# Middle School Numeracy and Parallel Stop-Gap Math Program

*Grades 6 - 8*

## Accelerating Middle School Students to Grade Level Mathematics

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# Executive Summary

Student success in middle school mathematics is highly dependent upon elementary grade arithmetic numeracy skill mastery. As students transition from their elementary school feeder patterns to junior high or middle school, all too often a significant percentage of incoming sixth grade students possess both math process skill (i.e. place value, rounding, computation, etc.) and math fact skill (addition, subtraction, multiplication and division operational fact) deficiencies. Those prerequisite numeracy skills are necessary for thorough understanding and development of the middle school grade level math standards.

In an elementary school, a classroom teacher usually provides instruction to the same students in every core subject. Middle school subject scheduling is different due to subject rotations – a student may have as many as five (5) different teachers per day. The daily rotation is either a scheduled using a block format or a traditional one. A block format is comprised by alternating days during the week for longer time periods; whereas, a traditional schedule offers core subject class every day but for shorter periods of time. In an elementary school, the typical teacher has much more control on instruction time compared to a middle school teacher. When a middle school teacher's allotted instructional time is over, the bell rings and students transition to their next scheduled class. The middle school mathematics teacher must be highly efficient and effective with their instructional focus. In short, the teacher must select what specific numeracy skills to emphasis during their math class. The fact that incoming students do not possess mastery of prerequisite skills places middle school math teachers in a quandary. They are required to teach grade level mathematics standards, but they must attempt to balance prior grade level numeracy skill deficiencies with as many as 175 students each school day. It is not only an organizational dilemma it is an accountability issue as well.

This pedagogical situation is an arduous task but manageable with the correct curricula implementation model. The teacher must implement a parallel stop-gap numeracy program for prior numeracy skill deficiencies simultaneously with a structured and differentiated daily numeracy program for current grade level math standards. The dual implementation process dictates two (2) different resource methodologies. The parallel stop-gap numeracy program is a teacher-driven spaced repetition system (SRS) instructional methodology. This SRS process is a daily mini-lesson comprised of prior numeracy content that was not mastered during students' elementary school years. It is paramount that students' prior math skill deficiencies are remediated if they are to be academically successful in middle school mathematics. The parallel stop-gap numeracy program must be heavily concentrated in sixth grade since that grade level is the last remaining year of arithmetic mathematics. The parallel program steps down each school year in both seventh and eighth grades – only students not academically on grade level require the additional numeracy focus.

Current grade level math skills are addressed through the daily individualized and differentiated Formative Loop (FL) Numeracy Program. Students progress through this blend of paper-pencil and digital numeracy accountability at a discrete but sequential pace. The FL numeracy program assures grade level mastery of skills taught in the daily core lessons. The parallel numeracy program and the Formative Loop program are independent of both the adopted core curriculum and either the Common Core (CC) or the Texas Essential Knowledge and Skills (TEKS) math standards. School and district personnel can select the adopted core math adoption as well as the problem solving resource.

The need for a parallel stop-gap numeracy program can be eliminated if the middle school's elementary feeder schools implement high levels of numeracy accountability and structure. However, until that is accomplished in feeder elementary schools, students will continue to transition to middle schools with significant numeracy skill deficiencies. If left unresolved, heightened mathematic performance in middle school will remain substandard.

With any pedagogy and instructional resource methodology, there exists an ever-present caveat of efficacy in every classroom. It is imperative that teachers and administrators develop positive relationships with their students as well as maintain both effective student management and daily routines in the classrooms to preserve daily instructional minutes. If these classroom relational dynamics are not nurtured and consistently maintained, the overall efficacy of a successful pedagogical resource and instructional system will be significantly impaired.

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*Accelerating Students to Grade Level*

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## *Accelerating Middle School Students to Grade Level*

Proficiency of elementary mathematics is essential for academic success in my middle school ($6^{th}$ grade – $8^{th}$ grade) math courses. However, a significant percentage of $5^{th}$ graders complete elementary school unprepared for the rigor of middle school math classes. Middle school math teachers are placed in a difficult pedagogical position. Current grade level math standards and the adopted core curriculum presume that the students possess dependent elementary school math process (place value, rounding, decimals, etc.) skills as well as proficiency of the four (4) math fact operations. However, many incoming $6^{th}$ grade students do not possess mastery of those numeracy skills. Consequently, this document proposes a parallel system of numeracy in addition to daily Formative Loop Numeracy Program, and the adopted core curriculum to accelerate students to grade level math standards. This process requires high levels of organization, faculty's expertise and coordinated efforts – and within a short period of time, academically struggling middle school students can perform at grade level math standards with this structured and proven methodology. The parallel math acceleration program concentrates on students in their $6^{th}$ grade year since the curriculum is the final year of arithmetic mathematics. Hence, the majority of the parallel program must be accomplished in $6^{th}$ grade, prior to the students beginning their algebra and geometry classes in the latter grades of middle school.

The Formative Loop (FL) Numeracy Program should be implemented to digitally track large number of students from $6^{th}$ to $8^{th}$ grade students. However, the recommendations and referenced skills in Section 2 are <u>in addition</u> to the normal grade level numeracy skills and standards that parallel both the FL Numeracy Program and the daily core math lesson. A schematic of this process is shown in Figure 1 below. The arithmetic numeracy skills in the parallel program were taught in elementary school but were not mastered by elementary, intermediate students.

Students must become proficient at pivotal elementary numeracy skills that were not mastered or these numeracy skill gaps continue to widen since middle school grade level academics are founded on

***Grade level Interaction Schematic between Grade Level Core and Problem Solving Curriculum, Formative Loop Numeracy Program and Parallel Stop-Gap Math Numeracy Program***

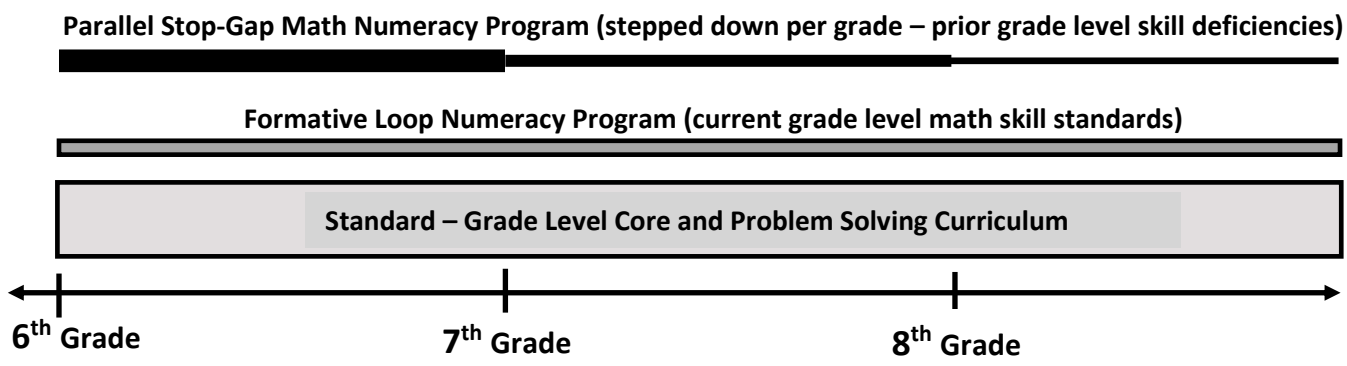


**Figure 1**

these prerequisite math processing and math fact skills. This document outlines the process to eliminate those math gaps and accelerate students to grade level concurrently with the instruction of middle school grade level core mathematics. A separate intervention class – between 30 minutes and 45 minutes - is the most effective and efficient means to handle the parallel catch-up part of the numeracy program. Students are all in the same class at the same time that require intervention. If not viable, two sample middle schools schedules are attached.

## SECTION 1

### *General Rationale and Recommendations*

Due to the fact that a high percentage of students enter 6th Grade with deficient skill sets from feeder Title 1 elementary schools, a parallel math program (sequenced below) must be implemented to accelerate these students up to grade level skill proficiency. Fortunately, the math facts and many math process skills are verified for mastery within the daily numeracy program; however, a parallel mathematics program in combination with the Formative Loop Numeracy Program will strengthen and complement the core curriculum and lessons for 6th grade so students continue to learn grade level TEKS while concurrently filling elementary intermediate grade level skills. The development of a daily *customized* warm-up may be used, but the process will depend on the level of skill deficiencies for each student and the intervention time needed may vary from classroom to classroom and year to year. In 6th grade, it is recommended to use the measurement warm-up system, provided in the Formative Loop Resource Library for a couple reasons. One, students rotate in middle school, and a half-sheet warm-up saves paper as well as provides for immediate, structured on-task behavior as students enter the classroom, pick-up the measurement warm-up and begin working. Two, after the measurement sheet is quickly checked, students can flip the sheet over and the spaced repetition instruction is an immediate transition. Regardless if a structured warm-up is used, the general sequencing guide is provided below for the classroom teacher to adapt to these parameters. The math process and fact sequencing is streamlined and concentrates on the most important arithmetic numeracy skills required for academic success in middle school mathematics. Finally, the described process is viable for any selected school or district core curriculum adoption and either the Common Core State Standards (CCSS) or Texas Essential Knowledge and Skills (TEKS) math standards.

Most resources required and pedagogical information for this parallel program will be located in the 6th grade section of the Formative Loop Resource Library; however, use of resources in both the 3rd through 5th grade sections as well as the 'General' section should prove helpful. The author has included some of the referenced resources in the Appendix of this document. It should also be noted that this document is NOT intended as a day-by-day pedagogical planning guide, but as a general sequencing plan to rectify paramount skill deficiencies from third, fourth and fifth grades. However, there is an annotated specific individual sequencing of these skills in the Appendix to assist classroom teachers. Finally, in order for this parallel program to be successful, it is of paramount importance that the entire process be a deliberate and intentional daily practice. In short, the accelerated process is an incremental 'get rich slowly' pedagogical approach using a spaced repetition system (SRS) instructional methodology for use with middle school students entering 6th grade with mathematical elementary numeracy skill deficiencies. A document describing the Spaced Repetition System (SRS) process for both math facts and math processing skills as well as a fraction-decimal connection is available for immediate download on website address located in the footer – under "Expertise" tab.

The process to complete this academic acceleration should primarily occur in 6th grade, since that curriculum is still arithmetic based, and the daily mathematics work meshes more smoothly than with the 7th and 8th grade curricula. However, the 7th and 8th grade teachers must still work through similar exercises very quickly to ensure the students have mastered those content areas or those grade level content areas will likely be adversely affected. If the process is consistent and deliberate during the 6th grade school year, then the 7th and 8th grade skill arithmetic skill deficiencies will be greatly lessened.

When implementing this parallel curriculum daily in the classroom, middle school mathematics teachers must be highly organized, prepared and efficient. This initial work must be done quickly so regular core lessons are not shortened to the point of ineffectiveness. The accelerated lessons must be 5 to 15 minutes in length (including the daily numeracy exercise), and the teacher must systematically teach 'small repetitive chunks' of skills each day until each skill set is mastered. For example, using a spaced repetition system (SRS) instructional format, the teacher may require three (3) whole number Place Value Expansion problems daily to the thousands place, and then extend that skill each day until the billions place value is mastered. Simultaneously, include in the daily SRS Base 10 Place Value Expansion skills and the combination will solidify understanding of regular whole number place value expansion. Then, continue the daily repetition with Standard and Word Form until all three place value skills have been reviewed and mastered. After students demonstrate mastery of PV Expansion forms, that skill may be dropped and another skill added in its place, so the teacher is concurrently working with two (2) to three (3) math skills listed in the sequence below during any one class period. The core curriculum skills for $6^{th}$, $7^{th}$ and $8^{th}$ grades may be taught, reviewed and mastered in the same manner, as time permits. Specific skill homework is highly beneficial for mastery of both processing and math skills in the parallel acceleration program in which 3 to 4 (or as many as needed) skill problems to reinforce skill practice at home. The daily skill problems may be written on the blackboard/whiteboard at the front of the classroom, and the students copy them on the back side of their regular homework sheet or in a spiral notebook specifically used for the Parallel Math Acceleration Program daily exercises.

Finally, it should be noted that the Formative Loop Numeracy Program includes basic math facts in all four (4) operations, but teachers may need to press students to master the multiplication and division facts. The incoming $6^{th}$ grade students may know their addition and subtraction facts, but the students often do not possess processing speed when mentally computing. However, multiplication and division facts are essential math fact skills and must be pressed to ensure high levels of efficacy and proficiency in middle and high school mathematics.

