Fractions Represent Two Things

Grades 3 - 9

Improving Student Understanding of the Fraction and Decimal Connection – Pedagogy

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Improving Student Understanding of the Fraction and Decimal Connection – Pedagogy

Fractions and decimals are difficult concepts for a significant percentage of late elementary and middle school students. When students do not grasp the fundamental relationship between fractions and decimals, they do not realize that both expressions can represent the same mathematical value (e.g., two-fifths ($^{2}/_{5}$) equals 0.4). In other words, many students view fractions separately from decimals. However, by the time a student is in the fifth grade, this misconception must change. In short, fractions are always represented by two mathematical entities: **part of a group** and a **division problem**. Additionally, it is highly recommended that teachers equate decimals to money regardless of the decimal digit size. In doing so, students can get a 'feel' and understanding for the size of decimals. Thus, if the given decimal is 5.023976, the approximate value of the decimal is about $5.02. This exercise reduces the mystery of decimals for the vast majority of students when multiple digits are present to the right of the decimal point.

This short pedagogy paper is intended to supplement a math teacher's lesson preparation and thinking with regard to teaching the interaction between fractions and decimals. Up until fifth grade, fraction conversions to decimals are generally limited due to decimal multiplication and division mechanics. The obvious exception is proper/improper fractions or mixed numbers when the denominator is a multiple of 10, 100, or 1,000. In these cases, the transfer between fractions and decimals is direct. For instance, $^{5}/_{10}$ is equal to 0.5 or $^{56}/_{1,000}$ is equivalent to 0.056. However, from fifth grade into middle school, students have much less difficulty converting standard proper fractions of ½, $^{1}/_{3}$, ¼, $^{1}/_{5}$, or $^{1}/_{8}$ to equivalent decimals **IF** they possess adequate exposure and mastery of multiplication and division arithmetic mechanics.

The pedagogical instruction presented in this short document is highly dependent upon the daily inclusion of incorporating a few example problems each day and culminates with the application of fraction number lines until the concepts are thoroughly mastered. A fractional number line affords students the means to garner an overarching understanding of connected relationships between fractions and decimals. Furthermore, the implementation of spaced repetition instruction into the student learning process is also essential to ensure students are provided threshold levels of repetition to secure mastery of the content. This white paper includes an appendix to make the planning and preparation process much more user friendly for the typical classroom teacher. Of course, one of the more challenging aspects of classroom instruction is preparation of teaching and student materials. The appendix greatly reduces the teacher workload by affording the necessary practice sheets for immediate download and print paper handouts for students.

Direct Conversion of Decimals to Fractions and Vice Versa – Base 10 Denominators

It seems remiss to not provide the direct transfer of decimals to fractions that are generally pre-fifth grade (i.e., third and fourth grades) understanding. It is a simple process and students are able to gain a complete understanding of not only the magnitude of the decimal and fraction but place value as well.

Part 1: Decimals to Fractions Conversion – Base 10

The conversion process from a decimal to a fraction is easiest for students. A student simply places a '1' under the decimal point and adds zeroes that exactly match the number of digits to the right of the

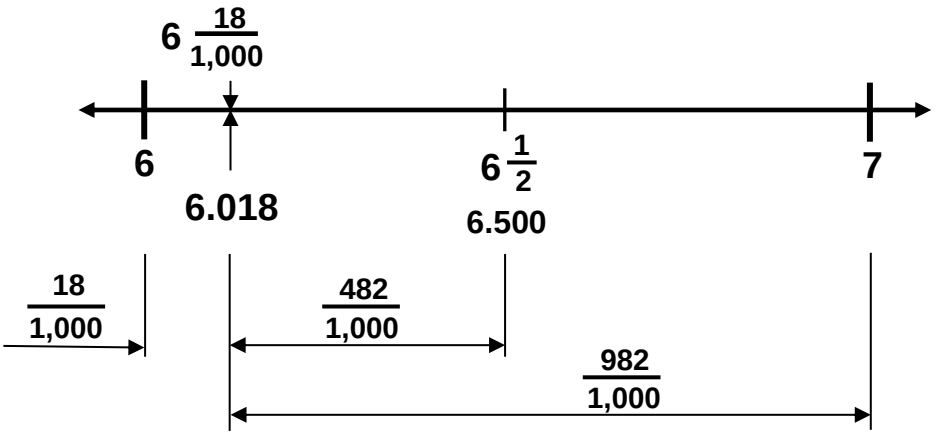
decimal point. For example, given the decimal 6.018, place a '1' under the decimal point and add three (3) zeroes that match the 3 digits (including the 0 in the tenths place) and each zero in the denominator is directly placed under each digit in the numerator. See visual example below.

