7} = 14$

$1 \times \underline{1} = 1$

$2 \times \underline{1} = 2$

$3 \times \underline{2} = 24$

$3 \times \underline{9} = 27$

$2 \times \underline{12} = 24$

$3 \times \underline{10} = 30$

$2 \times \underline{12} = 24$

$3 \times \underline{10} = 30$

$3 \times \underline{9} = 27$

$2 \times \underline{12} = 24$

$3 \times \underline{9} = 27$

$2 \times \underline{8} = 16$

$2 \times \underline{9} = 18$

$2 \times \underline{7} = 14$

$2 \times \underline{6} = 12$

$1 \times \underline{3} = 3$

$2 \times \underline{10} = 20$

$3 \times \underline{3} = 9$

$\star 2 \times \underline{10} = 20$

FIND THE MISSING FACTOR – 4, 5, and 6

Directions: Fill in the factor that makes the number sentence mathematically correct.

$1 \times \underline{\quad} = 4$

$5 \times \underline{\quad} = 5$

$6 \times \underline{\quad} = 12$

$6 \times \underline{\quad} = 6$

$4 \times \underline{\quad} = 8$

$4 \times \underline{\quad} = 24$

$6 \times \underline{\quad} = 6$

$6 \times \underline{\quad} = 30$

$6 \times \underline{\quad} = 12$

$6 \times \underline{\quad} = 48$

$4 \times \underline{\quad} = 8$

$5 \times \underline{\quad} = 30$

$5 \times \underline{\quad} = 15$

$4 \times \underline{\quad} = 24$

$5 \times \underline{\quad} = 40$

$6 \times \underline{\quad} = 54$

$6 \times \underline{\quad} = 18$

$5 \times \underline{\quad} = 30$

$5 \times \underline{\quad} = 30$

$6 \times \underline{\quad} = 60$

$1 \times \underline{\quad} = 6$

$4 \times \underline{\quad} = 8$

$1 \times \underline{\quad} = 6$

$5 \times \underline{\quad} = 55$

$5 \times \underline{\quad} = 15$

$5 \times \underline{\quad} = 45$

$6 \times \underline{\quad} = 54$

$4 \times \underline{\quad} = 20$

$4 \times \underline{\quad} = 12$

$4 \times \underline{\quad} = 8$

$6 \times \underline{\quad} = 18$

$5 \times \underline{\quad} = 40$

$4 \times \underline{\quad} = 24$

$4 \times \underline{\quad} = 40$

$4 \times \underline{\quad} = 20$

$5 \times \underline{\quad} = 45$

$6 \times \underline{\quad} = 54$

$5 \times \underline{\quad} = 25$

$6 \times \underline{\quad} = 48$

$6 \times \underline{\quad} = 54$

$5 \times \underline{\quad} = 10$

$6 \times \underline{\quad} = 36$

$4 \times \underline{\quad} = 12$

$4 \times \underline{\quad} = 12$

$4 \times \underline{\quad} = 20$

$4 \times \underline{\quad} = 24$

$5 \times \underline{\quad} = 20$

$5 \times \underline{\quad} = 15$

$5 \times \underline{\quad} = 20$

$4 \times \underline{\quad} = 28$

$6 \times \underline{\quad} = 24$

$4 \times \underline{\quad} = 16$

$6 \times \underline{\quad} = 6$

$5 \times \underline{\quad} = 35$

$6 \times \underline{\quad} = 6$

$5 \times \underline{\quad} = 50$

$6 \times \underline{\quad} = 18$

$6 \times \underline{\quad} = 54$

$5 \times \underline{\quad} = 10$

$6 \times \underline{\quad} = 66$

$5 \times \underline{\quad} = 30$

$6 \times \underline{\quad} = 42$

$4 \times \underline{\quad} = 24$

$5 \times \underline{\quad} = 10$

$6 \times \underline{\quad} = 36$

$1 \times \underline{\quad} = 5$

$6 \times \underline{\quad} = 48$

$1 \times \underline{\quad} = 5$

$4 \times \underline{\quad} = 4$

$4 \times \underline{\quad} = 16$

$6 \times \underline{\quad} = 18$

$4 \times \underline{\quad} = 12$

$6 \times \underline{\quad} = 24$

$5 \times \underline{\quad} = 35$

$1 \times \underline{\quad} = 5$

$5 \times \underline{\quad} = 45$

$4 \times \underline{\quad} = 12$

$1 \times \underline{\quad} = 6$

$5 \times \underline{\quad} = 5$

$6 \times \underline{\quad} = 24$

$4 \times \underline{\quad} = 40$

$4 \times \underline{\quad} = 12$

$5 \times \underline{\quad} = 30$

$6 \times \underline{\quad} = 54$

$5 \times \underline{\quad} = 50$

$6 \times \underline{\quad} = 30$

$4 \times \underline{\quad} = 24$

$6 \times \underline{\quad} = 36$

$4 \times \underline{\quad} = 16$

$5 \times \underline{\quad} = 15$

$5 \times \underline{\quad} = 25$

$5 \times \underline{\quad} = 25$

$1 \times \underline{\quad} = 6$

$4 \times \underline{\quad} = 40$

$6 \times \underline{\quad} = 54$

$6 \times \underline{\quad} = 54$

FIND THE MISSING FACTOR – 4, 5, and 6

Directions: Fill in the factor that makes the number sentence mathematically correct.

$1 \times \underline{4} = 4$

$5 \times \underline{1} = 5$

$6 \times \underline{2} = 12$

$6 \times \underline{1} = 6$

$4 \times \underline{2} = 8$

$4 \times \underline{6} = 24$

$6 \times \underline{1} = 6$

$6 \times \underline{5} = 30$

$6 \times \underline{2} = 12$

$6 \times \underline{8} = 48$

$4 \times \underline{2} = 8$

$5 \times \underline{6} = 30$

$5 \times \underline{3} = 15$

$4 \times \underline{6} = 24$

$5 \times \underline{8} = 40$

$6 \times \underline{9} = 54$

$6 \times \underline{3} = 18$

$5 \times \underline{6} = 30$

$5 \times \underline{6} = 30$

$6 \times \underline{10} = 60$

$1 \times \underline{6} = 6$

$4 \times \underline{2} = 8$

$1 \times \underline{6} = 6$

$5 \times \underline{11} = 55$

$5 \times \underline{3} = 15$

$5 \times \underline{8} = 45$

$6 \times \underline{9} = 54$

$4 \times \underline{5} = 20$

$4 \times \underline{3} = 12$

$4 \times \underline{2} = 8$

$6 \times \underline{3} = 18$

$5 \times \underline{8} = 40$

$4 \times \underline{6} = 24$

$4 \times \underline{10} = 40$

$4 \times \underline{5} = 20$

$5 \times \underline{9} = 45$

$6 \times \underline{3} = 54$

$5 \times \underline{5} = 25$

$6 \times \underline{8} = 48$

$6 \times \underline{9} = 54$

$5 \times \underline{2} = 10$

$6 \times \underline{6} = 36$

$4 \times \underline{3} = 12$

$4 \times \underline{3} = 12$

$4 \times \underline{5} = 20$

$4 \times \underline{6} = 24$

$5 \times \underline{4} = 20$

$5 \times \underline{3} = 15$

$5 \times \underline{4} = 20$

$4 \times \underline{7} = 28$

$6 \times \underline{4} = 24$

$4 \times \underline{4} = 16$

$6 \times \underline{1} = 6$

$5 \times \underline{7} = 35$

$6 \times \underline{1} = 6$

$5 \times \underline{10} = 50$

$6 \times \underline{3} = 18$

$6 \times \underline{9} = 54$

$5 \times \underline{2} = 10$

$6 \times \underline{11} = 66$

$5 \times \underline{6} = 30$

$6 \times \underline{7} = 42$

$4 \times \underline{6} = 24$

$5 \times \underline{2} = 10$

$6 \times \underline{6} = 36$

$1 \times \underline{5} = 5$

$6 \times \underline{8} = 48$

$1 \times \underline{5} = 5$

$4 \times \underline{1} = 4$

$4 \times \underline{4} = 16$

$6 \times \underline{3} = 18$

$4 \times \underline{3} = 12$

$6 \times \underline{4} = 24$

$5 \times \underline{7} = 35$

$1 \times \underline{5} = 5$

$5 \times \underline{9} = 45$

$4 \times \underline{3} = 12$

$1 \times \underline{6} = 6$

$5 \times \underline{1} = 5$

$6 \times \underline{4} = 24$

$4 \times \underline{10} = 40$

$4 \times \underline{3} = 12$

$5 \times \underline{6} = 30$

$6 \times \underline{9} = 54$

$5 \times \underline{10} = 50$

$6 \times \underline{5} = 30$

$4 \times \underline{3} = 24$

$6 \times \underline{6} = 36$

$4 \times \underline{2} = 16$

$5 \times \underline{3} = 15$

$5 \times \underline{5} = 25$

$5 \times \underline{5} = 25$

$1 \times \underline{6} = 6$

$4 \times \underline{10} = 40$

$6 \times \underline{9} = 54$

$★ 6 \times \underline{9} = 54$

FIND THE MISSING FACTOR – 7, 8, and 9

Directions: Fill in the factor that makes the number sentence mathematically correct.