## SECTION 2

### *Curricular Sequence for Parallel Stop-Gap Numeracy Program*

It is a much more involved and difficult task to academically accelerate a middle school student to grade level math standards. The typical academically struggling student – especially Title 1 student – most likely possesses skill math gaps in both math processing skills and math facts. Additionally, time is more of a factor in middle school than it is in elementary school. There are only three years a student spends in middle school, and but one year of arithmetic mathematics of those three years. Also, the control factor of student movement during the day is much different in middle school. Students are moving throughout the day during class to class rotations and the specific students in one class may be a different group in another class. However, there may be scheduling options in middle school that afford specific remediation that are highly beneficial to this process. Generally, middle school students are on a block rotation with an elective class. That elective class may be a double blocked class for math and literacy stop-gap remedial work. If teachers can implement the Formative Loop five (5) minute daily numeracy assessment at the onset of the school day as students arrive at school or at some other time during the day outside of the math class, this affords more class time for an effective spaced repetition instructional system in the normal math block. The dynamics of checking and entering each assessment into the Formative Loop Program will be dependent upon each middle school's organization. An example a typical Middle School Formative Loop Implementation Guide can be found in the Appendix. Students that demonstrate a need for an intervention on a particular skill is – again – more difficult in middle school than elementary school since students rotate from class to class. A system at each middle school must be designed and monitored to ensure students struggling with a skill are provided support via teachers, teacher aides, instructional specialists, administrators, volunteers or fellow students. Regardless of

the support personnel, there must be a consistent time in the school day to accomplish this ad hoc process. If not, students not understanding a skill will likely demonstrate a lack of proficiency on that skill when assessed the following day.

The accelerated academic 'catch-up' instructional process described in this paper are short mini lessons – a spaced repetition system (SRS) methodology. A concentrated curriculum focus should be taught each class day cumulatively covering the content sequenced below. If these concentrated content lessons cannot begin the regular mathematics class due to time constraints, then they should take place in a double blocked remedial section. The only constraint is the number of students that may need to attend the double block remedial class. In some middle schools, the number of sixth graders that require math (and literacy) intervention may be a significant percentage of that incoming class of students. Regardless, the spaced repetition lessons as dictated by student academic skill gap need by either the Formative Loop Numeracy Program OR the Parallel Stop-Gap Numeracy Program be repetitive and class inclusive so most students' progress through the academic acceleration process simultaneously.

Since sixth grade students are new to the middle school and will adapt to this learning environment as 'normal' operating procedure in any middle school. As students' academic elementary skill deficiencies are rectified, students that were academically behind will be capable of engaging in the normal class lesson. Efficiency and effectiveness of the daily core math lesson should dramatically improve as well classroom management behavioral issues are reduced since students possess the academic ability to engage appropriately in the daily content. The math skill sequencing for the accelerated program is listed and described below. These numeracy skill areas are further annotated and parsed in a time-line format in specific detail in the Appendix of this document. Specific numeracy practice sheets are also included in the Appendix to provide educators with examples of referenced student exercises and practice sheets.

## Math Skill Sequencing for Parallel Stop-Gap Math Accelerated Program

1.) **Whole Number Place Value** (Expansion, Contraction to Standard, and Word Form) and Base 10 format.
**Expansion:** 34,081 = 30,000 + 4,000 + 0 + 80 + 1 or 34,081 = (3 x 10,000) + (4 x 1,000) + 0 + (8 x 10) + (1 x 1)
**Standard:** Reverse Expansion above and in Base 10 format as well.
**Word Form:** 34,081 = thirty-four thousand eighty-one (Do not use 'and.' 'And' is only used as the decimal point.)

2.) **Decimal Place Value (Decimal and Fraction Form) and Base 10 Decimal and Fraction Form**. – (Expansion, Contraction to Standard, and Word Form - to the ten thousandths place value).
**Decimals Place Value Expansion – Fraction Form**: 0.2509 = 2/10 + 5/100 + 0/1,000 + 9/10,000)
**Decimal Place Value Expansion – Decimal Form**: 0.3025 = 0.3 + 0.002 + 0.0005
**Base 10 Expansion Fraction Form:** Fraction 0.2037 = [(2 x 1/10) + (0 x 1/100) + (3 x 1/1,000) + (7 x 1/10,000)]
**Base 10 Expansion Decimal Form:** 0.791 = [(7 x 0.1) + (9 x 0.01) + (1 x 0.001)].
**Decimal Contraction Place Value:** Reverse process shown in the Expansion Format.
**Decimal - Word Form:** Write the decimal using 'AND' to represent the decimal point (4.019 = four AND nineteen-thousandths). Recommend students use the pedagogical Tip" below in all decimal place value work.
**Pedagogical Tip:** There is a 'crutch' or a tool shown in Figure 3 that students may use to assist them in learning both the decimal and fractional place value positioning of any given decimal. The process uses a "1" under the decimal point and zeros are added under each digit behind the digit – regardless of the digit's value (i.e. a zero). The student can use the process to check every decimal to ensure his or her solution is correct.

Place a "**1**" under the decimal point and add zeroes under each digit in the given decimal number 3.0517. Hence, the "0" is in the tenths place (0/10), the "5" is in the hundredths place (5/100), the 1 is in thousandths (1/1,000), and the 7 is in the ten-thousandths (7/10,000). The teacher only needs to ensure the "**1**" is DIRECTLY under the decimal point and each zero in the denominator is DIRECTLY under the corresponding digit in the numerator.

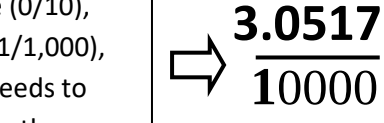


**Figure 3**

**3.) Math Facts – Addition and Subtraction (Multiples-1, Multiples-2, Making 10 and Making 100)**

Math fact accountability occurs through the daily Formative Loop Numeracy Program; however, there are intermediate steps that are highly effective to accelerate the learning process. A white paper entitled *"Accelerated Math Fact Student Mastery"* is available for immediate download at the website referenced in the footer below. Since a significant percentage of students (especially Title 1 students) are academically behind in math fact mastery, the following recommendations may assist the process and the classroom teacher.

The teacher should begin with **addition and subtraction** as sequenced in the Formative Loop Numeracy Program. Attempt to press as many students through the addition and subtraction as possible in the first three weeks of the school year. After every five (5) minute assessment each day, the teacher should require students to turn or flip their assessment over to the blank side and skip count (multiples) for a minute to a minute and thirty seconds. Begin skip counting by 2's, 10's and 5's. Then, add in 3's, 4's, 6's through 12's (entitled Multiples-1 practice sheet – numbers 1-12 is available in the Resources Section on the Formative Loop website and a copy is also in the Appendix). When this process is complete, the teacher should continue the numeracy acquisition process with multiple practice of 10's, 12's, 15's, 20's, 25's, and 30's through 100. These multiple practice sheets (entitled Multiples-2) are also available on the Formative Loop website and a copy is in the Appendix. There is much numeric ability associated with multiples and both Multiples-1 and Multiples-2; hence, mastery of these two skills will greatly assist the student in other mathematical areas. Homework is highly recommended each night in these two areas. After the students can pass Multiples –1, then, Multiples-2 should be the central focus. The Multiples-1 skill will assist the student in learning the physical meaning of multiplication as repetitive addition, so when the student memorizes these facts there is a substantive understanding of multiplication process. If students practice these numeracy skills with deliberation and purpose, they progress much quicker in mastering these two skill sets.

**Pedagogical Recommendation:** It is the objective to press as many students through addition and subtraction in the numeracy program as quickly as possible; however, quite often, they are just not as quick at the task as desired. The teacher can do one of two things if students become mired down in their subtractions skills. First, advance (i.e. skip command) or skip the student in the Formative Loop Program to multiplication, and circle back to those students who did not master either addition or subtraction skills at the speed level desired at a later point in the school year. Second, use the technique described below in Figure 4 for subtraction – single digit subtracted from a double digit math fact – to expedite student progress through subtraction math facts.

It is highly recommended and essential that teachers require proficient and practice of the 'Making 10' and 'Making 100' numeracy sheets. The 'Making 10' practice skill set will assist students in one digit from double digit subtraction. It is highly recommended the teacher explain the mathematical rationale (i.e. it is used in a one digit from double digit subtraction only because the difference passes through the number 10) via a whole number line to students, so the workings of the process is fully understand – depicted in Figure 4 below.

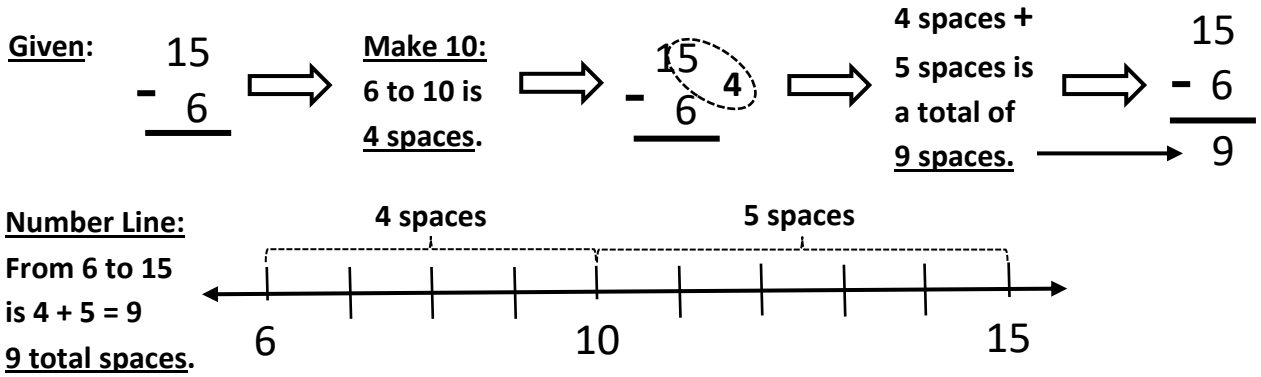


**Figure 4**

**4.) Math Facts – Multiplication and Division (Also: Compression Method and Finding the Missing Factor)**

These two math numeracy math fact skills MUST be mastered for success in middle school mathematics or the students academically struggle in every grade level. Although some schools are allowing students to use calculators for computational purposes, students' general numeracy levels are heightened with mental mastery of math facts

without the use of a digital aid. Furthermore, when students begin to use calculators, many times they have a tendency to not question the reasonableness of the calculator's final computational display.

At the beginning of the fourth - 4th week of school, it is recommended the teacher begin the multiplication and division math fact sequence in the Formative Loop Numeracy Program. If the student is unable to complete the multiplication 'Mixed' or 'Final' Assessment in 5 minutes, it is highly recommended to place the student immediately in the multiplication stepped (slow build-up) series of 1's, 2's, 3's, etc. Also, on all stepped series of math facts, if the student is looking at the above line to copy the completed row of math facts, the teacher should require that students cover the above line with a piece of paper to prevent copying. A teacher can always observe a student copying in this manner during the daily 5 minute assessment if the student's head is moving or bobbing vertically to look at the math fact line above.

**Recommendations:**

a.) Teacher should continue requiring practice sheets multiples-1 and multiples-2 for homework until mastered. It is also recommended the teacher send homework and give 'quick' assessments on Making 1 series, Making 1,000 and Making 10,000 series found in the Formative Loop's "Resources" in the 6th grade section. These numeracy skill sets are extremely helpful for a student to gain a higher number sense.

b.) Students should also practice finding all the factors for any given number in an ordered "compression method" (example below) to assist with identifying and producing prime and composite as well with computing the Greatest Common Factor (GCF). The "compression method" requires the student to start at the end boundaries and work inward. The next factor pair will be inside the last factor pair. Student should know basic divisibility rules of 2, 3, 5, 6 and 10.

Example: List all the factors for 12. [1, ,12]; then, [1, 2, 6, 12]; then, [1, 2, 3, 4, 6, 12]

*Thought Process to use Compression Method Follows:*

After listing the identity of 12: Factors 1 and 12. All factors remaining are between1 and 12. 12 is an even number or divisible by 2. Hence, 2 is a factors of 12. All factors remaining are between 2 and 6. All factors remaining are between 3 and 4 – none are. All factors are listed – in order - for 12: (1, 2, 3, 4, 6, 12).