Example 1: Convert 6.018 to an equivalent mixed number. **(thousandths)**

$$\mathbf{6.018} \Rightarrow \frac{\mathbf{6.018}}{1000} \Rightarrow \mathbf{6}\,\frac{18}{1{,}000}$$

Salient points to pedagogically consider:

- The decimal 6.018 is correctly converted to an equivalent mixed number.
- The place value of each digit to the right of the decimal point can be viewed directly by students. The '0' in the decimal is in the tenths place (i.e., $^{0}/_{10}$). The '1' is in the hundredths place (i.e., $^{1}/_{100}$), and the '8' is in the thousandths place (i.e., $^{8}/_{1,000}$).
- *"The decimal 6.018 is between what two whole numbers?"* Students can logically ascertain the magnitude of the decimal by considering the numerator '18' of the mixed number in comparison to the denominator '1,000'. There are only 18 out of 1,000 items shaded; thus, the decimal is much closer to the whole number 6 than it is to the whole number 7. It is 482 items away from 6.500 or $6\ ^{500}/_{1,000}$. Finally, the decimal is 982 items ($^{982}/_{1,000}$) away from the whole number 7.
  Note: 18 + 482 = 500, and 18 + 982 = 1,000.
- Since it is difficult to shade these decimals and mixed numbers on a 1,000 grid as opposed to decimals with denominators of either 10 or 100, it is often helpful for students to view the thousandths of a decimal on a quick 'make-shift' number line. Each of the relevant elements can be quickly drawn by students to demonstrate understanding of the 'part of a group' aspect of fractions.
  Note: Most importantly, the number line visually 'anchors' the decimal and the mixed number in relation to other 'fixed' numbers on the fractional number line with easily computed distances.



Number Line Pictorial

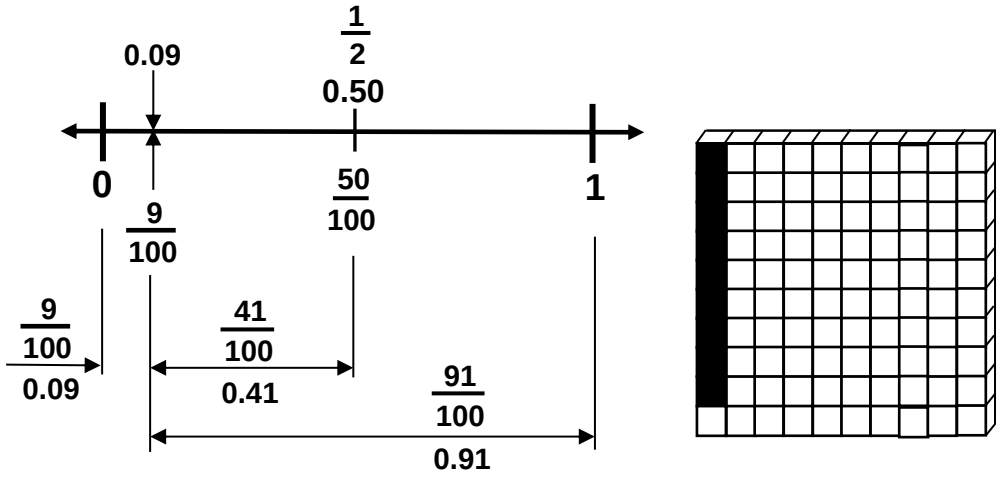
Example 2: Convert 0.09 to an equivalent proper fraction. **(hundredths)**

The conversion process is the same for the thousandths, and a number line can be used as well to show students the 'part of a group' aspect. See the picture below.

$$\mathbf{0.09} \quad \Rightarrow \quad \frac{\mathbf{0.09}}{100} \quad \Rightarrow \quad \frac{9}{100}$$

Salient points to pedagogically consider:

- The decimal 0.09 is correctly converted to an equivalent proper fraction.
- Again, the place value is reinforced for the decimal. The '0' represents ($^{0}/_{10}$) in the tenths place, and the 9 represents ($^{9}/_{100}$) – in the hundredths place.
- *"The decimal 0.09 is between what two whole numbers?"* The student can understand that only 9 out of 100 blocks are shaded on a hundred grid. Thus, the decimal and equivalent proper fraction is located 9 units from zero (0), 41 units from one-half ($^{1}/_{2}$ or $^{50}/_{100}$), and 91 (i.e., $^{91}/_{100}$) units from one (1) whole. Again, magnitudes and distances are readily understood from either a number line or a 100-grid shown below – both representing 0.09.