$1 \times \underline{\quad} = 7$

$9 \times \underline{\quad} = 9$

$9 \times \underline{\quad} = 18$

$7 \times \underline{\quad} = 63$

$7 \times \underline{\quad} = 7$

$7 \times \underline{\quad} = 28$

$7 \times \underline{\quad} = 7$

$8 \times \underline{\quad} = 56$

$8 \times \underline{\quad} = 16$

$8 \times \underline{\quad} = 48$

$9 \times \underline{\quad} = 18$

$7 \times \underline{\quad} = 49$

$7 \times \underline{\quad} = 14$

$7 \times \underline{\quad} = 28$

$7 \times \underline{\quad} = 49$

$9 \times \underline{\quad} = 54$

$9 \times \underline{\quad} = 18$

$8 \times \underline{\quad} = 64$

$8 \times \underline{\quad} = 80$

$7 \times \underline{\quad} = 70$

$1 \times \underline{\quad} = 8$

$7 \times \underline{\quad} = 7$

$1 \times \underline{\quad} = 7$

$8 \times \underline{\quad} = 88$

$8 \times \underline{\quad} = 24$

$9 \times \underline{\quad} = 45$

$7 \times \underline{\quad} = 14$

$6 \times \underline{\quad} = 18$

$7 \times \underline{\quad} = 21$

$7 \times \underline{\quad} = 14$

$8 \times \underline{\quad} = 32$

$7 \times \underline{\quad} = 49$

$8 \times \underline{\quad} = 24$

$9 \times \underline{\quad} = 63$

$8 \times \underline{\quad} = 24$

$9 \times \underline{\quad} = 45$

$9 \times \underline{\quad} = 36$

$7 \times \underline{\quad} = 70$

$7 \times \underline{\quad} = 49$

$7 \times \underline{\quad} = 7$

$7 \times \underline{\quad} = 70$

$8 \times \underline{\quad} = 32$

$8 \times \underline{\quad} = 64$

$9 \times \underline{\quad} = 81$

$7 \times \underline{\quad} = 21$

$9 \times \underline{\quad} = 27$

$9 \times \underline{\quad} = 72$

$8 \times \underline{\quad} = 80$

$8 \times \underline{\quad} = 32$

$7 \times \underline{\quad} = 28$

$8 \times \underline{\quad} = 72$

$7 \times \underline{\quad} = 14$

$7 \times \underline{\quad} = 42$

$8 \times \underline{\quad} = 64$

$7 \times \underline{\quad} = 49$

$8 \times \underline{\quad} = 24$

$9 \times \underline{\quad} = 90$

$7 \times \underline{\quad} = 63$

$8 \times \underline{\quad} = 16$

$7 \times \underline{\quad} = 77$

$9 \times \underline{\quad} = 54$

$9 \times \underline{\quad} = 54$

$9 \times \underline{\quad} = 27$

$8 \times \underline{\quad} = 16$

$7 \times \underline{\quad} = 42$

$1 \times \underline{\quad} = 9$

$8 \times \underline{\quad} = 48$

$1 \times \underline{\quad} = 8$

$9 \times \underline{\quad} = 9$

$7 \times \underline{\quad} = 42$

$7 \times \underline{\quad} = 35$

$7 \times \underline{\quad} = 70$

$7 \times \underline{\quad} = 56$

$9 \times \underline{\quad} = 90$

$1 \times \underline{\quad} = 9$

$7 \times \underline{\quad} = 56$

$8 \times \underline{\quad} = 56$

$1 \times \underline{\quad} = 8$

$7 \times \underline{\quad} = 7$

$8 \times \underline{\quad} = 24$

$8 \times \underline{\quad} = 72$

$8 \times \underline{\quad} = 56$

$7 \times \underline{\quad} = 35$

$7 \times \underline{\quad} = 35$

$7 \times \underline{\quad} = 49$

$7 \times \underline{\quad} = 63$

$8 \times \underline{\quad} = 24$

$8 \times \underline{\quad} = 56$

$8 \times \underline{\quad} = 16$

$8 \times \underline{\quad} = 64$

$9 \times \underline{\quad} = 63$

$7 \times \underline{\quad} = 49$

$1 \times \underline{\quad} = 9$

$7 \times \underline{\quad} = 35$

$8 \times \underline{\quad} = 64$

$8 \times \underline{\quad} = 72$

FIND THE MISSING FACTOR – 7, 8, and 9

Directions: Fill in the factor that makes the number sentence mathematically correct.

$1 \times \underline{7} = 7$

$9 \times \underline{1} = 9$

$9 \times \underline{2} = 18$

$7 \times \underline{9} = 63$

$7 \times \underline{1} = 7$

$7 \times \underline{4} = 28$

$7 \times \underline{1} = 7$

$8 \times \underline{7} = 56$

$8 \times \underline{2} = 16$

$8 \times \underline{6} = 48$

$9 \times \underline{2} = 18$

$7 \times \underline{7} = 49$

$7 \times \underline{2} = 14$

$7 \times \underline{4} = 28$

$7 \times \underline{7} = 49$

$9 \times \underline{6} = 54$

$9 \times \underline{2} = 18$

$8 \times \underline{8} = 64$

$8 \times \underline{10} = 80$

$7 \times \underline{10} = 70$

$1 \times \underline{8} = 8$

$7 \times \underline{1} = 7$

$1 \times \underline{7} = 7$

$8 \times \underline{11} = 88$

$8 \times \underline{3} = 24$

$9 \times \underline{5} = 45$

$7 \times \underline{2} = 14$

$6 \times \underline{3} = 18$

$7 \times \underline{3} = 21$

$7 \times \underline{2} = 14$

$8 \times \underline{4} = 32$

$7 \times \underline{7} = 49$

$8 \times \underline{3} = 24$

$9 \times \underline{7} = 63$

$8 \times \underline{3} = 24$

$9 \times \underline{5} = 45$

$9 \times \underline{4} = 36$

$7 \times \underline{10} = 70$

$7 \times \underline{7} = 49$

$7 \times \underline{1} = 7$

$7 \times \underline{10} = 70$

$8 \times \underline{4} = 32$

$8 \times \underline{8} = 64$

$9 \times \underline{9} = 81$

$7 \times \underline{3} = 21$

$9 \times \underline{3} = 27$

$9 \times \underline{8} = 72$

$8 \times \underline{10} = 80$

$8 \times \underline{4} = 32$

$7 \times \underline{4} = 28$

$8 \times \underline{9} = 72$

$7 \times \underline{2} = 14$

$7 \times \underline{6} = 42$

$8 \times \underline{8} = 64$

$7 \times \underline{7} = 49$

$8 \times \underline{3} = 24$

$9 \times \underline{10} = 90$

$7 \times \underline{9} = 63$

$8 \times \underline{2} = 16$

$7 \times \underline{11} = 77$

$9 \times \underline{6} = 54$

$9 \times \underline{6} = 54$

$9 \times \underline{3} = 27$

$8 \times \underline{2} = 16$

$7 \times \underline{7} = 42$

$1 \times \underline{9} = 9$

$8 \times \underline{6} = 48$

$1 \times \underline{8} = 8$

$9 \times \underline{2} = 9$

$7 \times \underline{6} = 42$

$7 \times \underline{5} = 35$

$7 \times \underline{10} = 70$

$7 \times \underline{8} = 56$

$9 \times \underline{10} = 90$

$1 \times \underline{9} = 9$

$7 \times \underline{8} = 56$

$8 \times \underline{7} = 56$

$1 \times \underline{8} = 8$

$7 \times \underline{1} = 7$

$8 \times \underline{3} = 24$

$8 \times \underline{9} = 72$

$8 \times \underline{7} = 56$

$7 \times \underline{5} = 35$

$7 \times \underline{5} = 35$

$7 \times \underline{7} = 49$

$7 \times \underline{9} = 63$

$8 \times \underline{3} = 24$

$8 \times \underline{7} = 56$

$8 \times \underline{2} = 16$

$8 \times \underline{8} = 64$

$9 \times \underline{7} = 63$

$7 \times \underline{7} = 49$

$1 \times \underline{9} = 9$

$7 \times \underline{5} = 35$

$8 \times \underline{8} = 64$

$\star 8 \times \underline{9} = 72$

Pictorial Mathematical Models

Multiplication and Division of Fractions and Decimals

4th – 8th Grade

Authored by:

Blaine A. Helwig

Retired Title 1 Elementary Principal

June 1, 2017

Executive Summary

In the last several years, both the Common Core (CC) Standards and Texas Knowledge of Essential Skills (TEKS) have transitioned mathematical computational skills in both multiplication and division fractional/decimal forms to the upper elementary grade levels. The computational skills are readily taught to students, but their associated pictorial models have presented pedagogical problems for a significant number of elementary teachers. These models can be challenging to teach students unless they are conceptually understood.

Students must not only comprehend the computational aspects of mathematics, but thoroughly understand the physical meaning of the calculations. Standardized state assessments often include questions requiring students to match the correct mathematics operations with a given pictorial model.

This paper selectively explains each possible algorithmic case so teachers may readily reference each pictorial conceptual model, as needed. Teachers' core lessons must include these conceptual models to provide that heightened level of understanding. The classroom teacher must repetitively require the pictorial model in conjunction with each algorithm so the students may ingrain the algorithm's physical meaning – as many times until the pictorial conceptual model is as mastered as the associated computations.

Student computation sheets are available in the Formative Loop Resource Library to provide sufficient student practice on classroom work or nightly homework.

Multiplication and Division of Fractions and Decimals

Pictorial Models

State standards have increasingly added challenging grade level computation problems in both decimals and fractions operations; however, state agencies have also included the pictorial model of these computational algorithms as a grade level expectation. This short pedagogical paper is intended to present a pictorial model of each multiplication and division operation with fractions and decimals so classroom teachers provide core lesson instruction on the conceptual model of each operation, repetitively, as well as requiring the associated computation skill.

Student computation practice sheets using these models may be downloaded in the Formative Loop Resources Library. The following multiplication and division pictorial models presented in this paper are listed below. *Note: These pictorial models must be thoroughly studied and understood to teach them well.*

‘Multiplication and Division Pictorial Models’

Fraction and Decimals

<u>Pictorial Model Type</u>	<u>Page Number</u>
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Multiplication and Division of Fractions and Decimals

Pictorial Models

Model 1: Proper Fraction multiplied by a Whole Number

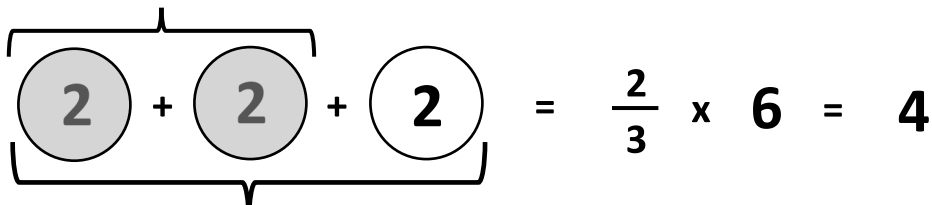
This model may be pedagogically shown in four (4) different ways. It is highly recommended that students learn all four models despite the fact that all models have the same physical meaning.

$$\frac{2}{3} \times 6 = \frac{2}{3} \times \frac{6}{1} = \frac{12}{3} = 4$$

This type of mathematics problem's product is relatively easy to compute. Changing the whole number (6) into an equivalent improper fraction (six over one = 6/1) and multiplying the numerators and denominators obtains the product (12/3) equaling four (4). However, the three "3" in the proper fraction (2/3) states that the whole number six (6) is divided into '3 equal groups' of two (2) each. Similarly, the two "2" in the proper fraction (2/3) states that only two '2' of the '3 equal groups' are selected. The four pictorial models (i.e. Model 1-A, 1-B, 1-C and 1-D) of this type of problem are shown below.