**Note:** This skill practice sheet is located in both the Formative Loop Resource Library and the Appendix for students to practice 'finding all the factors' for the important numbers from 1 through 50. This skill is beneficial when calculating GCF (for lowest terms). Hence, it is recommended the teacher provide a quick daily exercise for students to write out for numbers 1 through 10 until mastered. Then, students (practicing cumulatively) add the next 5 numbers (i.e. 11 through 15) until they master all the factors for numbers 1 through 15. In a very short time with these quick daily exercises, students readily write all the factors for most of the numbers between 1 through 60. This numeracy exercise also reinforces prime and composite numbers recognition, too.

c.) While learning multiplication, it is highly recommended that the "Find the Missing Factor" practice sheets (e.g. division math fact mastery) are sent home from homework practice and the students are quickly assessed in class for accountability. This numeracy skill is divided into three sheets, and students quickly learn their division facts by finding the missing factor. This practice also assists students with word problems that have tables of related numbers and the student needs to compute the missing factor that relates the two adjacent columns or rows. These practice sheets are also found in the Formative Loop Resources Library and in the Appendix.

d.) The middle school teacher is also able to access the Formative Loop Resource Library for any other grade level to locate skill practice sheets to provide students extra practice in any identified areas of mathematical deficiency, as needed.

**5.) Adding and Subtracting Whole Numbers**…subtracting across zero, quick review and assess. The pedagogical question that must be asked for skill mastery, "*Do students demonstrate ownership of the skill?"* If the students do not know this skill, practice two to four quick problems per day until they do – Spaced Repetition System (SRS), as before. Focus on the students that need the most assistance. Start sending practice subtraction math fact sheets home for extra practice for the students who demonstrate that need.

**Note:** As discussed above, it is recommended that the teacher consider the **5-minute daily measurement exercises.** These are factual information…customary units (length, capacity, and weight), then transition to metric after completion of customary units. Students need to know approximate distance, capacity, and weight/mass examples and use this knowledge as a reference to understand – Examples: One standard plastic composite floor tile that is standard in most classroom floors is 12 inches or 1 foot in length on each side, and a centimeter is the approximate length of a person's shortest finger's nail, and the mass of 1 nickel is exactly 5 grams. This customary and metric unit is located in the Formative Loop Resource Library – General Section and 5th/6th Grade Sections.

6.) **Estimating – Adding and Subtracting Whole Numbers –** Practice skill to the hundred thousand place value. If rounding is a skill deficiency, quick examples and homework may be given. Refer to the 3rd through 5th grades and the 'Resources' section for ready-made student rounding sheets and student rounding aids, as needed.

7.) **Magnitude of Decimals –** Understanding the size or magnitude of a decimal number is an important skill. The student should be able to determine how far it is numerically to the adjacent whole numbers. Example: Given 5.46 – the distance is 0.46 away from 5.00 and 0.54 away from 6.00. Check: does 0.46 + 0.54 = 1.00? Yes. Hence, the answer is correct.

**Note:** A student should always think "Money" when looking at a decimal. Ex. Given: 9.423 – this decimal number is about $ 9.42. Ex. 6.0713 – this is about $ 6.07. This will help sort out the confusion students commonly have with decimals like 2.04 and 2.4 Comparing the two decimals becomes relatively easy since 2.4 is equal to 2.40 – and when students are sufficiently numerate to realize 2.4 (e.g. 2 dollars and 4 dimes) equals 2.40 (e.g. 2 dollars and 40 pennies), number sense is clearly established.

8.) **Comparing Decimals –** Again, the student should **"**Think Money" to compare decimals regardless of the number of digits to the right of the decimal point. One method to compare decimals is for students to add zeros to the right of the decimal point until both numbers being compared have the same number of digits.
Note: Use the crutch of an imaginary "1" under the decimal point and add zeroes under each number right of the decimal to convert to an equivalent fraction and vice versa (Reference Figure 3 above for the decimal 3.0157).

9.) **Adding and Subtracting Decimals.** Line up decimal points in each number vertically to add or subtract. Stress with students that any number ALWAYS has a decimal to the right of the given number (e.g. the number 7 is really 7.0 or 7.00 or 7.000). Hence, any time numbers are added or subtracted the decimal points of every number are always lined vertically to preserve a number's place value positions (e.g. to ensure that all the numbers' one's columns are added, and the tens, etc.). As before, with Spaced Repetition, it is recommended the teacher provide 3 to 4 problems per day as a quick daily exercise until this process is completed.

10.) **Estimating – Adding and Subtracting Decimals –** Practice skill to the thousandths place value. Students rarely realize in every instance of adding and subtracting whole numbers that the decimal points in each number are always aligned. For example, 5 + 6 = 11 implies the decimal is directly behind each whole number – and decimals are always aligned in whole number addition or subtraction regardless if the decimal points are placed in the equation or not. These two simple addition problems are identical: 5 + 6 = 11 and 5.0 + 6.0 = 11.0

11.) **Multiplying Whole Numbers –** Using a 'circle' grouping – write the equal number of items inside each circle and label a number under each group for a visual methodology – Figure 5. Find the 'Total' – product. Mastery of both the model and computation algorithm skills is needed.

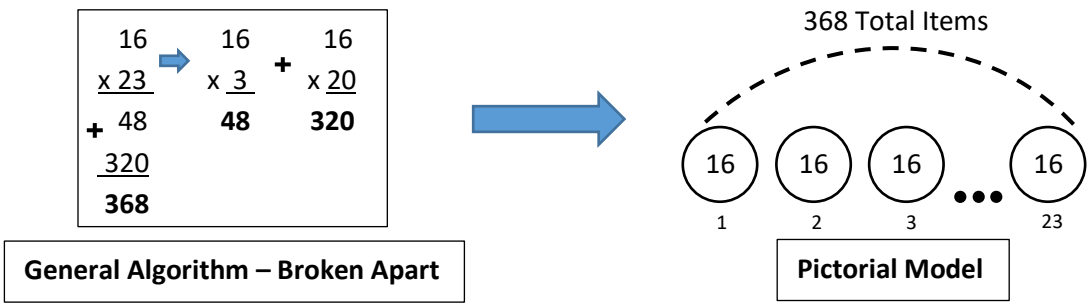


**Figure 5**

**12.) Estimating – Multiplying Whole Numbers –** Student must know multiplication math facts and rounding numbers. It is recommended that the students count zeros and multiply whole numbers. For example: Given: 241 x 35. Estimate: 200 x 40 = 8,000 – (2 x 4 = 8 and 3 total zeroes present in both factors; hence, 8,000). Caveat: In this case, the adding of zeros at the end of the whole number (e.g. 8, in this situation) is actually increasing the product by 10, 100 or 1,000 – which means mathematically the 'imaginary' decimal point is moved to the right one place value with each factor of 10. Students learn the whole number rule, and then misapply that 'trick' to decimal multiplication – a zero is added when the decimal point must be moved. Example: 2.43 x 10. Incorrect: 2.430. Correct: 24.3. In Base 10 multiplication, multiplying by 10 and 100 dictates decimal movement for place value – adding zeros is accomplishing that feat in whole numbers, but not in decimal multiplication by 10 or 100.

**13.) Multiplying Decimals (using whole numbers and multiplying another decimal) –** Model with 10 x 10 grids of both tenths and hundredths place value with the product represented by the double overlapping of the shaded model of both decimal or by a whole number. For algorithm – "count total digit places to the right of decimal" in both factors to be multiplied. Move decimal point to the appropriate place to the left in the product.

**Note:** It is recommended that the teacher stress reasonability when finding the product of two decimals by looking at the whole numbers. For example, 3.7 x 2.1 = ?? The product is somewhere around 8. Stressing with students that 3.7 is close to 4 and 2.1 is close to 2 takes away the difficulty of decimals when students understand that decimal multiplication 'works' exactly like whole number multiplication. Again, a whole number always has a decimal point to the right of the one's place even if it is not written. (13 = 13.0 = 13.00 = 13.000, etc.) – Review with students. It is highly probable many students will not know this mathematical fact.

**14.) Division of Whole Numbers –** Using a 'circle' grouping and number of groups with a 'square' for the remainder visual methodology. Total is given. The same methodology in Figure 5 can be used except solving for the number of groups in this situation. It is a visual means to illustrate to students what physically is missing when solving division problems. On Algorithm – Use short horizontal lines above each digit in the dividend on top of the 'roof'– where the quotient is written. A single digit number will be placed on each horizontal line as the student proceeds through the algorithm process of long division. As always, with spaced repetition instruction, the teacher should continue daily mini-lessons/spaced repetition with a few problems each day until student mastery on both the visual model and algorithm computation skills is demonstrated.

**15.) Division of Decimal Dividend by a Whole Number Divisor –** Draw short horizontal lines above each digit in the dividend and move decimal point vertically upward to "roof" of the division house in the quotient (refer to 16.) below for visual). Complete the division process using the methodology in 14.) Division of Whole Numbers.

**16.) Converting <u>Proper</u> Fractions to Decimals via Division –** To calculate an equivalent decimal from a proper fraction (decimal will always be less than 1 whole), "*Roll proper fraction to the <u>Right</u>*" – So the numerator becomes the dividend "under the division house ⌐ ", and the denominator becomes the divisor. Place a decimal point to the right of dividend and add a maximum of three zeroes to the thousandths place value. The decimal point is moved vertically to the "roof." Then, follow methodology of Division of Decimals by Whole Number.

**17.) Converting Improper Fractions to both Mixed Numbers and Decimals –** Same procedure as 16.) above "Converting Proper Fractions to Decimals via Division." The decimal equivalent follows the procedure of dividing a whole number by a decimal. However, the mixed number equivalent is the same fraction division procedure, but the remainder becomes the numerator and the divisor the denominator. (Hence, 7/4 = 1.75 (decimal equivalent) and 1 ¾ (mixed number equivalent).

**Note:** Students must recognize an improper fraction will always be greater than or equal to 1 whole when they divide the 'roll over fraction' and they must roll the fraction to the RIGHT.

**Note:** It is recommended that spaced repetition instruction begin on finding Least Common Multiples (LCM) by listing out the two multiple strings and circling common multiples, identifying the LCM. It is also recommended that the Greatest Common Factor (GCF) be practiced to prepare students for addition and subtraction of fractions with unlike denominators and comparing fractions with unlike denominators. If the compression method or if all factors have been memorized and understood due to repeated practice, this will be a relatively easy skill for students to master. (See number 19 below using spaced repetition on the first 10 integers for determining factor strings.)

**18.) Number Line Understanding – 'Tying Fractions and Decimals, Authentically' –** Labeling Number lines (1/2's, 1/3's, 1/4's, 1/5's, 1/6's, 1/8's and 1/10's). Label Proper Fractions, Improper Fractions, Mixed Numbers and Decimals (in stages – daily) on a number line. Begin with only proper and improper fractions labeling of the number line

beneath number line. Students *Count Number of "spaces" and "label the lines"* between any two whole numbers. After students master proper and improper fractions, begin labeling the Mixed Numbers ABOVE the number line (beginning at 1 whole – example: 1 0/4) as students also label both proper and improper fractions. After Mixed Numbers are mastered, write the equivalent decimals above the mixed number on the number line. Finally, the teacher should select a point on number line and require students to draw a fractional picture of that point (e.g. 1 ¾ on our number line) and the equivalency of that point should prove that 7/4 = 1¾ = 1.75 = 1 75/100. *This equivalency should be stressed to students so they are aware that all fraction/decimal forms are equivalent.* The number line in Figure 6 below provides clarity of explanation and an illustration of the final student work. Continue mini lessons each day until the student has mastered all four forms of a fractional/decimal number – the teacher may use a timer to press students to correctly complete the number line below (approximately 3 minutes is standard). This process will connect all three forms of fractions and decimals, so students possess a more complete understanding on the relationships between mixed numbers, decimals and improper/proper fractions. The mathematical importance of these exercises cannot be over-stated. The number lines presented in this fashion solidify all forms of fractions and decimals with a pictorial in a connected methodology. Otherwise, the different forms 'float' for many elementary and middle school students without a sense of an interconnected relationship. The example below provides a brief explanation of the pedagogy.

Example: "*Count the spaces and label the lines*" – There are 4 equal spaces between each whole number; hence, the number line is divided in fourths between any two whole numbers. These are QUICK lessons in which the teacher repeats the exercise daily – one or two number lines presented – found in the Formative Loop Resource Library or in the Appendix. It is also recommended that any whole number be labeled as a mixed number when students begin this exercise (i.e. 2 0/4 or 1 0/3); hence, when students transition to number lines that do not start at zero (0), students are adept at writing mixed numbers to start the process (i.e. 8 0/5 or 9 0/4). Then, the conversion to improper fractions for a whole number is a relatively easy transition for students. The decimal conversion can be accomplished from either the improper fraction or using the proper fraction within the mixed number. A white paper entitled, "*Connecting Fractions and Decimals – Using Spaced Repetition*" depicting this instructional process in detail is available for immediate download at the website address in the footer.