Number Line Pictorial **100 Grid**

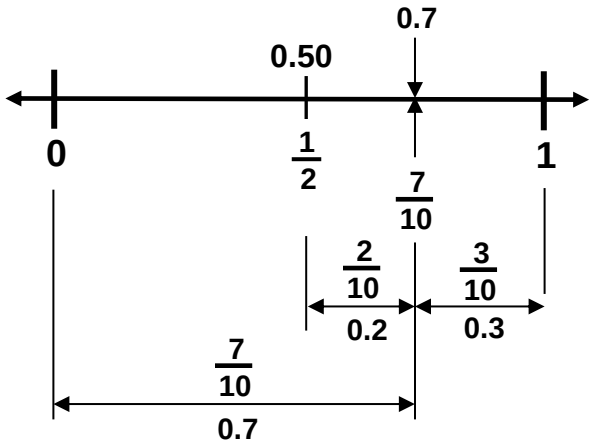
Example 3: Convert 0.7 to an equivalent proper fraction. **(tenths)**

Continuing, the decimal to fraction conversion is the same for the tenths, and either a number line or a ten-block grid can be used to show students the 'part of a group' aspect of a fraction. However, it is often easier to use the number line approach since it can be drawn in the moment rather than printing ten block sheets. It is the teacher's choice, of course.

$$\mathbf{0.7} \quad \Rightarrow \quad \frac{\mathbf{0.7}}{10} \quad \Rightarrow \quad \frac{7}{10}$$

Salient points to pedagogically consider:

- *"The decimal 0.7 is between what two whole numbers?"* The decimal 0.7 is correctly converted to an equivalent proper fraction. It is beneficial for the student to also write the decimal as 0.70 as well as 0.7. If the decimal is viewed as money, then $^{7}/_{10}$ (i.e., 0.7) may be viewed as 7 dimes out of 10 dimes and $^{70}/_{100}$ (i.e., 0.70) as 70 pennies out of 100 pennies. Thus, 0.7 is equal to 0.70 without the need for third and fourth graders to understand equivalent fraction mathematics and their identity property mechanics.
- Again, the place value is immediately reinforced for the decimal.
- See pictures below for magnitudes and physical understanding of conversion.



Number Line Pictorial **10 Grid**

It is important the students write out the equivalency when completing a conversion, so they ingrain the objective of the exercise. For instance, in each of the three examples above, the last step in the mathematical process is the equivalency: $6.018 = 6\ ^{18}/_{1,000}$; $0.09 = {}^{9}/_{100}$ and/or $0.7 = {}^{7}/_{10}$.

Part 2: Fraction to Decimal Conversions – Base 10

The reverse operation occurs when fractions are converted to equivalent decimals. The student must have mastered decimal place value to consistently and correctly convert fractions to equivalent decimals. However, a student can always 'check' their decimal by using the above methodology of using the '1' under the decimal point to ensure the fraction was correctly recreated.

Example: Convert $^{84}/_{1,000}$ to an equivalent decimal.

- ***Attempt 1:*** A student writes: 0.84 as their solution. Then, the student checks with a '1' under the decimal point to check if she/he reproduced the original fraction.

$$\mathbf{0.84} \Rightarrow \frac{\mathbf{0.84}}{100} \Rightarrow \frac{84}{100}$$

The student's fraction did **not** equal $^{84}/_{1,000}$; consequently, the decimal conversion of 0.84 is the **incorrect** equivalency.

- ***Attempt 2:*** A student writes: 0.084 as their solution. Again, the student checks by using a '1' under the decimal point and quickly checks to determine if he or she can reproduce the original fraction on their second try.

$$\mathbf{0.084} \Rightarrow \frac{\mathbf{0.084}}{1000} \Rightarrow \frac{84}{1{,}000}$$

On the second attempt, the student's fraction of $^{84}/_{1,000}$ matches the original fraction; therefore, his decimal calculation of 0.084 **is correct**. In time, the student masters the skill and no longer needs to check their decimal. However, in the initial learning stages of fraction to decimal conversion, it is beneficial and a confidence builder for the learner.

Conversion of Decimals to Fractions – Non-Base 10 Denominator

By the time students are in the fifth grade and definitely in middle school, they must be able to convert fractions of any number in the denominator and not only those that possess denominators of 10, 100, 1,000, etc. As expected, the division mechanics of fraction to decimal conversions for non-Base 10 denominators inhibit younger elementary students from engaging in this level of mathematics. This last statement stresses the importance of ALL elementary students memorizing their math facts to automaticity as well as mastering the physical significance of all four (i.e., addition, subtraction, multiplication and division) arithmetic operations.

It is highly recommended that students are taught when confronted with a proper or improper fraction, they think about the fraction in two ways: **part of a group** and **a division problem**. As a matter of fact, when I was a classroom teacher, I would write a proper fraction (e.g., ½) on the white board and ask students, *"Show me with your fingers the number of ways we can express/represent this fraction."* I would expect all hands raised with each student showing two fingers. Then, we would work several fraction to decimal conversion examples – each day before the core lesson in a spaced repetition instructional format to ensure student mastery threshold learning levels. Typical instructional conversion examples are provided below.

Example 1: Convert $^{1}/_{5}$ to an equivalent decimal.