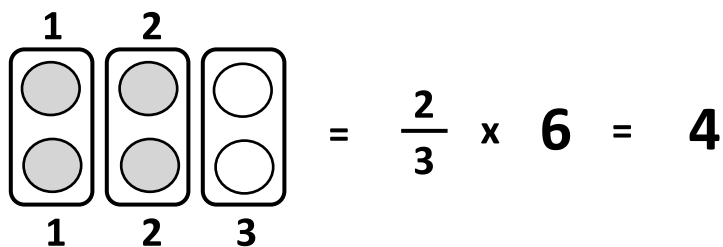
Select only two (2) groups of the '3 equal groups' = 4 Total (Shaded)

Model 1-A:



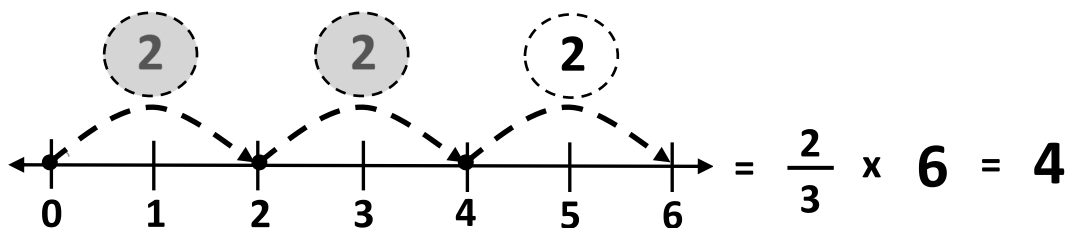
6 is divided into '3 equal groups' of 2 each

Model 1-B:



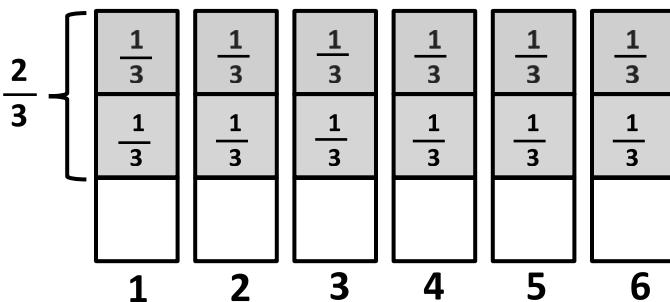
Same as Model 1A except 6 small circles are used to represent the number 6. The 6 objects are divided into '3 equal groups' of 2 each. Interested in 2 of the groups of the '3 equal groups' for a product of 4 shaded objects.

Model 1-C:



Multiplication and Division of Fractions and Decimals

Pictorial Models

Model 1-D: 
$$\frac{2}{3} \times 6 = 4$$

Use this pictorial model if the whole number is odd and count and sum the total number (i.e. 12) of shaded $\frac{1}{3}$ fractions.

Model 2: Improper Fraction/Mixed Number multiplied by a Whole Number

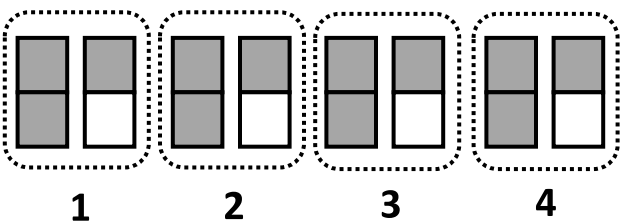
This model may be pedagogically shown in two (2) different ways using either a ‘group’ model or a number line. A mixed number multiplied by a whole number is computationally worked by turning the mixed number into an equivalent improper fraction (e.g. $1 \frac{1}{2} = \frac{3}{2}$). Hence, they are the same computational problem as well as the same pictorial physical model.

$$\frac{3}{2} \times 4 = \frac{3}{2} \times \frac{4}{1} = \frac{12}{2} = 6$$

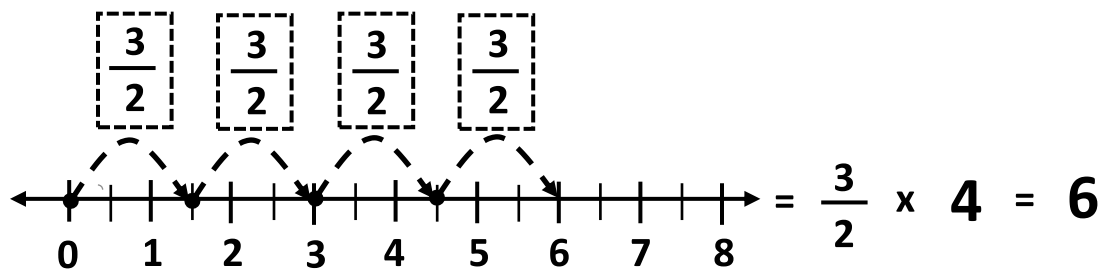
(or)

$$1 \frac{1}{2} \times 4 = 1 \frac{1}{2} \times \frac{4}{1} = \frac{12}{2} = 6$$

The two pictorial models (e.g. Model 2-A and 2-B) of this type of problem are shown below.

Model 2-A: 
$$\frac{3}{2} \times 4 = 6$$

$\frac{3}{2}$ or $1 \frac{1}{2}$ is placed in 4 equal groups and yield a product of 6.

Model 2-B: 
$$\frac{3}{2} \times 4 = 6$$

Using a number line. Six (6) is divided into ‘4 equal groups’ of $\frac{3}{2}$ or $1 \frac{1}{2}$ each. Summed or multiplied by 4 for each $1 \frac{1}{2}$ or $\frac{3}{2}$ yields a product of 6.

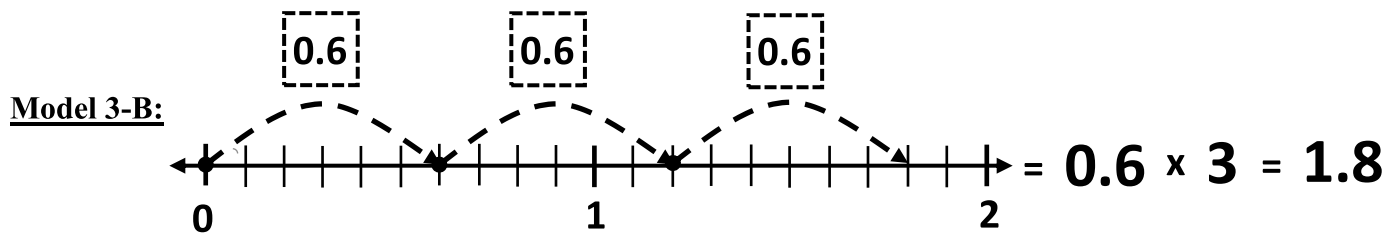
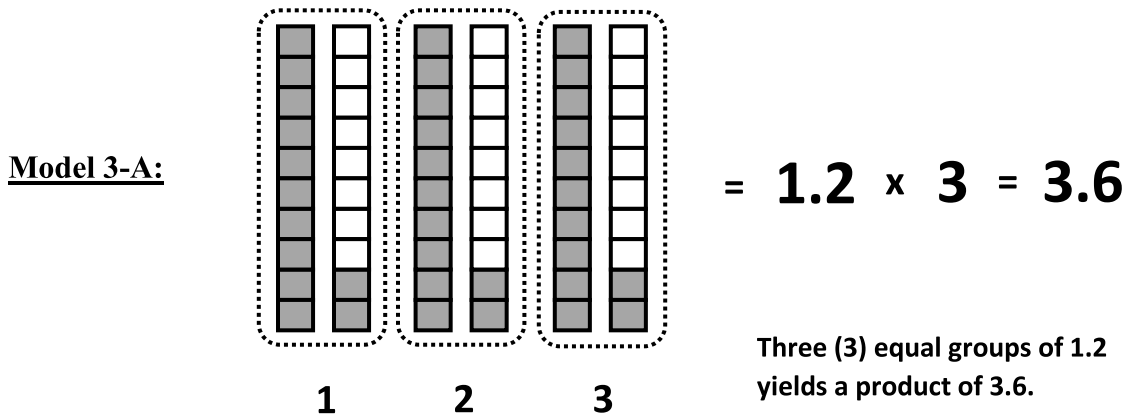
Multiplication and Division of Fractions and Decimals Pictorial Models

Model 3: Decimal multiplied by a Whole Number

This model may also be pedagogically shown in two (2) different ways using either a 'group' model or a number line. A decimal may either be less than one whole or greater than or equal to one whole. Hence, they are the same computational problem as well as the same pictorial physical model. A decimal less than 1 will always yield a product less than the original whole number, and a decimal greater than or equal to 1 whole will invariably produce a product greater than original whole number.

$$\mathbf{0.6 \times 3 = 1.8 \quad (or) \quad 1.2 \times 3 = 3.6}$$

The two pictorial models (e.g. Model 3-A and 3-B) of this type of problem are shown below.



Using a number line. Three (3) equal groups of 0.6 yields a product of 1.8.