**Number Line Student Directions:** Complete the number line depicting all decimal, proper/improper fraction/mixed number relationships on a number line divided into fourths (1/4's) with picture of an equivalent point and related quantities.

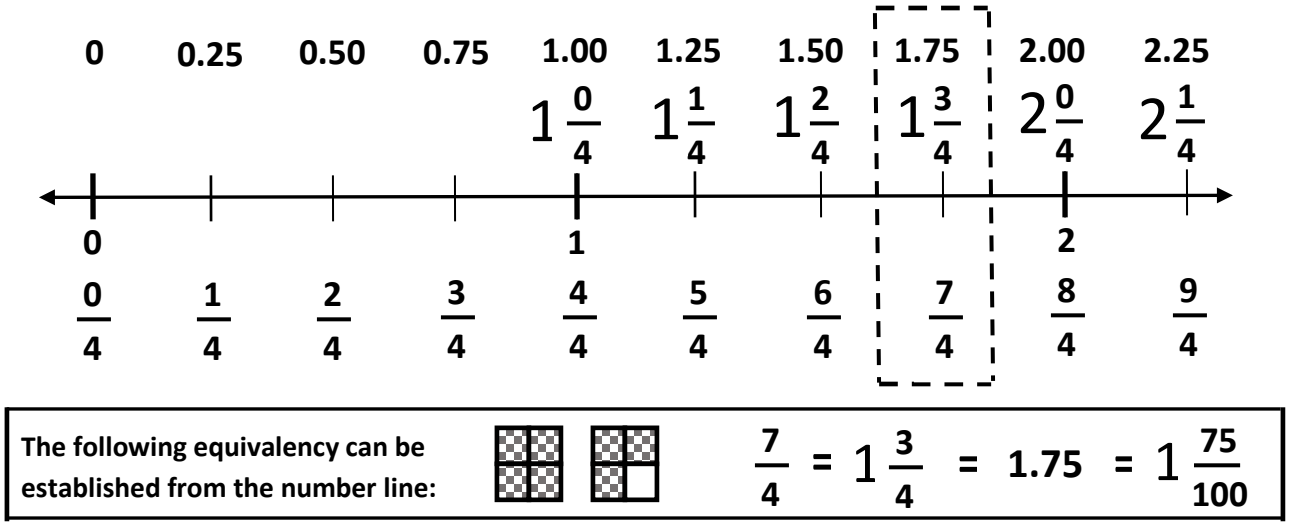


**Figure 6**

**19.) Equivalent Fractions (including reducing fractions to lowest terms) –** Any equivalent fraction is computed by multiplying or dividing by 1 whole. However, demonstrate that 1 whole is equal to 2/2, 3/3, 4/4, 5/5, etc. Teacher should stress that the student is actually dividing or multiplying by '1' and that is the mathematical reason the two fractions are equivalent. A picture or diagram depicting the equivalency should also be shown.

**Note:** The numeracy skill of finding equivalent fractions will also be needed to compare fractions with unlike denominators unless the student finds an equivalent decimal for each fraction. The student may also 'cross-multiply' the two fractions to determine the relative comparative size of each fraction. However, the cross multiplication method is not recommended by many middle school math teachers due to the incorrect algebraic algorithmic process.
**Note:** A student has mastered reducing fractions to lowest terms/simplest form when he/she recognizes and checks that the GCF (Greatest Common Factor) is equal to 1 between the numerator and denominator (catchy saying when GCF = 1 is "*One and Done*"). Figure 7 below illustrates the process.

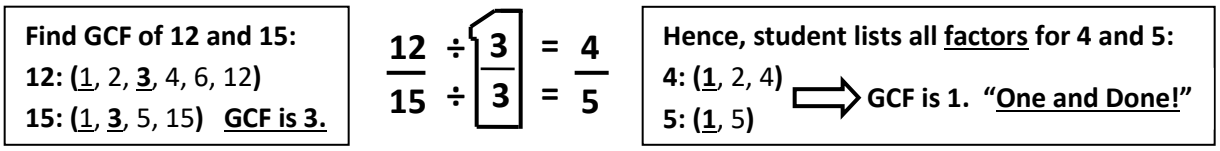


**Figure 7**

There is a practice sheet in the Appendix, "Factor Strings for Numbers Less than 60 – Prime and Composite." This sheet is highly effective if used correctly with spaced repetition. A classroom teacher can end the spaced repetition session each day requiring students to write the ALL the factors for the first 5 integers (i.e. 1 through 5). After mastered, the teacher requires the next five numbers (6 through 10), *cumulatively*. Students list out the factors each day in a vertical order for organizational purposes, using the compression method, until they are adept at the first 10 numbers – in an organized form, least to greatest.

*For example*: **1** : (1); not P or C, special number
**2** : (1, 2) – P
**3** : (1, 3) – P
**4** : (1, 2, 4) – C
**5** : (1, 5) – P
**6** : (1, 2, 3, 6) – C
**7** : (1, 7) – P
**8** : (1, 2, 4, 8) – C
**9** : (1, 3, 9) – C
**10** : (1, 2, 5, 10) – C

After the first 10 numbers are completed, the teacher adds five more numbers (11 through 15), cumulatively. Again, requiring that all the factors are listed for each number. Then, five more numbers (16 through 20), cumulatively. After the first 30 integers have been covered to mastery, the teacher can drop the first 10 numbers (1 through 10). The students know all the factors of those numbers by that point in the exercise. The teacher can continue this practice until the first 60 numbers have been covered. The sheet can be used for homework or in class after the students reach 25 or 30 in the factor sequencing.

This spaced repetition process accomplishes several important numeracy items as listed below.

1.) A little practice each class day in a targeted areas quickly augments into a complete mastery of skills in a matter of weeks.
2.) Students know their factor strings which is highly beneficial to simplifying fractions to lowest terms (determining the GCF), and students are confident and adept at finding equivalent fractions – for adding and subtracting proper and improper fractions.
3.) Students know their Prime and Composite numbers – and the definitions of each in contextual form.
4.) Students are continually reinforcing their multiplication single digit facts.
5.) Factors (and multiples, fractional/decimal number lines) are two necessary and strong numeracy foundational elements in arithmetic mathematics.

6.) This process builds students' confidence in mathematics – factors, like multiples are predictable and can be mastered in a sequential process.
7.) Students are comfortable in manipulating numbers efficiently in division of whole numbers, decimals, and using divisibility rules.

## SECTION 3

### *Conclusions and Final Comments*

This process does require effort and organization of middle school personnel to be effective. There are two points that should be made. First, if the middle school principal can develop a relationship with the elementary feeder principals and many of these skill gaps are readily corrected in the arithmetic elementary years. A white paper entitled, "*The 90 Minute Math Block: Putting all the Pieces Together*" and its two related companion papers will support the elementary development of a structured and effective mathematics block will support better mathematical understanding prior to a student entering middle school. If the arithmetic issues can be rectified at grade level in the elementary years, then middle school teachers will receive incoming students' grade level ready for algebra and geometry courses. There is also a short, white paper entitled, "*Poor Numeracy Skills and the Walls Come Tumbling Down*." This document analyzes the development of numeracy and its relation between arithmetic, algebra and rudimentary differential and integral calculus. The referenced document may also assist in persuading elementary feeder principals in the understanding of their grade level mathematics and its effect on higher level math courses in secondary public schools. Second, if the middle school principal is unable to develop an understanding with the elementary feeder principals, then there are only two options. One, ignore the problem and allow children to fail and not make grade level connections in mathematics from that point forward. Two, implement the described process in this white paper to support incoming students in mathematics.

These skill corrections should be dealt with as rapidly as possible in middle school; hopefully, the majority will be completed by the Holiday break ($6^{th}$ grade). After that time period, the students are less likely to respond with the same enthusiasm that they would have in the first semester of middle school. Additionally, in the spring semester, teachers begin transitioning classroom time toward standardized testing preparation, and the acceleration of rectifying skill deficiencies is generally more difficult to accomplish from a time constraint as well.

**Note:** Extra practice sheets for reducing fractions are also in the Resource Section of Formative Loop. As with most skills, daily (spaced repetition) of 2 to 6 problems is necessary until mastered.

*Caveat Emptor:*

If a classroom teacher is not adept with fundamentally sound classroom management and efficient classroom routines, the Mathematics Parallel Program as well as general teaching of grade level core lessons will have limited success in raising student achievement.

# APPENDIX
## *Listing of Resources*

# ***Sample A*** Middle School Formative Loop Scheduling

## Math (3 days per week each for 90 minutes)

### Implementation Guidelines

### *Quality Implementation Expectations:*

- Teachers will implement Formative Loop 5 minute assessment in comprehensive math block classes – during the first 5 minutes of class each math period.
- Teachers will grade student assessments on Wednesdays and Fridays.
- Graders will grade assessments on Mondays, Tuesdays and Thursdays.
- Teachers and Graders will evaluate student assessments for proficiency or mastery, and then, input students P/F performance in Formative Loop Numeracy Program (**FLNP**). The next day's 5 minute assessment will be delivered back to the assigned math teacher by the specified delivery date.

### *Grading Procedures:*

- The Main Office Student Aides will collect fluency folders containing daily fluency assessments, and deliver the folders to graders on Mondays, Tuesdays and Thursdays.
- Results will be coded into the FLNP as a P for pass, F for fail or A for Absent. To pass a student must score 95% or higher on the math fact skill assessments or demonstrate proficiency on the math processing skills (i.e. place value, rounding, etc.)
- If a student fails an assessment, he/she will remain on the same skill topic until passing. If a student passes the assessment, he/she will progress to the next skill sheet.
- For math fact assessments **only**, students will be given three (3) attempts to pass a skip-ahead assessment (i.e. mixed practice sheet). If a student fails to skip ahead assessment three times, he/she will begin the remedial assessments over that skill set (i.e. 2's, 3's, 4's, etc.). ***Note:*** *It is imperative that students are multiplication and division prepared. Students may be minimally proficient at addition or subtraction – not to a 95% mastery level in five minutes. However, students must be pressed in multiplication and division math fact skills, so it is recommended to skip a child to multiplication if they are not progressing in addition or subtraction.*

### *Indicators of Successful Implementation:*

- Individualized 5 minute numerical fluency assessments are given **daily** and are posted on the daily class agenda.
- Individualized 5 minute numerical fluency assessments begin immediately are the warm-up and/or tardy bell.
- A timing device is used to track five (5) minutes for the numerical fluency assessment.
- A procedure is in place to ensure that a transition is timely and smooth to the daily core lesson.
- Teachers monitor student work by physically moving through the classroom.
- Teacher establish a Formative Loop classroom-based incentive/reward system. For example, Formative Loop Certificates, Progress Sticker Charts, Front of Lunch Line Reward, Math Fact Drivers' Licenses, etc.)

 

- Formative Loop digital progress monitoring is updated online in real time for each student.
- Students are able to describe the purpose of the program, show their individual progress on a data tracker, and utilize an organizational system for storing previous assessments!
- Teachers monitor and communicate student progress, provide individual encouragement, and communicate achievement with parents.
- Teachers are providing intervention for skills not being mastered after three (3) attempts either through small group re-teach during class, lunch or tutorials by providing additional skill practice sheets via the Formative Loop Resource Pages – Elementary Grade Resources Available – to be practiced at home. Additional copies of selected practice sheets are in the teacher workroom.

## *Indicators of Successful Implementation:*

- All administrators will play a role in the implementation, grading and monitoring of the FLNP.
- Instructional coaches and administrators will observe the implementation of FLNP in each teacher's classroom at least once per week.
- Mutual accountability is established between the grader and the classroom teacher.

## *Providing Accurate, Productive and Timely Feedback:*

- **To Students:** Daily feedback will be provided to students when they receive next skill sheet and small group instruction.
- **To Teachers:** Feedback will be given to teachers after walk-through observation and during weekly planning meetings.
- **To Program Administrators:** Math teachers and graders may provide feedback to the instructional coach and administration through PLC meetings or other communication structures.

## *Publicly Reporting the Status of this Practice:*

- **To Students and Classroom Visitors:**

  **1.)** Print Achievement Awards through Formative Loop Website.

  **2.)** Maintain a progress or growth display in the classroom.

- **To Department Colleagues:**

  **1.)** Discussion during department meetings.

## *Providing Support to All Teachers:*

- If a math teacher or grader needs additional assistance, individual support will be provided, as needed. Please communicate a need for assistance or concern to the Instructional Coach.