Step 1: *"A fraction is two things – part of a group and a division problem."*

Sept 2: "Show the meaning of $^{1}/_{5}$ as ***part of group***.

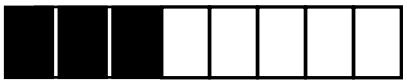
Step 3: "Show the meaning of $^{1}/_{5}$ as ***a division problem***.

$$\frac{1}{5} \Rightarrow \textit{"}\underline{\textbf{R}}\textit{oll to the }\underline{\textbf{R}}\textit{ight"} \Rightarrow \begin{array}{r} \mathbf{0.2} \\ 5\overline{)\,1.0} \\ -\,\underline{0} \\ \quad 1\,0 \\ -\,\underline{1\,0} \\ \quad\;\; 0 \end{array} \Rightarrow \boxed{\frac{1}{5} = \mathbf{0.2}}$$

Example 2: Convert $^{3}/_{8}$ to an equivalent decimal.

Step 1: *"A fraction is two things – part of a group and a division problem."*

Sept 2: "Show the meaning of $^{3}/_{8}$ as ***part of group***.



Step 3: "Show the meaning of $^{3}/_{8}$ as ***a division problem***.

$\frac{3}{8}$ ➡ *"**R**oll to the **R**ight"* ➡ $8\overline{)3.000}$ ➡ $\frac{3}{8} = 0.375$

Example 3: Convert $^{1}/_{3}$ to an equivalent decimal.

Step 1: "*A fraction is two things – part of a group and a division problem."*

Sept 2: "Show the meaning of $^{1}/_{3}$ as ***part of group***.

Step 3: "Show the meaning of $^{1}/_{3}$ as ***a division problem***.

$\frac{1}{3}$ ➡ *"**R**oll to the **R**ight"* ➡ $3\overline{)1.00}$ ➡ $\frac{1}{3} = 0.\overline{33}$

Connecting Fraction and Decimals Via Number Lines

At this point, students have mastered the basic numeracy skills on fractions and decimals and their inner workings, but the conversions have been an isolated skill exercise. Students lack global understanding of these arithmetic fraction and decimal elements with regard to a larger mathematical framework. It is important to tie all these elements together in one place. Thus, students can readily understand fractions and decimals and their connection precisely in the same manner that they grasp whole numbers as they occupy 'fixed' positions on a number line.

A classroom teacher can use BLANK fractional number lines and practice the above skills, and then expand that discussion to improper fractions and mixed numbers as well. More importantly, all fraction types and decimals may be viewed in a connected manner. Thus, students grasp that the same point on a fractional number line affords an equal value location of a decimal and proper fraction (or a decimal, improper fraction and mixed number).

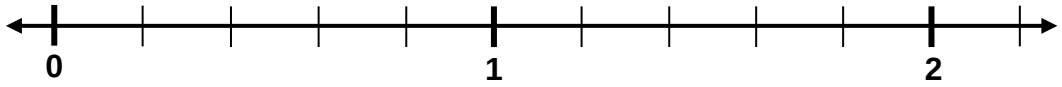
Again, it is recommended that the teacher utilize a daily spaced repetition instructional system to ensure that students attain a threshold mastery level of repetitions on these exercises. It is also highly recommended that the teacher begins these exercises with high degrees of structure, so all students in the classroom ingrain the relevant aspects of the decimal and fractional mathematics. Furthermore, the first three to four days should be guided practice with students – and the class and teacher simultaneously complete the number line while the teacher is verbally relaying his or her thinking as the fractional number line is completed. Example 1 below is intended to provide instructional guidance in this style of pedagogy.

After three or four days, the teacher should convey to students a step-by-step process, where students complete a portion of work (e.g., complete all proper and improper fractions) and stop and wait to begin the next step in completing the fractional number line. Finally, after the students have achieved an independent level of understanding, a teacher can provide a blank number line and students should complete the number line autonomously as the teacher monitors their work. The appendix of this document contains the paper/print resources for all classroom exercises.

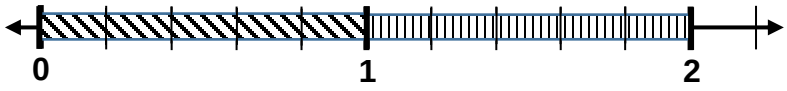
Note: Use correct vocabulary at all times with examples for clarity: proper fractions (i.e., fractions less than 1 whole), improper fractions (i.e., fractions greater than or equal to 1 whole), and mixed numbers (i.e., a whole number and a proper fraction).

Example 1: *Guided Practice* (3 to 4 days) of spaced repetition work prior to the daily math lesson.

- **Step 1:** Each student is given a BLANK fractional number line.