Multiplication and Division of Fractions and Decimals

Pictorial Models

Model 4: Proper Fraction multiplied by a Proper Fraction
(and two decimals each less than 1 whole)

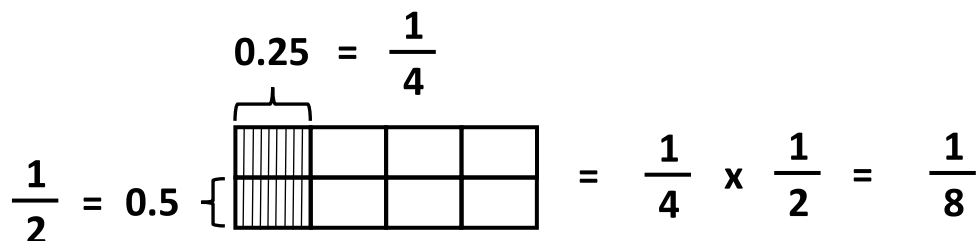
The proper fraction multiplied by a proper fraction model can be a bit challenging for many students. However, it may be pedagogically shown in two (2) different ways using either a ‘grid’ model or a number line. Both a proper fraction and a decimal multiplied by itself yields the same product; hence, their physical meaning may be shown using the same pictorial model.

$$\frac{1}{4} \times \frac{1}{2} = \frac{1}{8}$$

(or)

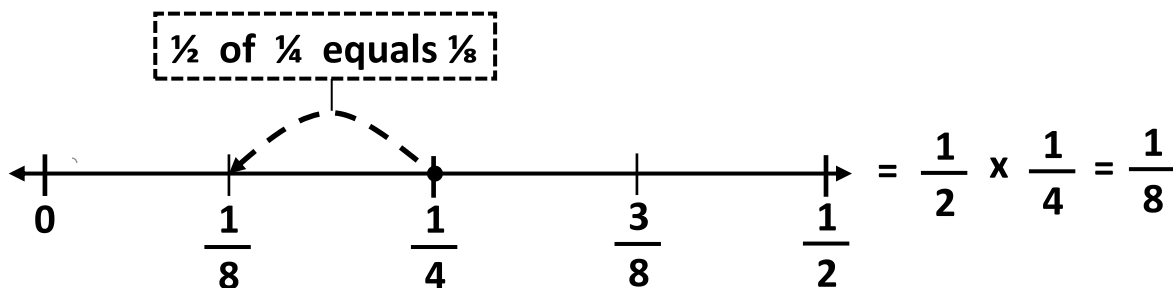
$$0.25 \times 0.5 = 0.125$$

The two pictorial models (e.g. Model 4-A and 4-B) of this type of problem are shown below.



Model 4-A:

Using an area or grid model, each side of the grid is divided into equal parts based on the value of each fraction’s denominator (e.g. 2 and 4). As each fraction ($1/4$ and $1/2$) is vertically or horizontally cross hatched, the product is the double cross-hatched area of intersection. This intersection area is 1 rectangle of the 8 total divided rectangles of the total grid. Hence, 0.25×0.5 is equal to 0.125 or $1/8$.



Model 4-B:

Using a number line, $1/4$ is divided into two equal sections of $1/8$ segments. Hence, $1/2$ OF $1/4$ must equal a product of $1/8$. (‘OF’ means to multiply in math)

Multiplication and Division of Fractions and Decimals

Pictorial Models

Model 5: Proper Fraction multiplied by an Improper Fraction/Mixed Number

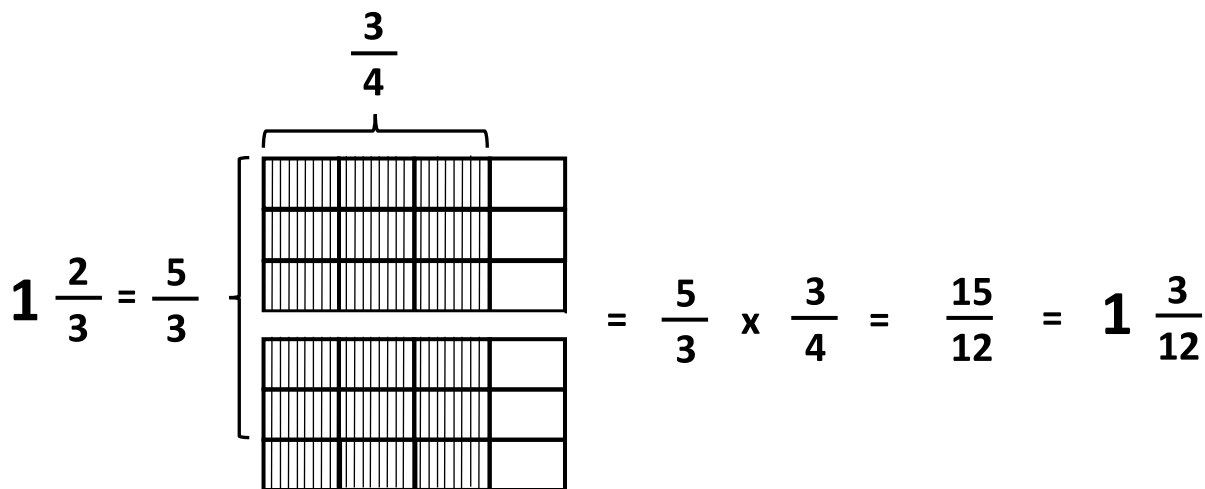
The proper fraction multiplied by an improper fraction pictorial model may be pedagogically shown using a ‘grid’ model. Since mixed numbers are converted to improper fractions (e.g. $5/3 = 1 \frac{2}{3}$) when multiplying computationally; their physical meaning may be shown using the same pictorial model below.

$$\frac{5}{3} \times \frac{3}{4} = \frac{15}{12} = 1 \frac{3}{12}$$

(or)

$$1 \frac{2}{3} \times \frac{3}{4} = \frac{15}{12} = 1 \frac{3}{12}$$

The pictorial model of this type of problem is shown below. Note: Since $5/3$ is greater than 1 whole, two rectangles will have to be drawn vertically (i.e. $3/3 + 2/3$ shaded horizontally).



Using an area or grid model, each side of the grid is divided into equal parts based on the value of each fraction’s denominator (e.g. 3 and 4). The denominators make two (2) separate rectangular grids each divided into equal groups of twelfths (e.g. 3×4) with each rectangular grid comprised of smaller rectangles each with an exact area of $1/12$.

As each fraction ($5/3$ and $3/4$) is vertically or horizontally cross hatched, the product is the double cross-hatched area where they intersect. This intersection area is 15 total rectangles each with an area of $1/12$. Hence, the 15 small rectangles sum to a total of $15/12$ or $1 \frac{3}{12}$ – which represents the product of the proper fraction ($3/4$) and improper fraction ($5/3$).

Multiplication and Division of Fractions and Decimals Pictorial Models

Model 6: Improper Fraction/Mixed Number multiplied by an Improper Fraction/Mixed Number

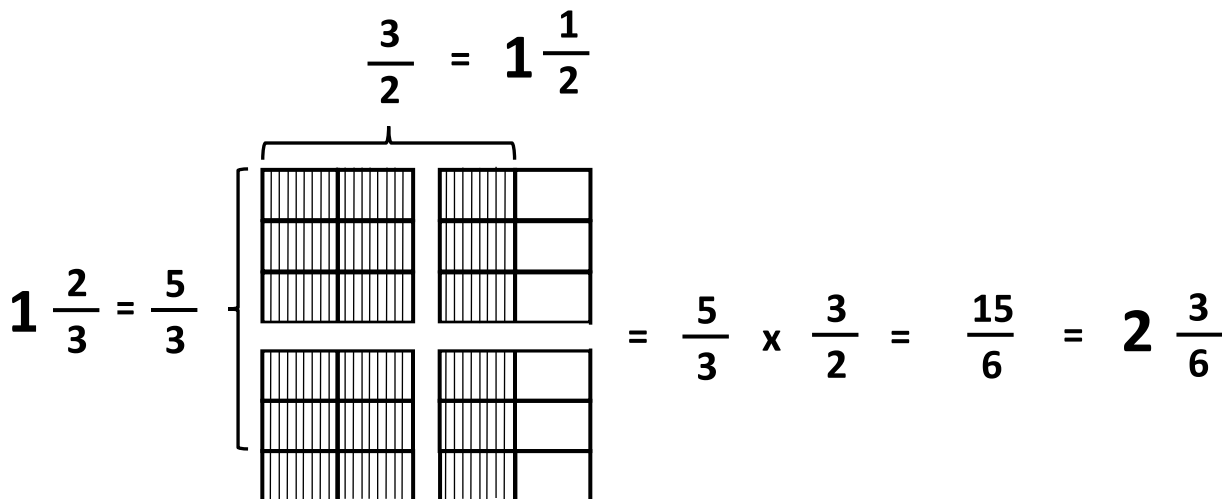
An improper fraction multiplied by an improper fraction pictorial model may also be pedagogically shown using a 'grid' model. Since mixed numbers are converted to improper fractions (e.g. $5/3 = 1 \frac{2}{3}$) when multiplying, two mixed numbers multiplied together represent the same physical meaning and pictorial model as two improper fractions multiplied together. See computation below for equivalency purposes.

$$\frac{5}{3} \times \frac{3}{2} = \frac{15}{6} = 2 \frac{3}{6}$$

(or)

$$1 \frac{2}{3} \times 1 \frac{1}{2} = \frac{15}{6} = 2 \frac{3}{6}$$

The pictorial model of this type of problem is shown below. Note: Both $5/3$ and $3/2$ are greater than 1 whole; therefore, two congruent rectangular grids will have to be drawn vertically and horizontally to represent the improper fractions ' $5/3$ ' and ' $3/2$ '.



Using an area or grid model, each side of the rectangular grids are divided into equal parts based on the value of each fraction's denominator (i.e. 2 and 3). The denominators make four (4) separate rectangles each divided into equal areas of sixths (i.e. 2×3) - each comprised of smaller rectangles with an exact area of $1/6$ each.

As each fraction ($5/3$ and $3/2$) is vertically or horizontally cross hatched, the product is the double cross-hatched area where they intersect. The intersection area is 15 small rectangles each with an area of $1/6$. Hence, the 15 small rectangular sum to $15/6$ or $2 \frac{3}{6}$ - representing the product of $3/2$ and $5/3$. Note: This model is more difficult for students because of the extra rectangles in the grid both horizontally and vertically to make the two improper fractions (i.e. $5/3$ and $3/2$).