***Note: Many of the arithmetic skills are elementary grade level skills, but MANY of our middle schools students did not master those skills during 3rd, 4th and 5th grade. The Formative Loop Program and the Parallel Stop-Gap Numeracy Programs are designed and intended to secure those skills as well as grade level skills. With pressing and encouraging our students and with Middle School B's teamwork and commitment, we can sufficiently prepare our students for middle and high school success in mathematics!***

# ***Sample B*** Middle School Formative Loop Scheduling

Math (5 days per week at 54 minute periods per day)

## *Sample B Middle School*

8 Period Class Schedule 2017 – 2018

**Simplified Schedule for 900 student capacity middle school**

***Monday through Friday***

| Period | 6th Grade | 7th Grade | 8th Grade |
|---|---|---|---|
| Arrival | 8:05 – 8:09 | 8:05 – 8:09 | 8:05 – 8:09 |
| Advisory | 8:09 – 8:30 | 8:09 – 8:30 | 8:09 – 8:30 |
| 2nd | 8:33 – 9:26 | 8:33 – 9:26 | 8:33 – 9:26 |
| 3rd | 9:29 – 10:23 | 9:29 – 10:23 | 9:29 – 10:23 |
| 4nd | 10:26 – 11:20 | 10:26 – 11:20 | 10:26 – 11:20 |
| A - Lunch | 11:23 – 11:52 | | |
| 5th | 11:55 – 12:49 | 11:23 – 11:52 | 11:23 – 11:52 |
| B - Lunch | | 11:55 – 12:49 | |
| 6th | 12:52 – 1:46 | 12:52 – 1:46 | 11:55 – 12:49 |
| C - Lunch | | | 12:52 – 1:46 |
| 7th | 1:49 – 2:43 | 1:49 – 2:43 | 1:49 – 2:43 |
| 8th | 2:46 – 3:40 | 2:46 – 3:40 | 2:46 – 3:40 |

***Notes:***

A.) Formative Loop Daily 5 Minute Assessment in Advisory

B.) Formative Loop 5 Minute Assessment Collected, Checked and Inputted into Computer as Pass/Fail during Advisory. Any intervention papers turned 90 degrees and immediate corrective action as needed by student volunteers and teacher.

C.) Student Formative Loop homework and next day assessment sheets printed to multiple school copiers. Homework picked-up by student and distributed to students. Assessment left in folder for following day.

D.) Announcements in Advisory are given during inputting and printing of daily assessments.

| MATH PROCESSING SKILLS – SEQUENCE ORDER | TARGET RANGE – Until Skill is Mastered |
|---|---|
| ***WHOLE NUMBER PLACE VALUE EXPANSION AND BASE 10 WHOLE NUMBER PLACE VALUE EXPANSION*** | |
| **1.)** Whole Number Expansion and Base 10 Whole Number Expansion - **Concurrent** | 1's through 1,000's – (Reference Sample HW Examples) |
| **2.)** Whole Number Expansion and Base 10 Whole Number Expansion - **Concurrent** | 1's through 100,000's – 4/6 examples per day |
| **3.)** Making 10, Making 100 and Multiples Numbers 1 through 6 daily practice – Assess in class for 5 minutes each assessment to correctly complete to black star on Answer Key. | Include with Whole Number Expansion each day + HW (Note: Use Formative Loop (FL) Resource Library for HW) |
| **4.)** Whole Number Expansion and Base 10 Whole Number Expansion - **Concurrent** | 1's through 1,000,000's – 4/6 examples per day |
| **5.)** Whole Number Expansion and Base 10 Whole Number Expansion - **Concurrent** | 1's through 100,000,000's – 2/3 examples per day |
| **6.)** Whole Number Expansion and Base 10 Whole Number Expansion - **Concurrent** | 1's through 1,000,000,000's – 2/3 examples per day |
| **7.)** Making 100 (numbers with multiples of 5 – Counting Up) and (Multiples 6 – 12) daily practice – Assess in class for 5 minutes each assessment to correctly complete to black star on Answer Key. Begin sending Place Value Word Form Practice Sheets for HW – Quick Assessment in class. Word Form Place Value up to the Millions Place Value. | Include with Whole Number Expansion each day + HW (Note: Use FL Resource Library for HW – Multiples-1 and PV Word Form – Whole Numbers.) |
| ***WHOLE NUMBER PLACE VALUE CONTRACTION AND BASE 10 WHOLE NUMBER PLACE VALUE CONTRACTION*** | |
| **8.)** Whole Number Contraction and Base 10 Whole Number Contraction - **Concurrent** | 1's through 1,000's – Use Prepared Examples |
| **9.)** Whole Number Contraction and Base 10 Whole Number Contraction - **Concurrent** | 1's through 100,000's – Use Prepared Examples |
| **10.)** Whole Number Contraction and Base 10 Whole Number Contraction - **Concurrent** | 1's through 1,000,000's – Use Prepared Examples |
| **11.)** Making 100 (numbers with multiples of 1's – Counting Up) and Multiples-2 for numbers (10 – 100) Sent home for HW practice – Assess in class for 5 minutes on each assessment to correctly complete to black star on Answer Key. | Include with Whole Number Contraction each day + HW (Note: Use FL Resource Library for HW – Multiples-2) |
| **12.)** Whole Number Contraction and Base 10 Whole Number Contraction - **Concurrent** | 1's through 100,000,000's – Use Prepared Examples |
| **13.)** Whole Number Contraction and Base 10 Whole Number Contraction - **Concurrent** | 1's through 1,000,000,000's – Use Prepared Examples |
| ***Estimated number of Class Days to Reach this Point: 35 days – Students on target with Whole Number PV including Base 10 – PV Word Form – Making 10 for subtraction math facts, Multiples-1 for numeracy and multiplication math facts, Multiples-2 and Making 100 for numeracy skill development. The four (4) Math Fact Operations are concurrently be emphasized in regular Formative Loop Numeracy Program – Use Making 10 skill on Subtraction and Multiples skill on Multiplications Math Facts. Reference "Accelerated Math Fact Student Mastery" white paper for process to heighten skill development.*** | |

| *DECIMAL PLACE VALUE EXPANSION AND DECIMAL BASE 10 PLACE VALUE EXPANSION* | |
|---|---|
| **14.)** Decimal Expansion: Both Decimal and Fraction Expansion Forms - **Concurrent** | Tenths and hundredths – 4/7 examples per day |
| **15.)** Decimal Expansion: Both Decimal and Fraction Expansion Forms - **Concurrent** | Tenths through thousandths – 4/7 examples per day |
| **16.)** Decimal Expansion: Both Decimal and Fraction Expansion Forms - **Concurrent** | Tenths through ten thousandths – 4/6 examples per day |
| **17.)** "Find the Missing Factor" – sent home for HW practice – 3 parts – Assess in class for 5 minutes each assessment – Factors (1, 2 & 3), Factors (4, 5 & 6) and Factors (7, 8 & 9). | Resource Practice Sheets in FL Resource Library – Use practice to expedite division math fact mastery. |
| **18.)** Decimal Base 10 Expansion: Both Decimal and Fraction Expansion Forms - **Concurrent** | Tenths and hundredths – 4/7 examples per day |
| **19.)** Decimal Base 10 Expansion: Both Decimal and Fraction Expansion Forms - **Concurrent** | Tenths through thousandths – 4/7 examples per day |
| **20.)** Decimal Base 10 Expansion: Both Decimal and Fraction Expansion Forms - **Concurrent** | Tenths through ten thousandths – 4/6 examples per day |
| *DECIMAL PLACE VALUE CONTRACTION AND DECIMAL BASE 10 PLACE VALUE CONTRACTION* | |
| **21.)** Decimal Contraction: Both Decimal and Fraction Contraction Forms - **Concurrent** | Tenths and hundredths – Use Prepared Examples |
| **22.)** Decimal Contraction: Both Decimal and Fraction Contraction Forms - **Concurrent** | Tenths through thousandths – Use Prepared Examples |
| **23.)** Decimal Contraction: Both Decimal and Fraction Contraction Forms - **Concurrent** | Tenths through ten thousandths – Use Prepared Examples |
| **24.)** Decimal Base 10 Contraction: Both Decimal and Fraction Contraction Forms - **Concurrent** | Tenths and hundredths – Use Prepared Examples |
| **25.)** Decimal Base 10 Contraction: Both Decimal and Fraction Contraction Forms - **Concurrent** | Tenths through thousandths – Use Prepared Examples |
| **26.)** Decimal Base 10 Contraction: Both Decimal and Fraction Contraction Forms - **Concurrent** | Tenths through ten thousandths – Use Prepared Examples |
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# *Multiples - 1 Practice – (1 – 12)*

**<u>Directions:</u> 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 - 1 Practice – (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* | *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 - 2 Practice – (10 – 90 + 12, 15 & 25)*

**<u>Directions:</u> Fill in the table with the correct multiples by skip counting downward.**

| 10 | 12 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 70 | 80 | 90 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| *0* | *0* | *0* | | | | | | | | | |
| *10* | *12* | | | | | | | | | | |
| *20* | | | | | | | | | | | |
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# *Multiples - 2 Practice – (10 – 90 + 12, 15 & 25)*

**Directions:** **Fill in the table with the correct multiples by skip counting downward.**

| 10 | 12 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 70 | 80 | 90 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| *0* | *0* | *0* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *10* | *12* | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 70 | 80 | 90 |
| *20* | 24 | 30 | 40 | 50 | 60 | 80 | 100 | 120 | 140 | 160 | 180 |
| 30 | 36 | 45 | 60 | 75 | 90 | 120 | 150 | 180 | 210 | 240 | 270 |
| 40 | 48 | 60 | 80 | 100 | 120 | 160 | 200 | 240 | 280 | 320 | 360 |
| 50 | 60 | 75 | 100 | 125 | 150 | 200 | 250 | 300 | 350 | 400 | 450 |
| 60 | 72 | 90 | 120 | 150 | 180 | 240 | 300 | 360 | 420 | 480 | 540 |
| 70 | 84 | 105 | 140 | 175 | 210 | 280 | 350 | 420 | 490 | 560 | 630 |
| 80 | 96 | 120 | 160 | 200 | 240 | 320 | 400 | 480 | 540 | 640 | 720 |
| 90 | 108 | 135 | 180 | 225 | 270 | 360 | 450 | 540 | 630 | 720 | 810 |
| 100 ★ | 120 ★ | 150 ★ | 200 ★ | 250 ★ | 300 ★ | 400 ★ | 500 ★ | 600 ★ | 700 ★ | 800 ★ | 900 ★ |

# *Making 10 – Practice – Version 1*

**Directions:** **Fill in each box so the two numbers SUM to 10**.

| | |
|---|---|
| **10** | ***0*** |
| **5** | ***5*** |
| **8** | ***2*** |
| **3** | ***7*** |
| **6** | |
| **2** | |
| **4** | |
| **7** | |
| **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 – Practice – Version 1*

**Directions:** **Fill in each box so the two numbers SUM to 10.**

| | |
|---|---|
| 10 | *0* |
| 5 | *5* |
| 8 | *2* |
| 3 | *7* |
| 6 | 4 |
| 2 | 8 |
| 4 | 6 |
| 7 | 3 |
| 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 – Practice – Version 1*

**Directions:** **Fill in each box so the two numbers SUM to a total of 100**.

| | |
|---|---|
| **100** | ***0*** |
| **80** | ***20*** |
| **10** | ***90*** |
| **70** | ***30*** |
| **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 – Practice

**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 |
| 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 |

# *Making 100 – Practice – Version 2*

**Directions:** **Fill in each box so the two numbers SUM to a total of 100**.

***Hint:*** **Add up.** Example: ***55*** → 55 to 60 = **5** → 60 to 100 = **40** ⟶ Therefore, **5** + **40** = **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 – Practice – Version 2*

**Directions:** **Fill in each box so the two numbers SUM to a total of 100**.

***Hint:*** **Add up.** Example: ***55*** → 55 to 60 = **5** → 60 to 100 = **40** ⟶ Therefore, **5** + **40** = **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 – Practice – Version 3*

**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 – Practice – Version 3*

**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 | 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 10 – Practice – Version 2*