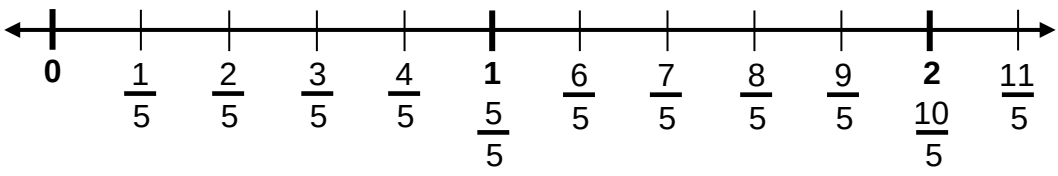


- **Step 2:** The teacher asks the students, *"How many equal spaces are between any two whole numbers on the number line?"* The students should count '5' equal spaces between the whole numbers 0 and 1 or whole numbers 1 and 2. Students can show the teacher with a raised hand and five fingers. If students err in this initial process, the teacher should count the 'equal spaces' so students completely understand that the above number line is divided into fifths. The teacher can also draw a make-shift 'fraction bar' overlayed on the number line to visually show the students that a fractional number line is nothing more than a series of fraction bars (see below).



Continuing – A 'catchy' phrase that is helpful to students when working with fractional number lines is, *"Count the (equal) spaces and label the lines."* Otherwise, students invariably count the 'lines' between two adjacent whole numbers and incorrectly calculate that the above number line is in fourths – not fifths.

- **Step 3:** Label all proper and improper fractions on the number line. See below.

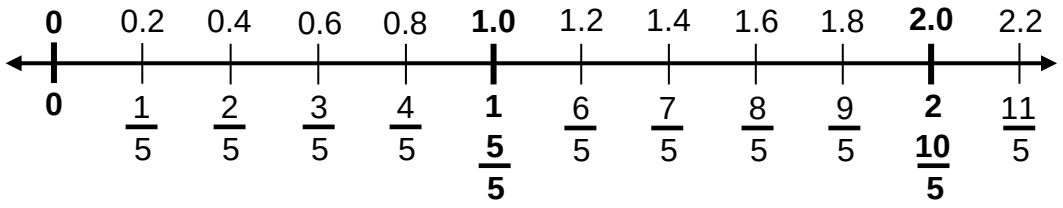


Teacher may question students, *"How do we know the number line is correctly labeled with proper and improper fractions?"*

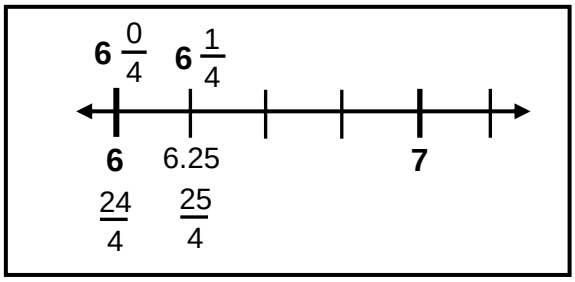
Student reply, *"Since every fraction is a division problem, 5 divided by 5 equals 1* ***or*** *10 divided by 5 equals 2."* Or, they may state that the whole numbers 1 and 2 possess equivalent improper fraction via division.

- **Step 4:** Since the number line is in fifths, compute an equivalent decimal using a proper fraction (e.g., $^1/_5 = 0.2$ or $^3/_5 = 0.6$) from the number line. Then, write remaining decimals on fractional number line.

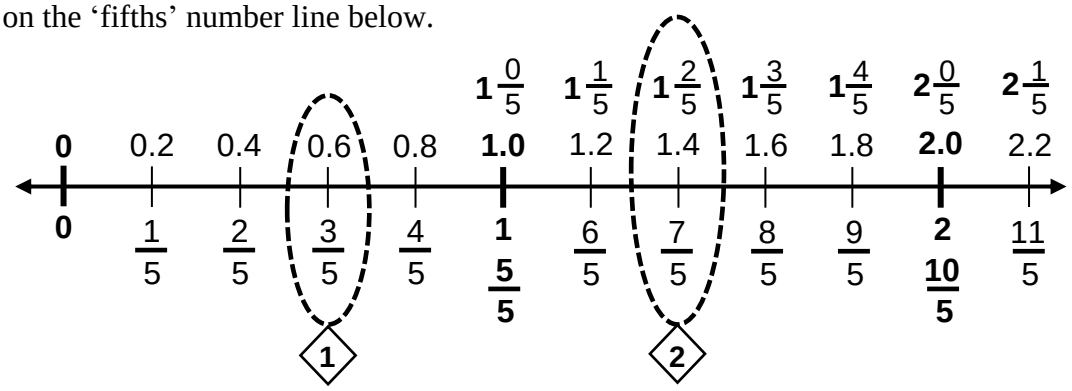
  Note: It is recommended to begin with halves or fifths fractional number line since the decimal conversion is only 1 arithmetic computation. Also, students quickly learn to count decimals by multiples of the first proper fraction (i.e., 0.2) to complete the remaining decimals on the number line.