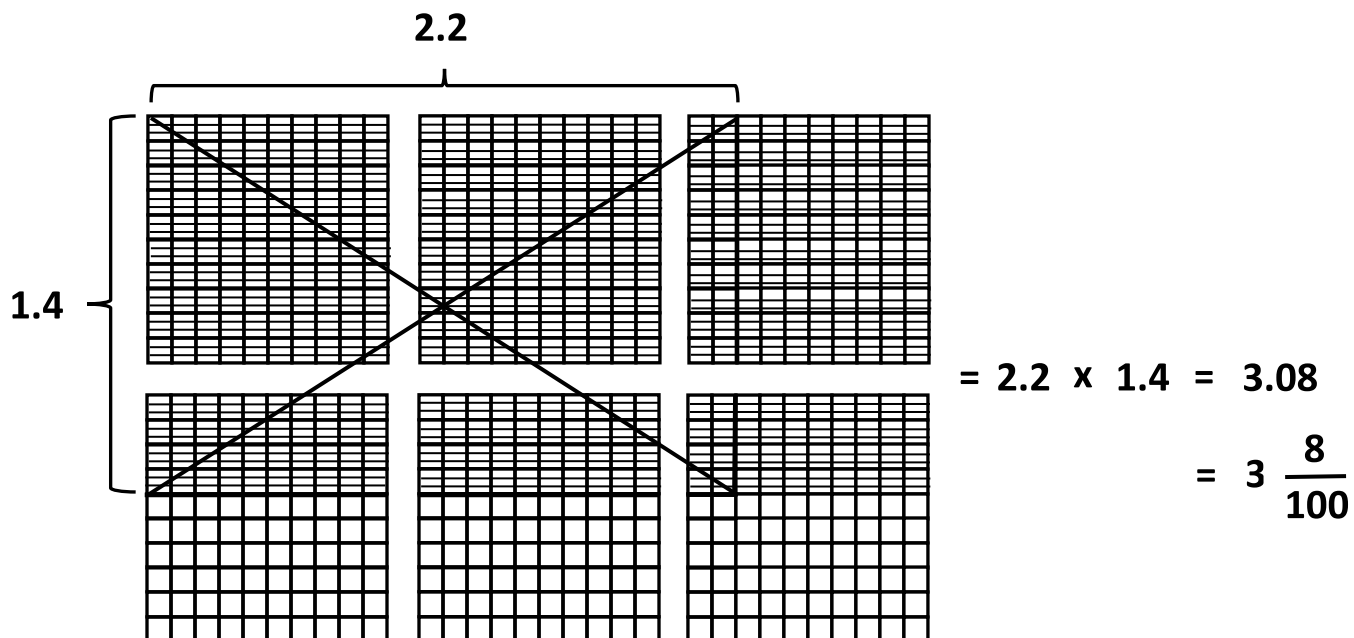
Multiplication and Division of Fractions and Decimals Pictorial Models

Model 7: Decimal multiplied by a Decimal (both decimals are greater than 1 whole)

A decimal multiplied by a decimal pictorial model is also pedagogically shown using a ‘grid’ model. It is noted that both decimals must have a value greater than 1 whole for the model shown below to be valid.

$$2.2 \times 1.4 = 3.08 = 3 \frac{8}{100}$$

The pictorial model of this type of problem is shown below.



Using an area or grid model, each side of the rectangular grids are in tenths and each square represents an area equal to exactly $1/100$. The intersection area (double cross-hatched and also shown with a large ‘X’) of the two decimals (2.2 and 1.4) is the product of the two decimals. Summing the intersection area ($100 + 100 + 40 + 40 + 20 + 8$) yields a total of 308 squares – each square equaling an area of $1/100$. Hence, the product is $308/100 = 3.08 = 3 \frac{8}{100}$.

Multiplication and Division of Fractions and Decimals

Pictorial Models

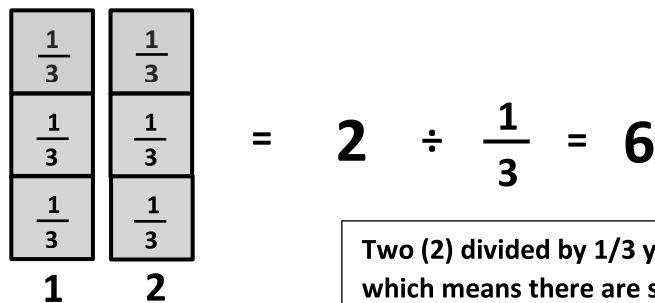
Model 8: Whole Number divided by a Proper Fraction

The division model of a whole number divided by a proper fraction may be pedagogically shown in two (2) different ways. It is highly recommended that students learn both pictorial models despite the fact that both of the models have the same physical meaning.

$$2 \div \frac{1}{3} = 6$$

The two (2) pictorial models (e.g. Model 8-A and 8-B) of this type of problem are shown.

Model 8-A:

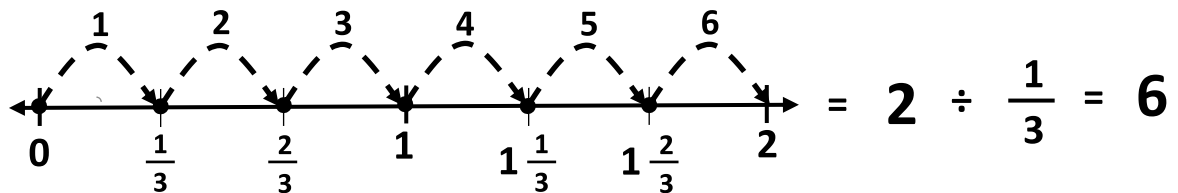


Two (2) divided by $\frac{1}{3}$ yields a quotient of 6 – which means there are six (6) equal groups of $\frac{1}{3}$.

This pictorial model is very useful for students since it can readily be drawn on their paper and the total number (i.e. 6) of shaded $\frac{1}{3}$ fractions counted and summed.

Note: The classroom teacher can tell students if they start with a whole number (2 in the above example), then their quotient is a whole number (6, above) to help them in the initial stages of learning this model. The reverse is true when starting with a fraction ($\frac{1}{3} \div 2 = \frac{1}{6}$) – starting with $\frac{1}{3}$ yields $\frac{1}{6}$ as a quotient.

Model 8-B:



Using a number line, two (2) is divided by $\frac{1}{3}$ into '6 equal groups'. Summed for each $\frac{1}{3}$ yields a quotient of 6.

Multiplication and Division of Fractions and Decimals

Pictorial Models

Model 9: Whole Number divided by an Improper Fraction/Mixed Number

The division model of a whole number divided by an improper fraction may also be pedagogically shown in two (2) different ways. This division model also holds for mixed numbers (e.g. $3/2 = 1 \frac{1}{2}$). Again, it is highly recommended that students learn both pictorial models despite the fact that both of the models have the same physical meaning.

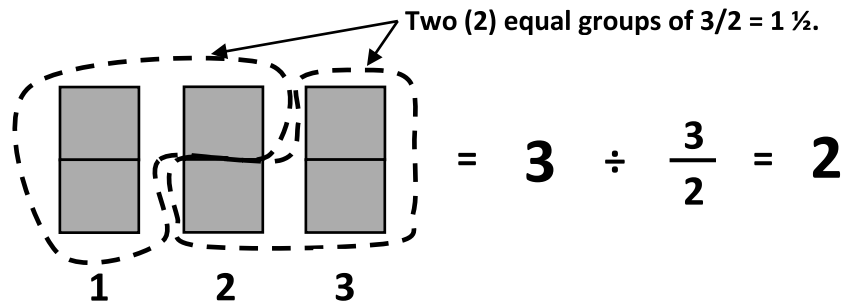
$$3 \div 1 \frac{1}{2} = 2$$

or

$$3 \div \frac{3}{2} = 2$$

The two (2) pictorial models (e.g. Model 9-A and 9-B) of this type of problem are shown.

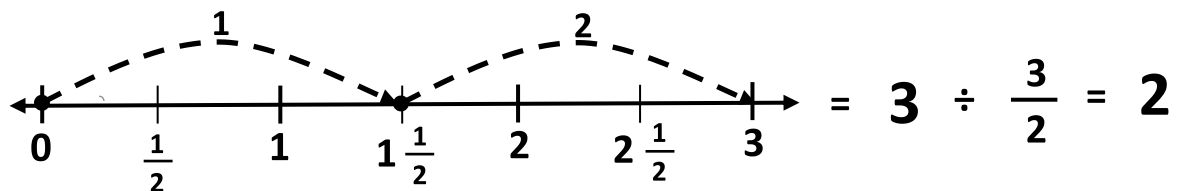
Model 9-A:



Three (3) Wholes are divided into equal groups of $3/2$ or $1 \frac{1}{2}$ yielding a quotient of 2.

Note: Students should always be reminded of the most basic of division fundamentals regardless of the appearance of a complicated division problem as shown above. The divisor (i.e. $3/2$) is always equal groups that the dividend (i.e. 3) may be separated, and the quotient is always the number of equal groups in this model.

Model 9-B:



Using a number line, three (3) is divided by $3/2$ into '2 equal groups'. Hence, yielding a quotient of 2.

Multiplication and Division of Fractions and Decimals

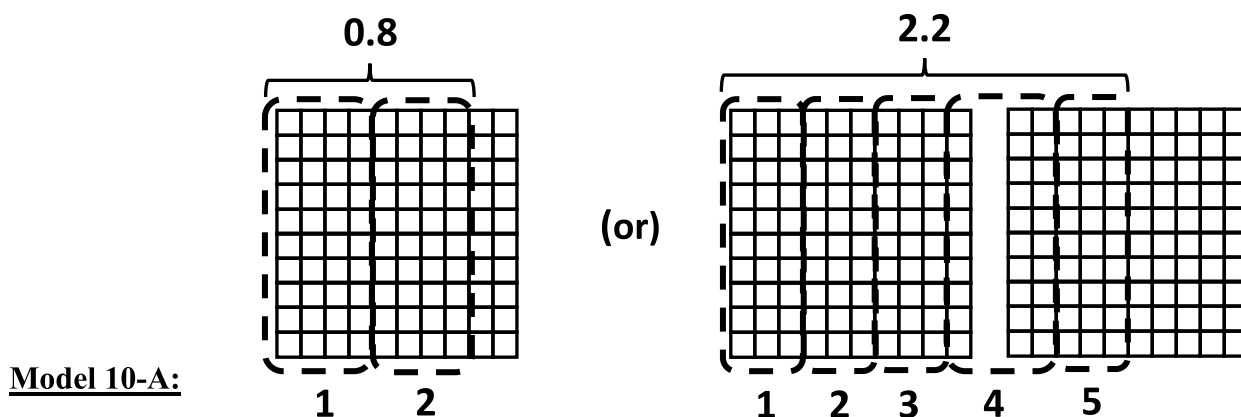
Pictorial Models

Model 10: Decimal divided by a Whole Number

The division model of a decimal divided by a whole number may be pedagogically shown in two (2) different ways. The decimal (dividend) may be greater or less than one whole since both pictorial models are represented in the same manner. It is highly recommended that students learn both pictorial models despite the fact that both of the models have the same physical meaning.

$$0.8 \div 2 = 0.4 \quad (\text{or}) \quad 1.5 \div 5 = 0.3$$

The two (2) pictorial models (e.g. Model 10-A and 10-B) of this type of problem are shown.