**<u>Making 10.0 Directions:</u> Fill in each box so the two numbers SUM to 10.0**

***<u>Hint:</u>* Add up.** Example: ***3.2*** → 3.2 to 4.0 = **<u>0.8</u>** → 4.0 to 10.0 = **<u>6.0</u>** → Therefore, **<u>0.8</u>** + **<u>6.0</u>** = **<u>6.8</u>**

| | |
|---|---|
| **10.0** | ***0*** |
| **9.1** | ***0.9*** |
| **8.7** | ***1.3*** |
| **7.3** | ***2.7*** |
| **6.1** | |
| **5.1** | |
| **4.9** | |
| **3.7** | |
| **2.3** | |
| **1.6** | |
| **0** | |
| **3.2** | |
| **6.5** | |
| **9.7** | |
| **2.0** | |
| **0.5** | |
| **8.6** | |
| **2.5** | |
| **1.7** | |
| **5.2** | |
| **0** | |
| **2.8** | |
| **4.6** | |

| | |
|---|---|
| **4.1** | |
| **6.7** | |
| **7.0** | |
| **2.1** | |
| **8.7** | |
| **1.3** | |
| **9.8** | |
| **4.2** | |
| **8.6** | |
| **2.8** | |
| **6.2** | |
| **2.5** | |
| **9.1** | |
| **8.9** | |
| **0** | |
| **4.1** | |
| **7.5** | |
| **8.2** | |
| **2.8** | |
| **9.3** | |
| **9.1** | |
| **5.5** | |
| **3.0** | |

| | |
|---|---|
| **1.0** | |
| **2.8** | |
| **8.8** | |
| **2.2** | |
| **5.3** | |
| **9.0** | |
| **5.5** | |
| **9.3** | |
| **0** | |
| **3.6** | |
| **5.1** | |
| **7.7** | |
| **8.0** | |
| **1.5** | |
| **8.9** | |
| **9.3** | |
| **10.0** | |
| **8.3** | |
| **3.2** | |
| **6.9** | |
| **3.1** | |
| **2.0** | |
| **3.5** | |

| | |
|---|---|
| **5.6** | |
| **2.0** | |
| **2.5** | |
| **4.9** | |
| **10.0** | |
| **9.6** | |
| **9.8** | |
| **6.2** | |
| **3.9** | |
| **8.5** | |
| **1.4** | |
| **9.9** | |
| **5.0** | |
| **2.8** | |
| **0** | |
| **8.2** | |
| **2.5** | |
| **5.9** | |
| **1.4** | |
| **4.2** | |
| **1.0** | |
| **9.2** | |
| **5.2** | |

# *Making 10 – Practice – Version 2*

**Making 10.0 Directions:** **Fill in each box so the two numbers SUM to 10.0**

***Hint:*** **Add up.** Example: ***3.2*** → 3.2 to 4.0 = **0.8** → 4.0 to 10.0 = **6.0** → Therefore, **0.8** + **6.0** = **6.8**

| | |
|---|---|
| 10.0 | *0* |
| 9.1 | *0.9* |
| 8.7 | *1.3* |
| 7.3 | *2.7* |
| 6.1 | 3.9 |
| 5.1 | 4.9 |
| 4.9 | 5.1 |
| 3.7 | 6.3 |
| 2.3 | 7.7 |
| 1.6 | 8.4 |
| 0 | 10.0 |
| 3.2 | 6.8 |
| 6.5 | 3.4 |
| 9.7 | 0.3 |
| 2.0 | 8.0 |
| 0.5 | 9.5 |
| 8.6 | 1.6 |
| 2.5 | 7.5 |
| 1.7 | 8.3 |
| 5.2 | 4.8 |
| 0 | 10.0 |
| 2.8 | 7.2 |
| 4.6 | 5.4 |

| | |
|---|---|
| 4.1 | 5.9 |
| 6.7 | 3.3 |
| 7.0 | 3.0 |
| 2.1 | 7.9 |
| 8.7 | 1.3 |
| 1.3 | 8.7 |
| 9.8 | 0.2 |
| 4.2 | 5.8 |
| 8.6 | 1.4 |
| 2.8 | 7.2 |
| 6.2 | 4.8 |
| 2.5 | 7.5 |
| 9.1 | 0.9 |
| 8.9 | 1.1 |
| 0 | 10.0 |
| 4.1 | 5.9 |
| 7.5 | 2.5 |
| 8.2 | 1.8 |
| 2.8 | 7.2 |
| 9.3 | 0.7 |
| 9.1 | 0.9 |
| 5.5 | 4.5 |
| 3.0 | 7.0 |

| | |
|---|---|
| 1.0 | 9.0 |
| 2.8 | 7.2 |
| 8.8 | 1.2 |
| 2.2 | 7.8 |
| 5.3 | 4.7 |
| 9.0 | 1.0 |
| 5.5 | 4.5 |
| 9.3 | 0.7★ |
| 0 | 10.0 |
| 3.6 | 6.4 |
| 5.1 | 4.9 |
| 7.7 | 2.3 |
| 8.0 | 2.0 |
| 1.5 | 8.5 |
| 8.9 | 1.1 |
| 9.3 | 0.7 |
| 10.0 | 0 |
| 8.3 | 1.7 |
| 3.2 | 6.8 |
| 6.9 | 3.1 |
| 3.1 | 6.9 |
| 2.0 | 8.0 |
| 3.5 | 6.5 |

| | |
|---|---|
| 5.6 | 4.4 |
| 2.0 | 8.0 |
| 2.5 | 7.5 |
| 4.9 | 5.1 |
| 10.0 | 0 |
| 9.6 | 0.4 |
| 9.8 | 0.2 |
| 6.2 | 3.8 |
| 3.9 | 6.1 |
| 8.5 | 1.5 |
| 1.4 | 8.6 |
| 9.9 | 0.1 |
| 5.0 | 5.0 |
| 2.8 | 7.2 |
| 0 | 10.0 |
| 8.2 | 1.8 |
| 2.5 | 7.5 |
| 5.9 | 4.1 |
| 1.4 | 8.6 |
| 4.2 | 5.8 |
| 1.0 | 9.0 |
| 9.2 | 0.8 |
| 5.2 | 4.8 |

# *Making 1 – Practice – Version 1*

**<u>Making 1.0 Directions:</u> Fill in each box so the two numbers SUM to 1.0**

| | |
|---|---|
| **1.0** | ***0*** |
| **0.1** | ***0.9*** |
| **0.7** | ***0.3*** |
| **0.3** | ***0.7*** |
| **0.5** | |
| **0.1** | |
| **0.9** | |
| **0.7** | |
| **0.3** | |
| **0.4** | |
| **0** | |
| **0.2** | |
| **0.6** | |
| **0.7** | |
| **0** | |
| **0.5** | |
| **0.4** | |
| **0.5** | |
| **0.7** | |
| **0.1** | |
| **0** | |
| **0.8** | |
| **0.2** | |

| | |
|---|---|
| **0.1** | |
| **0.7** | |
| **0** | |
| **0.1** | |
| **0.7** | |
| **0.3** | |
| **0.8** | |
| **0.2** | |
| **0.6** | |
| **0.9** | |
| **0.2** | |
| **0.5** | |
| **0.1** | |
| **0.9** | |
| **0** | |
| **0.1** | |
| **0.4** | |
| **0.2** | |
| **0.8** | |
| **0.3** | |
| **0.1** | |
| **0.5** | |
| **0** | |

| | |
|---|---|
| **1.0** | |
| **0.8** | |
| **0.5** | |
| **0.2** | |
| **0.3** | |
| **0** | |
| **0.5** | |
| **0.3** | |
| **0** | |
| **0.6** | |
| **0.1** | |
| **0.7** | |
| **0.9** | |
| **0.5** | |
| **0.2** | |
| **0.3** | |
| **1.0** | |
| **0.3** | |
| **0.2** | |
| **0.9** | |
| **0.1** | |
| **0.4** | |
| **0.5** | |

| | |
|---|---|
| **0.6** | |
| **0.2** | |
| **0.5** | |
| **0.9** | |
| **1.0** | |
| **0.6** | |
| **0.8** | |
| **0.2** | |
| **0.9** | |
| **0.5** | |
| **0.4** | |
| **0.9** | |
| **1.0** | |
| **0.8** | |
| **0** | |
| **0.2** | |
| **0.5** | |
| **0.9** | |
| **0.4** | |
| **0.2** | |
| **1.0** | |
| **0.7** | |
| **0.2** | |

# *Making 1 – Practice – Version 1*

**Making 1.0 Directions:** **Fill in each box so the two numbers SUM to 1.0**

| | |
|---|---|
| 1.0 | *0* |
| 0.1 | *0.9* |
| 0.7 | *0.3* |
| 0.3 | *0.7* |
| 0.5 | 0.5 |
| 0.1 | 0.9 |
| 0.9 | 0.1 |
| 0.7 | 0.3 |
| 0.3 | 0.7 |
| 0.4 | 0.6 |
| 0 | 1.0 |
| 0.2 | 0.8 |
| 0.6 | 0.4 |
| 0.7 | 0.3 |
| 0 | 1.0 |
| 0.5 | 0.5 |
| 0.4 | 0.6 |
| 0.5 | 0.5 |
| 0.7 | 0.3 |
| 0.1 | 0.9 |
| 0 | 1.0 |
| 0.8 | 0.2 |
| 0.2 | 0.8 |

| | |
|---|---|
| 0.1 | 0.9 |
| 0.7 | 0.3 |
| 0 | 1.00 |
| 0.1 | 0.9 |
| 0.7 | 0.3 |
| 0.3 | 0.7 |
| 0.8 | 0.2 |
| 0.2 | 0.8 |
| 0.6 | 0.4 |
| 0.9 | 0.1 |
| 0.2 | 0.8 |
| 0.5 | 0.5 |
| 0.1 | 0.9 |
| 0.9 | 0.1 |
| 0 | 1.0 |
| 0.1 | 0.9 |
| 0.4 | 0.6 |
| 0.2 | 0.8 |
| 0.8 | 0.2 |
| 0.3 | 0.7 |
| 0.1 | 0.9 |
| 0.5 | 0.5 |
| 0 | 1.0 |

| | |
|---|---|
| 1.0 | 0 |
| 0.8 | 0.2 |
| 0.5 | 0.5 |
| 0.2 | 0.8 |
| 0.3 | 0.7 |
| 0 | 1.0 |
| 0.5 | 0.5 |
| 0.3 | 0.7★ |
| 0 | 1.0 |
| 0.6 | 0.4 |
| 0.1 | 0.9 |
| 0.7 | 0.3 |
| 0.9 | 0.1 |
| 0.5 | 0.5 |
| 0.2 | 0.8 |
| 0.3 | 0.7 |
| 1.0 | 0 |
| 0.2 | 0.8 |
| 0.4 | 0.6 |
| 0.9 | 0.1 |
| 0.1 | 0.9 |
| 0.4 | 0.6 |
| 0.5 | 0.5 |

| | |
|---|---|
| 0.6 | 0.4 |
| 0.2 | 0.2 |
| 0.5 | 0.5 |
| 0.9 | 0.1 |
| 1.0 | 0 |
| 0.6 | 0.4 |
| 0.8 | 0.2 |
| 0.2 | 0.8 |
| 0.9 | 0.1 |
| 0.5 | 0.5 |
| 0.4 | 0.6 |
| 0.9 | 0.1 |
| 1.0 | 0 |
| 0.8 | 0.2 |
| 0 | 1.0 |
| 0.2 | 0.8 |
| 0.5 | 0.5 |
| 0.9 | 0.1 |
| 0.4 | 0.6 |
| 0.2 | 0.8 |
| 1.0 | 0 |
| 0.7 | 0.3 |
| 0.2 | 0.8 |