- **Step 5:** Add the mixed numbers on the number line. It is highly recommended to write a mixed number for the whole number 1 (i.e., $1\ ^0/_5$) because if the number line does not start at zero (0) as in the above case, the student can immediately convert the mixed number to an improper fraction. For instance, if a number line's first whole number begins at 6 and the number line is in fourths, a student can write $6\ ^0/_4$ for the mixed number and compute an equivalent mixed number to $^{24}/_4$. Then, it is relatively easy to compute a decimal for ¼ (i.e., 0.25) and complete the number line for mixed numbers, improper fractions and decimals. (See below)



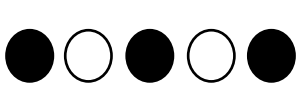
Continuing, add the mixed numbers on the 'fifths' number line below.



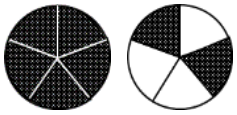
- **Step 6:** This last step is an extremely important learning point. A teacher should vertically circle or ring two (2) points on the number line (Diamond 1 and 2 above). One ring should include fractions less than 1 whole and the other ring, fractions greater than 1 whole. Students should write the equivalencies **and** draw the correct picture illustrating the equivalency (see below).

  Again, it is of paramount importance that students do not get 'lost' in the exercise and miss the overarching objective – fractions and decimals (and mixed numbers

converted from improper fractions) are all equivalent in value at a single location. Moreover, the mathematical entities are only in a different form, and those forms can be easily converted between one another. Then, the learner can choose to 'work with' with either decimals, fractions or mixed numbers depending on the mathematical situation simply by converting from one equivalent form to another.

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

Diamond 1 Equivalency

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

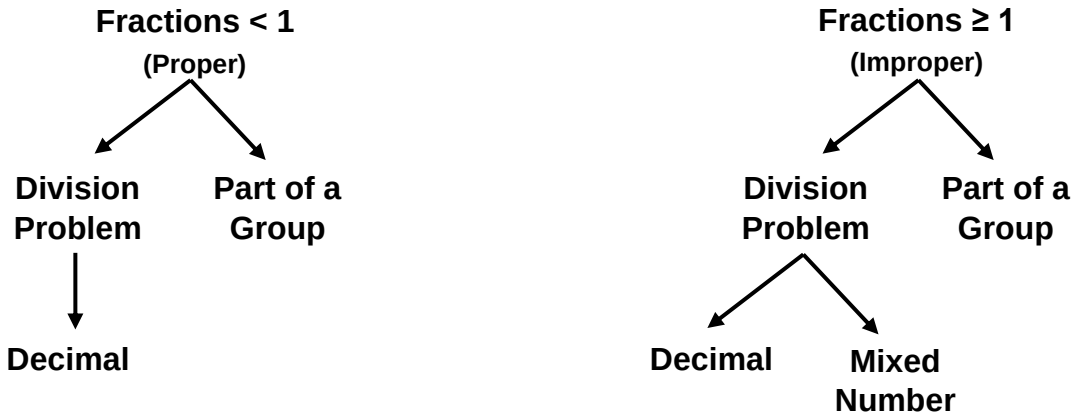
Diamond 2 Equivalency

Final Comments Regarding Fractions Represent Two Things

In this short document, the fundamental nature of fractions and decimals and their pedagogy has been presented in detail. However, there are two (2) 'elusive obvious' aspects of the enclosed content that an educator must address to ensure ALL students are successful in understanding these and the related arithmetic content. One, students must be rudimentarily sound and automatic with recall of math facts – especially multiplication and division when students are engaged in fraction conversions. A recently written white paper entitled *"Math Fact Mastery – Easy to do!"* outlines the pedagogical methodology to resolve math fact numeracy issues. Second, the methodology outlines spaced repetition instruction to ensure that the minimum repetition thresholds are met to ensure student mastery of each numeracy skill. An additional document outlines that process and is also available for free download at the website provided in the footer of this paper – under the '*expertise resources*' tab.

When a student views a decimal, math educators want them to grasp its magnitude regardless of the number of digits to the right of the decimal point. Thus, the decimal 13.091456 is about $13.09. From this approximation, a student is able to evaluate the reasonableness of computations as well as the location of the decimal on a number line. The same thinking is also true of fractions. When a student sees a fraction, teachers want them to think two things: *part of a group* and *a division problem*. The tree diagram below provides an expansion of the different mathematical representations of both proper and improper fractions.