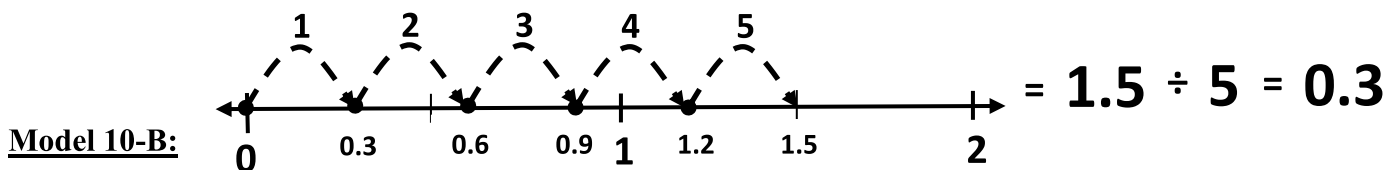


$$0.8 \div 2 = 0.4$$

$$1.5 \div 5 = 0.3$$

Both decimals (0.8 and 1.5) are divided by a divisor (2 and 5) to yield quotients (0.4 and 0.3) that represent the number of equal groups based on each divisor.

Note: Students have much more difficulty with the division of decimals that are greater than 1 whole. They have a group (i.e. number 4 above) that looks unequal since it must group items across the gap between the grids. This is the type of problem State assessments will ask generally for this reason.



Using the number line, 1.5 is divided by 5 (i.e. divisor) to form equal groups of 0.3 (i.e. the quotient).

Multiplication and Division of Fractions and Decimals Pictorial Models

Model 11: Decimal or Whole Number divided by a Proper Fraction/Improper Fraction/Mixed Number or Decimal

This model is a standard model of division since the divisor (e.g. changed to a whole number by multiplying by 10/10, 100/100 or 1,000/1,000 so the *divisor is converted to a whole number*) is manipulated so the problem appears as it would in Model 10 (above) or simply put, whole number division students learned when they were first provided instruction in long division. All fractions and mixed numbers are converted to an equivalent decimal. The examples below illustrates this process.

Example 1: Given a decimal divided by a proper fraction: $3.12 \div \frac{1}{2}$

$$3.12 \div \frac{1}{2} = \frac{1}{2} \overline{)3.12} = 0.5 \overline{)3.12} = \frac{3.12}{0.5} = \frac{3.12}{0.5} \times \frac{10}{10} = \frac{31.2}{5}$$

The original problem $3.12 \div \frac{1}{2}$ is now $\frac{31.2}{5}$ or $5 \overline{)31.2}$

Example 2: Given a decimal divided by a mixed number: $9.124 \div 5\frac{1}{4}$

$$9.124 \div 5\frac{1}{4} = 5\frac{1}{4} \overline{)9.124} = 5.25 \overline{)9.124} = \frac{9.124}{5.25} = \frac{9.124}{5.25} \times \frac{100}{100} = \frac{912.4}{525}$$

The original problem $9.124 \div 5\frac{1}{4}$ is now $\frac{912.4}{525}$ or $525 \overline{)912.4}$

Example 3: Given a decimal divided by a decimal: $14.59 \div 0.304$

$$14.59 \div 0.304 = \frac{14.59}{0.304} \times \frac{1,000}{1,000} = \frac{14,590}{304} = 304 \overline{)14,590}$$

Note: The divisor is multiplied by 10/10 or 100/100 or 1,000/1,000 to convert it to a whole number.

Multiplication and Division of Fractions and Decimals

Pictorial Models

Model 12: Proper Fraction/Improper Fraction/Mixed Number divided by a Whole Number

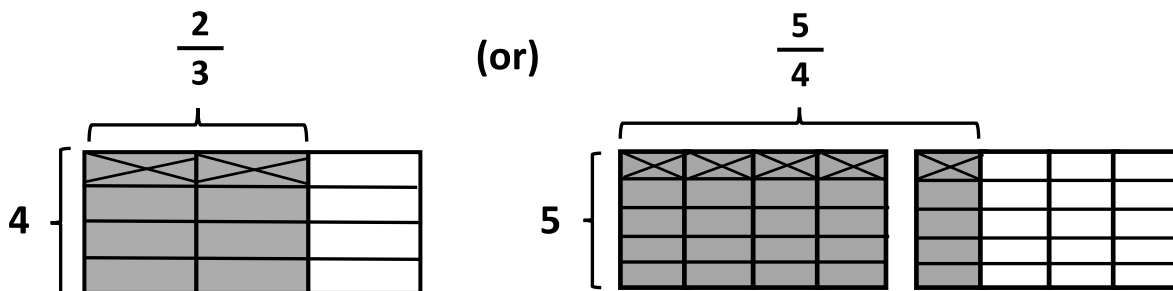
This division model may be shown through fraction strips and number lines as well as an area/grid model. Since mixed numbers are converted to an equivalent improper fraction, the improper fraction model will also be modelled. The grid model and number line pictorial models are the easier models to understand and instruct to students. Hence, both the grid and number line models are illustrated below.

$$\frac{2}{3} \div 4 = \frac{2}{3} \div \frac{4}{1} = \frac{2}{3} \times \frac{1}{4} = \frac{2}{12}$$

(or)

$$\frac{5}{4} \div 5 = \frac{5}{4} \div \frac{5}{1} = \frac{5}{4} \times \frac{1}{5} = \frac{5}{20}$$

The two pictorial models (e.g. Model 12-A and 12-B) of this type of problem are shown below.



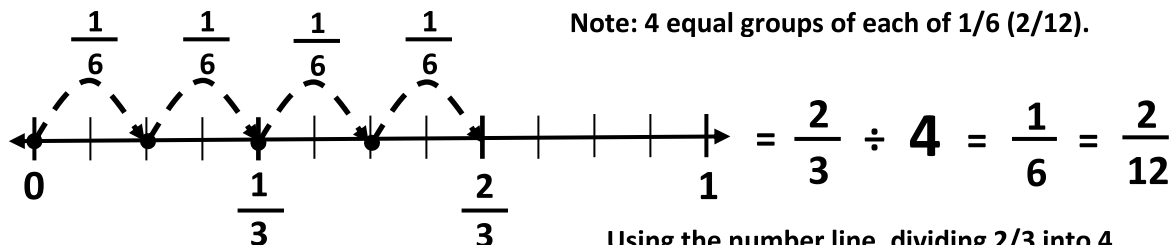
Model 12-A:

$$\frac{2}{3} \div 4 = \frac{2}{12}$$

$$\frac{5}{4} \div 5 = \frac{5}{20}$$

Both fractions ($\frac{2}{3}$ and $\frac{5}{4}$) are divided by a divisor (4 and 5) to yield quotients ($\frac{2}{12}$ and $\frac{5}{20}$) that represent the number of equal parts that each fraction was divided (indicated by the 'X' on each diagram). The denominator will always be the total equal parts (12 and 20, respectively) of each rectangular grids.

Model 12-B:



Using the number line, dividing $\frac{2}{3}$ into 4 equal groups yields a quotient of $\frac{1}{6}$ ($\frac{2}{12}$).

Multiplication and Division of Fractions and Decimals

Pictorial Models

Model 13: Proper Fraction/Improper Fraction/Mixed Number divided by a
Proper Fraction/Improper Fraction/Mixed Number

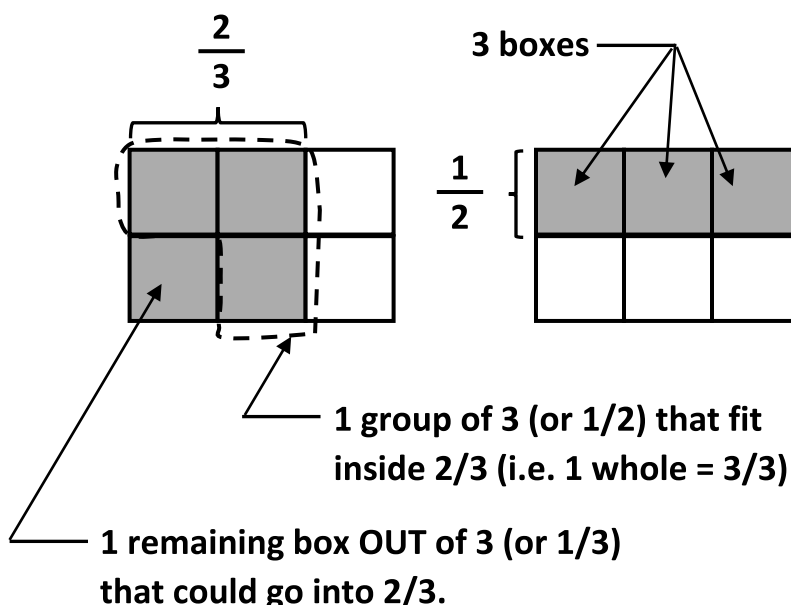
This division model may be shown using an area/grid model. Since mixed numbers are converted to an equivalent improper fraction, the improper fraction model will also be modelled. Although the computational aspect of this division algorithm is relatively straightforward, these models' quotients are difficult to visualize and understand for many students. It is highly recommended the teacher repetitively require the students to question and reflect if their computation solution 'makes sense' and is reasonable. For example, when $\frac{2}{3}$ is divided by $\frac{1}{2}$, the student should ask, "How many times will $\frac{1}{2}$ equally 'go into' $\frac{2}{3}$?" In doing so, the student realizes that $\frac{1}{2}$ can fit once into $\frac{2}{3}$, and their quotient will be a little larger than 1 whole. Another example where a student should self-reflect is when $\frac{5}{4}$ is divided by $\frac{4}{3}$. Since $\frac{4}{3}$ (the divisor) is larger than $\frac{5}{4}$ (the dividend), the student should realize that the quotient should be less than 1 (i.e. $\frac{15}{16}$ when calculated). In doing so, students learn to 'think' about the mathematics on a physical level each time when computing quotients. The grid model grid/area model is illustrated below.