# *Making 1 – Practice – Version 2*

**Making 1.0 Directions:** **Fill in each box so the two numbers SUM to 1.0**

***Hint:*** **Add up.** Example: ***0.32*** → 0.32 to 0.40 = **0.08** → 0.40 to 1.00 = **0.60** → Therefore, **0.08** + **0.60** = **0.68**

| | |
|---|---|
| **1.00** | ***0*** |
| **0.13** | ***0.87*** |
| **0.08** | ***0.92*** |
| **0.29** | ***0.71*** |
| **0.43** | |
| **0.09** | |
| **0.9** | |
| **0.66** | |
| **0.93** | |
| **0.42** | |
| **0** | |
| **0.11** | |
| **0.96** | |
| **0.65** | |
| **0** | |
| **0.43** | |
| **0.38** | |
| **0.42** | |
| **0.07** | |
| **0.91** | |
| **0** | |
| **0.75** | |
| **0.12** | |

| | |
|---|---|
| **0.05** | |
| **0.67** | |
| **0** | |
| **0.09** | |
| **0.68** | |
| **0.25** | |
| **0.98** | |
| **0.14** | |
| **0.08** | |
| **0.99** | |
| **0.92** | |
| **0.5** | |
| **0.03** | |
| **0.84** | |
| **0** | |
| **0.91** | |
| **0.38** | |
| **0.15** | |
| **0.74** | |
| **0.28** | |
| **0.01** | |
| **0.95** | |
| **0** | |

| | |
|---|---|
| **1.00** | |
| **0.79** | |
| **0.75** | |
| **0.19** | |
| **0.93** | |
| **0** | |
| **0.5** | |
| **0.28** | |
| **0** | |
| **0.55** | |
| **0.91** | |
| **0.68** | |
| **0.81** | |
| **0.05** | |
| **0.92** | |
| **0.27** | |
| **1.00** | |
| **0.28** | |
| **0.12** | |
| **0.99** | |
| **0.07** | |
| **0.94** | |
| **0.48** | |

| | |
|---|---|
| **0.58** | |
| **0.98** | |
| **0.7** | |
| **0.95** | |
| **1.00** | |
| **0.6** | |
| **0.89** | |
| **0.20** | |
| **0.9** | |
| **0.5** | |
| **0.01** | |
| **0.99** | |
| **1.00** | |
| **0.76** | |
| **0** | |
| **0.18** | |
| **0.95** | |
| **0.85** | |
| **0.35** | |
| **0.18** | |
| **1.00** | |
| **0.65** | |
| **0.18** | |

# *Making 1 – Practice – Version 2*

**Making 1.0 Directions:** **Fill in each box so the two numbers SUM to 1.0**

***Hint:*** **Add up.** Example: ***0.32*** → 0.32 to 0.40 = **0.08** → 0.40 to 1.00 = **0.60** → Therefore, **0.08** + **0.60** = **0.68**

| | |
|---|---|
| 1.00 | *0* |
| 0.13 | *0.87* |
| 0.08 | *0.92* |
| 0.29 | *0.71* |
| 0.43 | 0.57 |
| 0.09 | 0.91 |
| 0.9 | 0.1 |
| 0.66 | 0.34 |
| 0.93 | 0.07 |
| 0.42 | 0.58 |
| 0 | 1.00 |
| 0.11 | 0.89 |
| 0.96 | 0.04 |
| 0.65 | 0.35 |
| 0 | 1.00 |
| 0.43 | 0.57 |
| 0.38 | 0.62 |
| 0.42 | 0.58 |
| 0.07 | 0.93 |
| 0.91 | 0.09 |
| 0 | 1.00 |
| 0.75 | 0.25 |
| 0.12 | 0.88 |

| | |
|---|---|
| 0.05 | 0.95 |
| 0.67 | 0.33 |
| 0 | 1.00 |
| 0.09 | 0.91 |
| 0.68 | 0.32 |
| 0.25 | 0.75 |
| 0.98 | 0.02 |
| 0.14 | 0.86 |
| 0.08 | 0.92 |
| 0.99 | 0.01 |
| 0.92 | 0.08 |
| 0.5 | 0.50 |
| 0.03 | 0.97 |
| 0.84 | 0.16 |
| 0 | 1.00 |
| 0.91 | 0.09 |
| 0.38 | 0.62 |
| 0.15 | 0.85 |
| 0.74 | 0.26 |
| 0.28 | 0.72 |
| 0.01 | 0.99 |
| 0.95 | 0.05 |
| 0 | 1.00 ★ |

| | |
|---|---|
| 1.00 | 0 |
| 0.79 | 0.21 |
| 0.75 | 0.25 |
| 0.19 | 0.81 |
| 0.93 | 0.07 |
| 0 | 1.00 |
| 0.5 | 0.50 |
| 0.28 | 0.72 |
| 0 | 1.00 |
| 0.55 | 0.45 |
| 0.91 | 0.09 |
| 0.68 | 0.32 |
| 0.81 | 0.19 |
| 0.05 | 0.95 |
| 0.92 | 0.08 |
| 0.27 | 0.73 |
| 1.00 | 0 |
| 0.28 | 0.72 |
| 0.12 | 0.88 |
| 0.99 | 0.01 |
| 0.07 | 0.93 |
| 0.94 | 0.06 |
| 0.48 | 0.52 |

| | |
|---|---|
| 0.58 | 0.42 |
| 0.98 | 0.02 |
| 0.7 | 0.30 |
| 0.95 | 0.05 |
| 1.00 | 0 |
| 0.6 | 0.4 |
| 0.89 | 0.11 |
| 0.20 | 0.8 |
| 0.9 | 0.1 |
| 0.5 | 0.50 |
| 0.01 | 0.99 |
| 0.99 | 0.01 |
| 1.00 | 0 |
| 0.76 | 0.24 |
| 0 | 1.00 |
| 0.18 | 0.82 |
| 0.95 | 0.05 |
| 0.85 | 0.15 |
| 0.35 | 0.65 |
| 0.18 | 0.82 |
| 1.00 | 0 |
| 0.65 | 0.35 |
| 0.18 | 0.82 |

# FIND THE MISSING FACTOR – 1, 2, and 3

**Directions:** **Fill in the factor that makes the number sentence mathematically correct.**

| | | | |
|---|---|---|---|
| 1 x ____ = 3 | 2 x ____ = 2 | 2 x ____ = 12 | 2 x ____ = 6 |
| 2 x ____ = 4 | 3 x ____ = 24 | 2 x ____ = 6 | 3 x ____ = 30 |
| 3 x ____ = 12 | 2 x ____ = 20 | 2 x ____ = 8 | 2 x ____ = 18 |
| 2 x ____ = 18 | 3 x ____ = 18 | 3 x ____ = 24 | 3 x ____ = 15 |
| 3 x ____ = 9 | 3 x ____ = 30 | 3 x ____ = 27 | 2 x ____ = 12 |
| 1 x ____ = 2 | 2 x ____ = 14 | 1 x ____ = 2 | 3 x ____ = 15 |
| 3 x ____ = 15 | 3 x ____ = 24 | 3 x ____ = 12 | 3 x ____ = 27 |
| 2 x ____ = 12 | 2 x ____ = 8 | 2 x ____ = 16 | 2 x ____ = 4 |
| 3 x ____ = 21 | 3 x ____ = 30 | 3 x ____ = 18 | 3 x ____ = 24 |
| 2 x ____ = 10 | 2 x ____ = 12 | 2 x ____ = 6 | 2 x ____ = 2 |
| 1 x ____ = 1 | 1 x ____ = 3 | 2 x ____ = 10 | 2 x ____ = 14 |
| 2 x ____ = 18 | 2 x ____ = 22 | 2 x ____ = 20 | 3 x ____ = 12 |
| 3 x ____ = 24 | 2 x ____ = 20 | 2 x ____ = 24 | 2 x ____ = 16 |
| 2 x ____ = 6 | 2 x ____ = 8 | 3 x ____ = 6 | 2 x ____ = 10 |
| 3 x ____ = 15 | 3 x ____ = 12 | 3 x ____ = 21 | 3 x ____ = 21 |
| 2 x ____ = 8 | 2 x ____ = 4 | 2 x ____ = 24 | 2 x ____ = 10 |
| 3 x ____ = 3 | 1 x ____ = 2 | 2 x ____ = 2 | 1 x ____ = 3 |
| 2 x ____ = 4 | 2 x ____ = 16 | 2 x ____ = 8 | 2 x ____ = 12 |
| 1 x ____ = 2 | 3 x ____ = 9 | 1 x ____ = 2 | 3 x ____ = 12 |
| 2 x ____ = 14 | 1 x ____ = 1 | 2 x ____ = 2 | 3 x ____ = 24 |
| 3 x ____ = 27 | 2 x ____ = 24 | 3 x ____ = 30 | 2 x ____ = 24 |
| 3 x ____ = 30 | 3 x ____ = 27 | 2 x ____ = 24 | 3 x ____ = 27 |
| 2 x ____ = 16 | 2 x ____ = 18 | 2 x ____ = 14 | 2 x ____ = 12 |
| 1 x ____ = 3 | 2 x ____ = 20 | 3 x ____ = 9 | 2 x ____ = 20 |

# FIND THE MISSING FACTOR – 1, 2, and 3

**Directions:** **Fill in the factor that makes the number sentence mathematically correct.**

| | | | |
|---|---|---|---|
| 1 x 3 = 3 | 2 x 1 = 2 | 2 x 6 = 12 | 2 x 3 = 6 |
| 2 x 2 = 4 | 3 x 8 = 24 | 2 x 3 = 6 | 3 x 10 = 30 |
| 3 x 4 = 12 | 2 x 10 = 20 | 2 x 4 = 8 | 2 x 9 = 18 |
| 2 x 9 = 18 | 3 x 6 = 18 | 3 x 8 = 24 | 3 x 5 = 15 |
| 3 x 3 = 9 | 3 x 10 = 30 | 3 x 9 = 27 | 2 x 6 = 12 |
| 1 x 2 = 2 | 2 x 7 = 14 | 1 x 2 = 2 | 3 x 5 = 15 |
| 3 x 5 = 15 | 3 x 8 = 24 | 3 x 4 = 12 | 3 x 9 = 27 |
| 2 x 6 = 12 | 2 x 4 = 8 | 2 x 8 = 16 | 2 x 2 = 4 |
| 3 x 7 = 21 | 3 x 10 = 30 | 3 x 6 = 18 | 3 x 8 = 24 |
| 2 x 5 = 10 | 2 x 6 = 12 | 2 x 3 = 6 | 2 x 1 = 2 |
| 1 x 1 = 1 | 1 x 3 = 3 | 2 x 5 = 10 | 2 x 7 = 14 |
| 2 x 9 = 18 | 2 x 11 = 22 | 2 x 10 = 20 | 3 x 4 = 12 |
| 3 x 8 = 24 | 2 x 10 = 20 | 2 x 12 = 24 | 2 x 8 = 16 |
| 2 x 3 = 6 | 2 x 4 = 8 | 3 x 2 = 6 | 2 x 5 = 10 |
| 3 x 5 = 15 | 3 x 4 = 12 | 3 x 7 = 21 | 3 x 7 = 21 |
| 2 x 4 = 8 | 2 x 2 = 4 | 2 x 12 = 24 | 2 x 5 = 10 |
| 3 x 1 = 3 | 1 x 2 = 2 | 2 x 1 = 2 | 1 x 3 = 3 |
| 2 x 2 = 4 | 2 x 8 = 16 | 2 x 4 = 8 | 2 x 6 = 12 |
| 1 x 2 = 2 | 3 x 3 = 9 | 1 x 2 = 2 | 3 x 4 = 12 |
| 2 x 7 = 14 | 1 x 1 = 1 | 2 x 1 = 2 | 3 x 8 = 24 |
| 3 x 9 = 27 | 2 x 12 = 24 | 3 x 10 = 30 | 2 x 12 = 24 |
| 3 x 10 = 30 | 3 x 9 = 27 | 2 x 12 = 24 | 3 x 9 = 27 |
| 2 x 8 = 16 | 2 x 9 = 18 | 2 x 7 = 14 | 2 x 6 = 12 |
| 1 x 3 = 3 | 2 x 10 = 20 | 3 x 3 = 9 | 2 x 10 = 20 ★ |