Fraction Representation Via A Tree Diagram



In the end, the ability of students to successfully apply fractions, decimals and mixed numbers are the ultimate learning outcome. For instance, **if** students possess the ability to convert a group of fractions with different denominators to equivalent decimals, then they can easily compare their relative size since decimals viewed as money are readily known by the vast majority of children. Furthermore, it is the fractional number line work that connects all of the fractional/decimal elements for global understanding. Students are visually able to view the continuum of fractions, decimals and mixed number equivalencies along the number line. Hence, discrete fraction conversions to decimals are no longer an isolated numeracy skill, but they become a mental schema of comprehensive understanding of fractional and decimal meaning for the learner.

With the use of 'spaced repetition instruction,' students are systematically exposed to the threshold number of repetitions required to master mathematics content. A white paper expounding on the basics and benefits of 'spaced repetition' can be downloaded for free at the website address located in the footer. This instructional method is a highly effective and efficient pedagogical process that ensures mastery and retention of learned content. Finally, the appendix of resources at the end of this document is intended to significantly reduce teacher planning and preparation time.

Fractions Represent Two Things

APPENDIX of Resources

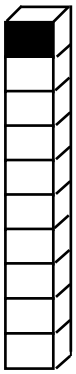
Shade the PROPER FRACTIONS – V1

Developing Fraction-Decimal Connection

Directions: Convert the decimals to equivalent proper fractions. Shade the grid to match equivalency.

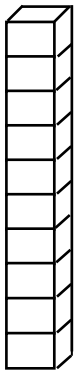
1.

$0.1 = \frac{1}{10}$



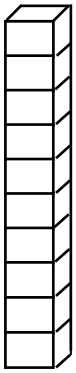
2.

$0.3 = \frac{\quad}{\quad}$



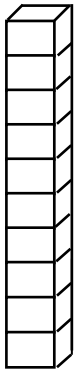
3.

$0.5 = \frac{\quad}{\quad}$



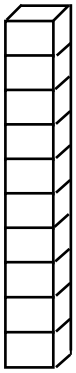
4.

$0.7 = \frac{\quad}{\quad}$



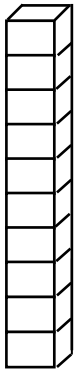
5.

$0.8 = \frac{\quad}{\quad}$



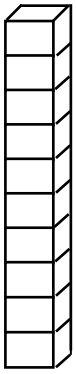
6.

$0.2 = \frac{\quad}{\quad}$



7.

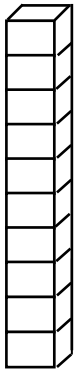
$0.4 = \frac{\quad}{\quad}$



8.

$1.0 = \frac{\quad}{\quad}$

Improper Fraction.



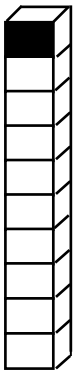
Shade the PROPER FRACTIONS – V1

Answer Key

Directions: Convert the decimals to equivalent proper fractions. Shade the grid to match equivalency.

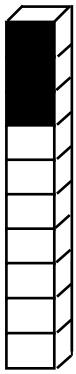
1.

$0.1 = \frac{1}{10}$



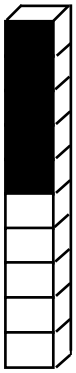
2.

$0.3 = \frac{3}{10}$



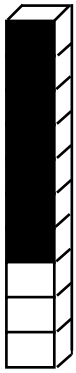
3.

$0.5 = \frac{5}{10}$



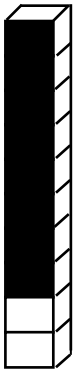
4.

$0.7 = \frac{7}{10}$



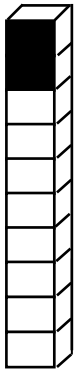
5.

$0.8 = \frac{8}{10}$



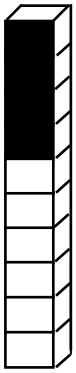
6.

$0.2 = \frac{2}{10}$



7.

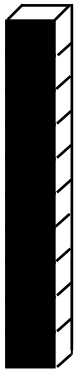
$0.4 = \frac{4}{10}$



8.

$1.0 = \frac{10}{10}$

Improper Fraction.

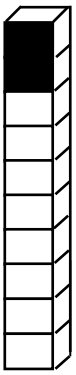


Shade the PROPER FRACTIONS – V2

Directions: Your teacher will provide you with a decimal. **Write** the decimal in the box provided. **Convert** the decimals to equivalent proper fractions. Then, **shade** the grid to match equivalency.

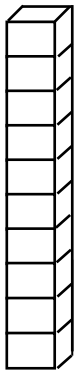
1.

0.2 = $\frac{2}{10}$



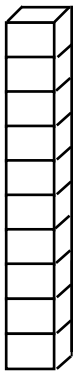
2.

☐ = ___



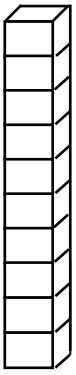
3.

☐ = ___



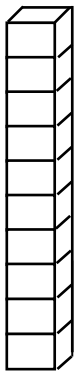
4.