$$\frac{2}{3} \div \frac{1}{2} = \frac{2}{3} \times \frac{2}{1} = \frac{4}{3}$$

(or)

$$\frac{5}{4} \div \frac{4}{3} = \frac{5}{4} \times \frac{3}{4} = \frac{15}{16}$$

Example: Proper Fraction divided by a Proper Fraction:



STEPS IN USING THIS MODEL:

- 1.) Draw a grid of $\frac{2}{3}$.
- 2.) The grid area should be the product of the fraction's denominators ($2 \times 3 = 6$).
- 3.) Count the number of shaded boxes in grid labeled $\frac{1}{2}$. (3 Total.)
- 4.) How many boxes of 3 'go in to' the $\frac{2}{3}$ shaded grid? 1 group of 3 with 1 box remaining (So, 1 remains of group of 3).
- 5.) 1 Group of 3 ($\frac{3}{3}$) + $\frac{1}{3}$ (remaining fraction); hence, $\frac{3}{3} + \frac{1}{3} = \frac{4}{3}$ (i.e. the quotient)

$$\frac{2}{3} \div \frac{1}{2} = \frac{3}{3} + \frac{1}{3} = \frac{4}{3}$$

Positive and Negative Integers

Grades 5 - 8

*Student Understanding of Magnitudes
and Basic Operations*

Pedagogy

Blaine A. Helwig

January, 2018

Positive and Negative Integers

Student Understanding of Magnitudes and Basic Operations - Pedagogy

After several visits to middle schools in the last couple months, my interest in the pedagogy of positive and negative integers has dramatically increased. From a curriculum sequencing perspective, positive and negative numbers are introduced at the end of 5th grade in select elementary schools and fully during sixth grade. The mathematical content of negative and positive integers is embryonic, so background information does not hinder student understanding as it often does with other math content areas – meaning a vast number of dependent numeracy skills is not vertically aligned or needed to comprehend the rudiments of positive and negative numbers. Furthermore, The Khan Academy and many YouTube videos offer the typical classroom teacher rich, in depth course content and invaluable pedagogical advice; hence, it seems more than a little surprising that so many students seem to struggle with this important number sense concept.

After much reflection, I believe one of the problematic pedagogical issues in student understanding of negative and positive integer magnitudes and operations may be due to the possibility that a number line was not used in the initial instructional lessons to the extent that was necessary. Therefore, I created a basic template with positive and negative numbers that ranges from negative twelve (-12) to positive twelve (+12) on 11 x 17 inch paper so the student aid is sufficiently large for effective classroom use. There are five (5) templates on each page so the teacher may have a classroom set with only six (6) Xeroxed copies. The positive and negative integer number line template is included at the end of this document.

This short pedagogy paper is intended to supplement a math teacher's lesson preparation and thinking with regard to teaching positive and negative integers' magnitudes and their use in basic math operations (i.e. addition, subtraction, multiplication and division). This instruction is highly dependent upon the daily inclusion of incorporating a student aid positive and negative integer number line until the concepts are mastered. The use of a positive/negative integer number line template is essential for understanding relative magnitudes of negative numbers as well as their inclusion in the physical meaning of addition and subtraction. This number line is easy and quick to prepare each day, so students may use the number lines until a true understanding of positive and negative integer relationships is thoroughly developed. Furthermore, the implementation of spaced repetition instruction into the learning process is also essential to ensure students are exposed to threshold levels of repetition to secure mastery of the content. A free downloadable white paper and two blogs with more detailed information are available for the interested educator at the website address in the footer of this document.

Relative Magnitudes of Positive and Negative Integers - Comparing using $<$, $>$, $=$ Signs

If students do not understand relative magnitudes of positive and negative numbers, a majority of related mathematical content presented in future math lessons will not be founded on mathematical bedrock. Subsequently, there is one general rule that students should completely understand when considering the magnitude or the relative size of integers regardless of its fixed location/position on the number line.

General Rule of Magnitude for All Integers: “*The integer to the right is a larger integer.*”

As students learned in their elementary math classes, the integer that is farthest to the right is the largest in value. As expected this situation does not change when considering the relative magnitudes of positive or negative integers. In fact, there are only six unique situations.

There are six (6) general cases to consider with *comparing* positive and negative integers. Those six (6) unique cases are the following: (Case 1: Positive – Positive), (Case 2: Positive – Zero), (Case 3: Negative – Negative), (Case 4: Negative – Zero), (Case 5: Positive – Negative) and (Case 6: Equal Integers – Positive or Negative). Specific examples of each case with a numerical situation is shown below.

Case 1: If given two integers, 3 and 5. Five (5) is farther to the right on the number line; therefore, it is larger in value than three (3). Hence, $5 > 3$ or $3 < 5$.

Case 2: If given two integers, 0 and 8. Eight (8) is farther to the right on the number line; therefore, it is larger in value than zero (0). Hence, $8 > 0$ or $0 < 8$.

Case 3: If given two integers, 7 and - 3. Seven (7) is farther to the right on the number line; therefore, it is larger in value than negative three (- 3). Hence, $7 > - 3$ or $- 3 < 7$.

Case 4: If given two integers, - 6 and 0. Zero (0) is farther to the right on the number line; therefore, it is larger in value than negative six (- 6). Hence, $0 > - 6$ or $- 6 < 0$.

Case 5: If given two integers, - 4 and - 2. Negative (- 2) is farther to the right on the number line; therefore, it is larger in value than negative four (- 4). Hence, $- 2 > - 4$ or $- 4 < - 2$.

Case 6: If given two integers, - 9 and - 9. Negative nine (- 9) is in the exact same location as negative nine (- 9). Hence, $- 9 = - 9$.

Second semester 5th graders and middle school students must completely understand the relative magnitudes of positive and negative numbers to correctly add and subtract integers. It is highly recommended that a teacher devote a couple class days of instruction in this content area prior to transitioning to addition and subtraction of positive and negative integers. The lessons on magnitude and other concepts are dramatically heightened with short mini-lessons (see Spaced Repetition Instruction methodology as referenced on website address in the footer) to ensure students understand the relative size of positive and negative integers.

Addition of Positive and Negative Integers

Addition of two integers regardless if the integers are negative or positive is a fairly straight forward procedure. If the two integers are both positive (i.e. + 2, + 5), then the addition problem is identical to the addition problems the student has successfully engaged since kindergarten. The two integers represent the total number of combined spaces on the number line when summed. As expected, the same physical meaning is true when one integer is positive and one integer is negative. For example, if the addition problem is the following equation: $5 + (-3)$, then the student can sum the integers by using the location of either integer as a starting point, and move in the direction of positive or negative value of the other integer. For instance, on $5 + (-3)$, students may begin on the number line at the number 5 (or count 5 spaces from zero to locate positive five (+ 5), but not necessary for older students) and move 3 spaces to the left, since

it is a negative 3 to obtain the sum of +2. Or, start at negative three (-3) on the number line, and move 5 spaces to the right since five (5) is positive, and the same sum of +2 is obtained.

It is highly recommended that students use a number line when working problems until they are highly proficient at the process and can mentally map a number line with positive and negative integers. Implementing a spaced repetition instructional system using addition of positive and negative numbers is an effective means to ensure student mastery. Prior to the start of the core math lesson, the teacher should provide 3 to 5 addition problems using both negative and positive operations. The problems should be quickly reviewed and checked by the classroom teacher. In 4 to 6 consecutive days of consistent instruction, students have mastered the positive and negative integer addition.

The spaced repetition should continue as students are introduced to subtraction of negative and positive numbers. Although, after the subtraction process has been introduced and students have demonstrated a basic understanding, the teacher should include one or two subtraction problems in conjunction with the addition problems. Students should be presented with ample opportunities to become proficient. As they complete both addition and subtraction problems over multiple days of the mini-lesson/spaced repetition, students begin to separate the operational processes of addition and subtraction and ingrain their unique meaning until they are competent completing each problem without the use or need of a number line visual aid. Finally, it is important to note that when students begin to learn subtraction of negative and positive numbers, many students will confuse the previously learned addition process and make errors; however, with continued daily practice with addition as they learn subtraction, these errors significantly diminish.

Subtraction of Positive and Negative Integers

Most elementary students discover the following truism by first grade: Subtraction is much more challenging than addition. Unfortunately, this axiom does not change when negative integers are added into the fray. There are two main reasons students generally struggle more on subtraction than addition. First, the commutative property of addition eliminates memorizing many of the standard one-digit addition facts since $5 + 3 = 3 + 5$. Simply put, it matters not which of the two integers a student selects to begin the addition process to compute the sum of any two integers. Unfortunately, there is not a commutative property for subtraction. Second, when subtracting two integers, students often do not realize that they are computing a ‘difference’ between the integers. In fact, students are calculating the total number of ‘spaces’ on the number line between the two integers. This aspect of the subtraction of two positive integers is true in all subtraction processes. The student is always computing the number of spaces or distance between two integers regardless if the integers are positive or negative. Consequently, **the first step** in computing differences between positive and negative integers is computing the total number of spaces between them on the number line. **The second step** is determining if the difference is negative or positive. For example, when computing the difference between $7 - 4$, there are 3 spaces between the two integers. Consequently, the first step of the subtraction process yields that the difference is 3. The second step depends upon the relative magnitude of the two integers. Since 4 is smaller than 7, the difference must be positive. The second step in the subtraction process was an oblivious step to elementary students since they always subtracted a smaller integer from a larger one.

However, if one of the integers is a positive integer and the other is a negative integer, the process is exactly the same, but students must evaluate if the value of the difference is positive or negative. For

instance, in the subtraction problem, $3 - (-4)$, there are 7 total spaces between positive three (+3) and negative four (-4). Therefore, the difference is 7. But, when working with positive and negative integers, there is a second step. Since a smaller integer (-4) is subtracted from a larger integer, the difference is positive. If the subtraction problem were reversed, $(-4) - (+3)$, then the total number of spaces or difference remains 7 spaces between the two integers, but the difference is a negative seven (-7) since we are subtracting a larger number from a smaller number.