# FIND THE MISSING FACTOR – 4, 5, and 6

**Directions:** **Fill in the factor that makes the number sentence mathematically correct.**

| | | | |
|---|---|---|---|
| 1 x ____ = 4 | 5 x ____ = 5 | 6 x ____ = 12 | 6 x ____ = 6 |
| 4 x ____ = 8 | 4 x ____ = 24 | 6 x ____ = 6 | 6 x ____ = 30 |
| 6 x ____ = 12 | 6 x ____ = 48 | 4 x ____ = 8 | 5 x ____ = 30 |
| 5 x ____ = 15 | 4 x ____ = 24 | 5 x ____ = 40 | 6 x ____ = 54 |
| 6 x ____ = 18 | 5 x ____ = 30 | 5 x ____ = 30 | 6 x ____ = 60 |
| 1 x ____ = 6 | 4 x ____ = 8 | 1 x ____ = 6 | 5 x ____ = 55 |
| 5 x ____ = 15 | 5 x ____ = 45 | 6 x ____ = 54 | 4 x ____ = 20 |
| 4 x ____ = 12 | 4 x ____ = 8 | 6 x ____ = 18 | 5 x ____ = 40 |
| 4 x ____ = 24 | 4 x ____ = 40 | 4 x ____ = 20 | 5 x ____ = 45 |
| 6 x ____ = 54 | 5 x ____ = 25 | 6 x ____ = 48 | 6 x ____ = 54 |
| 5 x ____ = 10 | 6 x ____ = 36 | 4 x ____ = 12 | 4 x ____ = 12 |
| 4 x ____ = 20 | 4 x ____ = 24 | 5 x ____ = 20 | 5 x ____ = 15 |
| 5 x ____ = 20 | 4 x ____ = 28 | 6 x ____ = 24 | 4 x ____ = 16 |
| 6 x ____ = 6 | 5 x ____ = 35 | 6 x ____ = 6 | 5 x ____ = 50 |
| 6 x ____ = 18 | 6 x ____ = 54 | 5 x ____ = 10 | 6 x ____ = 66 |
| 5 x ____ = 30 | 6 x ____ = 42 | 4 x ____ = 24 | 5 x ____ = 10 |
| 6 x ____ = 36 | 1 x ____ = 5 | 6 x ____ = 48 | 1 x ____ = 5 |
| 4 x ____ = 4 | 4 x ____ = 16 | 6 x ____ = 18 | 4 x ____ = 12 |
| 6 x ____ = 24 | 5 x ____ = 35 | 1 x ____ = 5 | 5 x ____ = 45 |
| 4 x ____ = 12 | 1 x ____ = 6 | 5 x ____ = 5 | 6 x ____ = 24 |
| 4 x ____ = 40 | 4 x ____ = 12 | 5 x ____ = 30 | 6 x ____ = 54 |
| 5 x ____ = 50 | 6 x ____ = 30 | 4 x ____ = 24 | 6 x ____ = 36 |
| 4 x ____ = 16 | 5 x ____ = 15 | 5 x ____ = 25 | 5 x ____ = 25 |
| 1 x ____ = 6 | 4 x ____ = 40 | 6 x ____ = 54 | 6 x ____ = 54 |

 

# FIND THE MISSING FACTOR – 4, 5, and 6

**Directions:** **Fill in the factor that makes the number sentence mathematically correct.**

| | | | |
|---|---|---|---|
| 1 x **4** = 4 | 5 x **1** = 5 | 6 x **2** = 12 | 6 x **1** = 6 |
| 4 x **2** = 8 | 4 x **6** = 24 | 6 x **1** = 6 | 6 x **5** = 30 |
| 6 x **2** = 12 | 6 x **8** = 48 | 4 x **2** = 8 | 5 x **6** = 30 |
| 5 x **3** = 15 | 4 x **6** = 24 | 5 x **8** = 40 | 6 x **9** = 54 |
| 6 x **3** = 18 | 5 x **6** = 30 | 5 x **6** = 30 | 6 x **10** = 60 |
| 1 x **6** = 6 | 4 x **2** = 8 | 1 x **6** = 6 | 5 x **11** = 55 |
| 5 x **3** = 15 | 5 x **9** = 45 | 6 x **9** = 54 | 4 x **5** = 20 |
| 4 x **3** = 12 | 4 x **2** = 8 | 6 x **3** = 18 | 5 x **8** = 40 |
| 4 x **6** = 24 | 4 x **10** = 40 | 4 x **5** = 20 | 5 x **9** = 45 |
| 6 x **9** = 54 | 5 x **5** = 25 | 6 x **8** = 48 | 6 x **9** = 54 |
| 5 x **2** = 10 | 6 x **6** = 36 | 4 x **3** = 12 | 4 x **3** = 12 |
| 4 x **5** = 20 | 4 x **6** = 24 | 5 x **4** = 20 | 5 x **3** = 15 |
| 5 x **4** = 20 | 4 x **7** = 28 | 6 x **4** = 24 | 4 x **4** = 16 |
| 6 x **1** = 6 | 5 x **7** = 35 | 6 x **1** = 6 | 5 x **10** = 50 |
| 6 x **3** = 18 | 6 x **9** = 54 | 5 x **2** = 10 | 6 x **11** = 66 |
| 5 x **6** = 30 | 6 x **7** = 42 | 4 x **6** = 24 | 5 x **2** = 10 |
| 6 x **6** = 36 | 1 x **5** = 5 | 6 x **8** = 48 | 1 x **5** = 5 |
| 4 x **1** = 4 | 4 x **4** = 16 | 6 x **3** = 18 | 4 x **3** = 12 |
| 6 x **4** = 24 | 5 x **7** = 35 | 1 x **5** = 5 | 5 x **9** = 45 |
| 4 x **3** = 12 | 1 x **6** = 6 | 5 x **1** = 5 | 6 x **4** = 24 |
| 4 x **10** = 40 | 4 x **3** = 12 | 5 x **6** = 30 | 6 x **9** = 54 |
| 5 x **10** = 50 | 6 x **5** = 30 | 4 x **6** = 24 | 6 x **6** = 36 |
| 4 x **4** = 16 | 5 x **3** = 15 | 5 x **5** = 25 | 5 x **5** = 25 |
| 1 x **6** = 6 | 4 x **10** = 40 | 6 x **9** = 54 | 6 x **9** = 54★ |

# FIND THE MISSING FACTOR – 7, 8, and 9

**Directions:** **Fill in the factor that makes the number sentence mathematically correct.**

| | | | |
|---|---|---|---|
| 1 x ____ = 7 | 9 x ____ = 9 | 9 x ____ = 18 | 7 x ____ = 63 |
| 7 x ____ = 7 | 7 x ____ = 28 | 7 x ____ = 7 | 8 x ____ = 56 |
| 8 x ____ = 16 | 8 x ____ = 48 | 9 x ____ = 18 | 7 x ____ = 49 |
| 7 x ____ = 14 | 7 x ____ = 28 | 7 x ____ = 49 | 9 x ____ = 54 |
| 9 x ____ = 18 | 8 x ____ = 64 | 8 x ____ = 80 | 7 x ____ = 70 |
| 1 x ____ = 8 | 7 x ____ = 7 | 1 x ____ = 7 | 8 x ____ = 88 |
| 8 x ____ = 24 | 9 x ____ = 45 | 7 x ____ = 14 | 6 x ____ = 18 |
| 7 x ____ = 21 | 7 x ____ = 14 | 8 x ____ = 32 | 7 x ____ = 49 |
| 8 x ____ = 24 | 9 x ____ = 63 | 8 x ____ = 24 | 9 x ____ = 45 |
| 9 x ____ = 36 | 7 x ____ = 70 | 7 x ____ = 49 | 7 x ____ = 7 |
| 7 x ____ = 70 | 8 x ____ = 32 | 8 x ____ = 64 | 9 x ____ = 81 |
| 7 x ____ = 21 | 9 x ____ = 27 | 9 x ____ = 72 | 8 x ____ = 80 |
| 8 x ____ = 32 | 7 x ____ = 28 | 8 x ____ = 72 | 7 x ____ = 14 |
| 7 x ____ = 42 | 8 x ____ = 64 | 7 x ____ = 49 | 8 x ____ = 24 |
| 9 x ____ = 90 | 7 x ____ = 63 | 8 x ____ = 16 | 7 x ____ = 77 |
| 9 x ____ = 54 | 9 x ____ = 54 | 9 x ____ = 27 | 8 x ____ = 16 |
| 7 x ____ = 42 | 1 x ____ = 9 | 8 x ____ = 48 | 1 x ____ = 8 |
| 9 x ____ = 9 | 7 x ____ = 42 | 7 x ____ = 35 | 7 x ____ = 70 |
| 7 x ____ = 56 | 9 x ____ = 90 | 1 x ____ = 9 | 7 x ____ = 56 |
| 8 x ____ = 56 | 1 x ____ = 8 | 7 x ____ = 7 | 8 x ____ = 24 |
| 8 x ____ = 72 | 8 x ____ = 56 | 7 x ____ = 35 | 7 x ____ = 35 |
| 7 x ____ = 49 | 7 x ____ = 63 | 8 x ____ = 24 | 8 x ____ = 56 |
| 8 x ____ = 16 | 8 x ____ = 64 | 9 x ____ = 63 | 7 x ____ = 49 |
| 1 x ____ = 9 | 7 x ____ = 35 | 8 x ____ = 64 | 8 x ____ = 72 |

# FIND THE MISSING FACTOR – 7, 8, and 9

**Directions:** **Fill in the factor that makes the number sentence mathematically correct.**

| | | | |
|---|---|---|---|
| 1 x 7 = 7 | 9 x 1 = 9 | 9 x 2 = 18 | 7 x 9 = 63 |
| 7 x 1 = 7 | 7 x 4 = 28 | 7 x 1 = 7 | 8 x 7 = 56 |
| 8 x 2 = 16 | 8 x 6 = 48 | 9 x 2 = 18 | 7 x 7 = 49 |
| 7 x 2 = 14 | 7 x 4 = 28 | 7 x 7 = 49 | 9 x 6 = 54 |
| 9 x 2 = 18 | 8 x 8 = 64 | 8 x 10 = 80 | 7 x 10 = 70 |
| 1 x 8 = 8 | 7 x 1 = 7 | 1 x 7 = 7 | 8 x 11 = 88 |
| 8 x 3 = 24 | 9 x 5 = 45 | 7 x 2 = 14 | 6 x 3 = 18 |
| 7 x 3 = 21 | 7 x 2 = 14 | 8 x 4 = 32 | 7 x 7 = 49 |
| 8 x 3 = 24 | 9 x 7 = 63 | 8 x 3 = 24 | 9 x 5 = 45 |
| 9 x 4 = 36 | 7 x 10 = 70 | 7 x 7 = 49 | 7 x 1 = 7 |
| 7 x 10 = 70 | 8 x 4 = 32 | 8 x 8 = 64 | 9 x 9 = 81 |
| 7 x 3 = 21 | 9 x 3 = 27 | 9 x 8 = 72 | 8 x 10 = 80 |
| 8 x 4 = 32 | 7 x 4 = 28 | 8 x 9 = 72 | 7 x 2 = 14 |
| 7 x 6 = 42 | 8 x 8 = 64 | 7 x 7 = 49 | 8 x 3 = 24 |
| 9 x 10 = 90 | 7 x 9 = 63 | 8 x 2 = 16 | 7 x 11 = 77 |
| 9 x 6 = 54 | 9 x 6 = 54 | 9 x 3 = 27 | 8 x 2 = 16 |
| 7 x 6 = 42 | 1 x 9 = 9 | 8 x 6 = 48 | 1 x 8 = 8 |
| 9 x 1 = 9 | 7 x 6 = 42 | 7 x 5 = 35 | 7 x 10 = 70 |
| 7 x 8 = 56 | 9 x 10 = 90 | 1 x 9 = 9 | 7 x 8 = 56 |
| 8 x 7 = 56 | 1 x 8 = 8 | 7 x 1 = 7 | 8 x 3 = 24 |
| 8 x 9 = 72 | 8 x 7 = 56 | 7 x 5 = 35 | 7 x 5 = 35 |
| 7 x 7 = 49 | 7 x 9 = 63 | 8 x 3 = 24 | 8 x 7 = 56 |
| 8 x 2 = 16 | 8 x 8 = 64 | 9 x 7 = 63 | 7 x 7 = 49 |
| 1 x 9 = 9 | 7 x 5 = 35 | 8 x 8 = 64 | 8 x 9 = 72 ★ |

# *Finding 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:** **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**

 

# *Finding Factor Strings and Prime - Composite Identification*

**26:** _____ **Prime** or **Composite**

**27:** _____ **Prime** or **Composite**

**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**

**48:** _____ **Prime** or **Composite**

**49:** _____ **Prime** or **Composite**

**50:** _____ **Prime** or **Composite**

**51:** _____ **Prime** or **Composite**

**54:** _____ **Prime** or **Composite**

**55:** _____ **Prime** or **Composite**

**56:** _____ **Prime** or **Composite**

**60:** _____ **Prime** or **Composite**

# *Finding Factor Strings and Prime - Composite Identification*

# ANSWER KEY

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)** **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**

# *Finding Factor Strings and Prime - Composite Identification*

## ANSWER KEY

**26:** (1, 2, 13, 26) — **Prime** or **Composite**

**27:** (1, 3, 9, 27) — **Prime** or **Composite**

**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, 41) — **Prime** or **Composite**

**42:** (1, 2, 3, 6, 7, 13, 21, 42) — **Prime** or **Composite**

**43:** (1, 43) — **Prime** or **Composite**

**44:** (1, 2, 4, 22, 44) — **Prime** or **Composite**

**45:** (1, 3, 5, 9, 15, 45) — **Prime** or **Composite**

**48:** (1, 2, 3, 4, 6, 8, 12, 16, 24, 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**

**54:** (1, 2, 6, 9, 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, 20, 30, 60) — **Prime** or **Composite**