The last case to consider is when students are subtracting two negative integers from one another. For example, give the subtraction problem, $(-3) - (-8)$, there are 5 total spaces between the two negative integers; hence, the difference is five (5). In step 2, since negative eight (-8) is smaller than negative three (-3), the student is subtracting a smaller number from a larger number and the difference is a positive five (+5).

If students are not provided instruction on the physical meaning of subtraction that matches their understanding from his or her primary grades, students think subtraction possesses a different physical meaning than they initially learned. In sixth grade, students often are taught to memorize that when subtracting a negative number from a positive number, that they should automatically add without realizing that they are actually computing the total number of spaces between the two integers. The subtraction process yields the correct answer, but it does not result in mathematical understanding of the process. This lack of foundational understanding often hinders the successful systematic construction of dependent mathematics in subsequent middle and high school math courses.

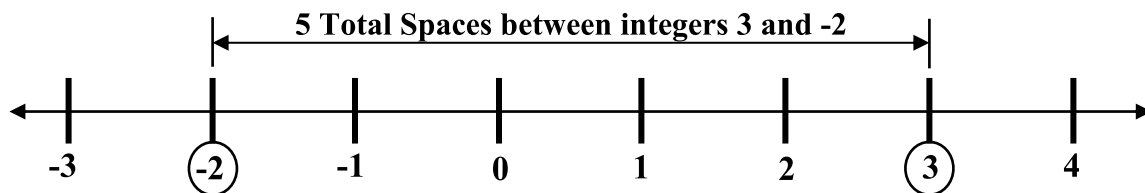


Figure A

Figure A above illustrates a subtraction process for the problem/equation: $3 - (-2) = 5$. In this situation, the student completely understands computing differences with positive and negative integers. The two integers, positive three (+3) and negative two (-2), are both circled on the whole number line. There are five total spaces between the two integers. Since positive three (+3) is larger than negative two (-2), the difference is a positive five or +5.

However, if the subtraction problem shown in Figure A were reversed to the following equation: $-2 - (+3)$, then there are still 5 total spaces between the integers, but since positive three (+3) is larger than negative two (-2), the difference is a negative five or -5.

In summary, there are always **two steps** when computing differences that promote complete student understanding of the subtraction process when using positive and negative numbers.

First, compute the total number of spaces (the difference) between the two integers on a number line either mentally or initially, with the aid of a negative/positive number line. This meaning is identical to the subtraction process that was learned in the primary grades during the students' elementary years.

Second, the student analyzes the subtraction problem to determine if the difference computed in step 1 is either a positive or negative value. If a smaller integer is subtracted from a larger integer, the difference value is positive. If a larger integer is subtracted from a smaller integer, the difference value is negative.

Multiplication and Division of Positive and Negative Integers

Multiplication and Division of positive and negative numbers is extremely straightforward and much easier to understand than the subtraction process. The student only needs to know the sign conventions for multiplication and division. If the two factors are positive, then the product (or quotient if dividend and divisor are of opposite signs) is positive. If one of the factors is negative and the other positive, then the product (or quotient) is negative. Finally, if both factors are negative, then the product (or quotient) is positive. Students usually memorize these situations, and if they are familiar with their multiplication and division math facts, they are functionally able to compute products, factors, and quotients correctly.

However, for the intention of a more thorough analysis, the mathematical reason these sign conventions exist can be illustrated based the following proof using the distributive property. If mathematics is to be consistent, then the distributive property of multiplication must remain valid when computing negative and positive products.

For example, if the following distributive property is true and must remain valid in all operations, then a positive integer multiplied by a negative integer **must** equal a negative product.

Proof that a negative integer multiplied by a positive integer equals a negative product

$3(0) = 0$. Simply put, a whole number multiplied by zero (0) must equal zero (0). If zero is rewritten as adding a positive integer to a negative integer of the opposite value, then $(6 + (-6)) = 0$.

$$3(6 + (-6)) = 0 \implies \text{expanding via the distributive property yields: } 3(6) + 3(-6) = 0$$

In order to be mathematically true, $18 + 3(-6) = 0$ Hence $3(-6)$ must be a -18. ***Therefore, a negative integer multiplied by a positive integer must always equal a negative product.***

Proof that a negative integer multiplied by a negative integer equals a positive product

This same analysis can be developed to prove that a negative integer multiplied by another negative integer must be a positive product. Again, using the distributive property of multiplication to prove that premise is illustrated below.

$$-3(6 + (-6)) = 0 \implies \text{expanding via the distributive property yields: } -3(6) + (-3)(-6) = 0$$

In order to be mathematically valid, $-18 + (-3)(-6) = 0$ Hence, $(-3)(-6)$ must be a positive 18. ***Therefore, a negative integer multiplied by a negative integer must always equal a positive product.***

As expected, the same sign convention rules are valid for either multiplication or division computations. The multiplication and division sign conventions rules are summarized below:

Multiplication and Division Sign Conventions

- 1.) $[x \text{ or } \div]$: **Positive (+)** by **Positive (+)** = **Positive Product/Quotient**
- 2.) $[x \text{ or } \div]$: **Negative (-)** by **Positive (+)** = **Negative Product/Quotient**
- 3.) $[x \text{ or } \div]$: **Negative (-)** by **Negative (-)** = **Positive Product/Quotient**

Final Comments Concerning Positive and Negative Integers

It is imperative that students readily understand positive and negative integers and their physical meaning in both magnitudes and operations. In order to accomplish this objective, students require consistent, quality instruction on set processes. The use of a number line student aid that possesses positive and negative numbers significantly assists students to visually understand the mathematics and the corresponding physical meaning. Students must possess a visualization of a ‘mental positive/negative number line’ when working integer addition, subtraction, multiplication or division operations regardless of the integer sign. Students should not rote memorize but fully comprehend that the same mathematical rules that were valid during their elementary school numeracy work with only positive integers are identical to the same mathematical rules that govern the operations of positive and negative integers.

The end result of an in-depth student understanding of negative and positive integer work is significant and lasting. The process ensures that the mathematics instruction presented in later grades builds upon a correctly constructed foundation of mathematical conceptual and physical meaning.

With the use of ‘spaced repetition instruction,’ students are systematically exposed to the threshold number of repetitions required to master mathematics content. A white paper expounding on the basics and benefits of ‘spaced repetition’ can be downloaded for free at the website address located in the footer. This instructional method is a highly effective and efficient pedagogical process that ensures both mastery and retention of prior content. Finally, a recommended sequence of instruction is summarized below to assist teachers in the pedagogical planning and preparation process.

Positive and Negative Integer – Recommended Sequencing - Pedagogy

- 1.) *Teacher secures all students undivided attention prior to beginning daily lesson.*
- 2.) **Using the positive/negative number line, the teacher should model (direct teach), provide guided instruction and independent practice on comparing two integers using $<$, $>$, and $=$ signs. Continue until students can successfully engage problems without the need of the number line. Check Understanding. Duration: 2 to 3 days of instruction, adjust as needed.**
- 3.) **Using the positive/negative number line, the teacher should model (direct teach), provide guided instruction and independent practice on the addition of two integers. Continue until students can successfully engage problems without the need to use the number line. Again, check student understanding! Duration: 3 to 5 days of instruction, adjust as needed.**

Positive and Negative Integer – Recommended Sequencing – Pedagogy CONTINUED

- 4.) The classroom teacher should consider providing three (3) to six (6) comparing integer problems *daily* at the onset of each addition of integer's core lessons to ensure mastery of previously taught content – Spaced Repetition Instruction. Then, gradually interject the addition integer problems and phase out daily instruction on the comparison of integer problems to only one (1) per day. Duration: Mini-Lesson, every day, adjust content as needed.
- 5.) Using the positive/negative number line, the teacher should model (direct teach), provide guided instruction and independent practice on the subtraction of two integers. Continue until students can successfully engage problems without the need to use the number line. Check student understanding. Duration: 5 to 7 days of instruction, adjust as needed.
- 6.) The classroom teacher continues providing three (3) to six (6) addition of integer problems at the onset of subtraction of integer core lessons to ensure mastery of previously taught content – Spaced Repetition Instruction. Gradually interject both the addition and subtraction integer problems. Duration: Mini-Lesson, every day, adjust content as needed.
- 7.) Using the positive/negative number line (model as multiplication as repetitive adding in either the positive or negative number line direction), the teacher should model (direct teach), provide guided instruction and independent practice on the multiplication of two integers. Continue until students can successfully engage problems without the need to use the number line. Duration: 4 to 6 days of instruction, adjust as needed.
- 8.) The classroom teacher continues providing five (5) to nine (9) addition and subtraction of integer problems prior to the core lessons to ensure mastery of previously taught content – Spaced Repetition Instruction. Gradually reduce addition problems and subtraction integer problems and interject multiplication problems of two integers. Further challenge students with a daily diet of one (1) to three (3) distributive property of multiplication application problems. For example: $5(x - 2)$ and $-3(-4 + y)$. Duration: Spaced Repetition/Daily warm-up or Mini-Lesson, every instructional day, adjust content as needed.
- 9.) The teacher should model (direct teach), provide guided instruction and independent practice on the division of two integers. Continue until students can successfully engage problems. Teacher may use the number line. For example, select the integer, negative 8 (-8) divided by four (4). Quotient is negative 2 (-2). Consequently, there are four (4) equal groups of negative two (-2). Duration: 3 to 4 days of instruction, adjust as needed.
- 10.) The classroom teacher should continue with the daily spaced repetition instruction/mini-lessons using one (1) comparison of integers, one (1) addition problem of integers, one (1) subtraction problem of integers, one (1) multiplication problem of integers, two (2) distributive property of multiplication problems, and two (2) to three (3) division of integer problems until students demonstrate proficiency of all content. These daily spaced repetition/mini-lesson formative assessments will indicate the students' preparedness to successfully be engaged in a final summative assessed on all negative and positive integer work. The teacher should assist any and all students struggling during the daily spaced repetition/mini-lesson via active monitoring of students. Always check student understanding before moving on! Duration: 2 to 3 days of instruction, adjust as needed.