☐ = ___



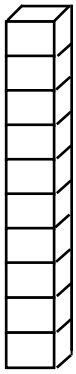
5.

☐ = ___



6.

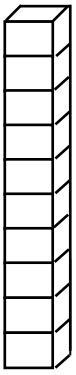
☐ = ___



Directions: Your teacher will provide you with a decimal. **Write** the decimal in the box provided. **Convert** the decimals to equivalent proper fractions. Then, **shade** the grid to match equivalency.

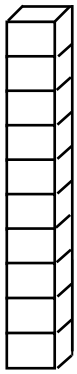
1.

☐ = ___



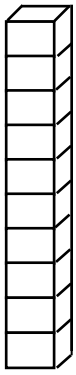
2.

☐ = ___



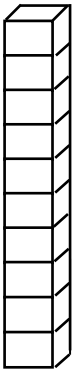
3.

☐ = ___



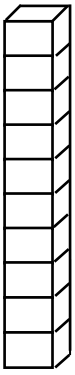
4.

☐ = ___



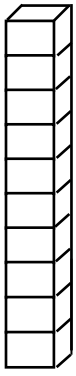
5.

☐ = ___



6.

☐ = ___



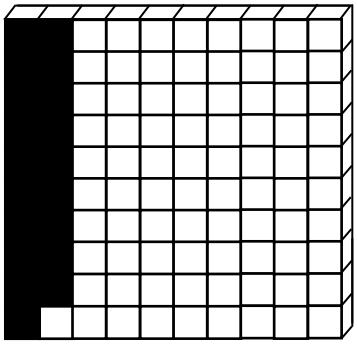
Shade the PROPER FRACTIONS – V1

Developing Fraction-Decimal Connection

Directions: Convert the decimals to equivalent proper fractions. Shade the grid to match equivalency.

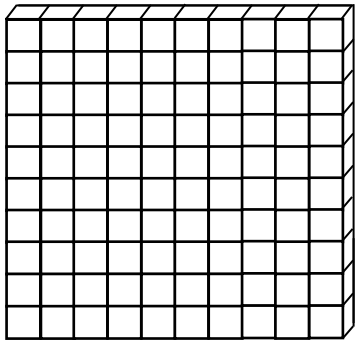
1.

$0.19 = \frac{19}{100}$



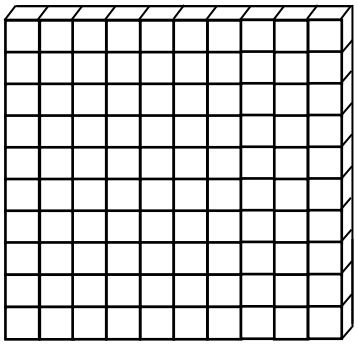
2.

$0.01 = \frac{\quad}{\quad}$



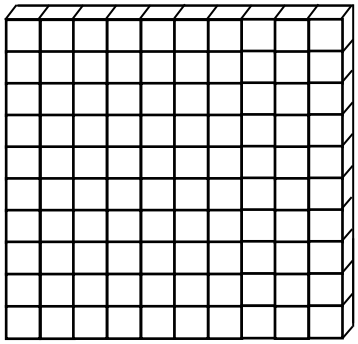
3.

$0.27 = \frac{\quad}{\quad}$



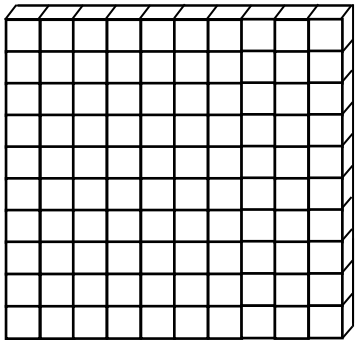
4.

$0.82 = \frac{\quad}{\quad}$



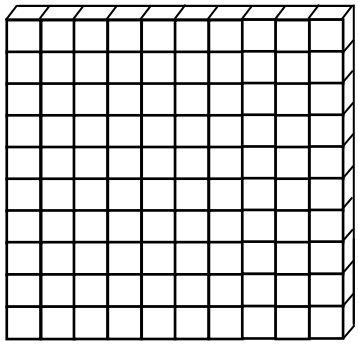
5.

$0.04 = \frac{\quad}{\quad}$



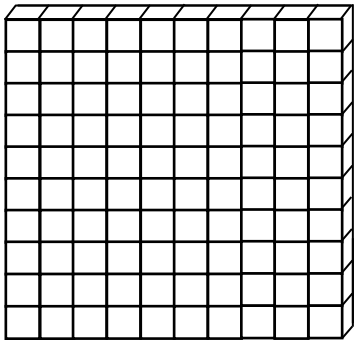
6.

$0.65 = \frac{\quad}{\quad}$



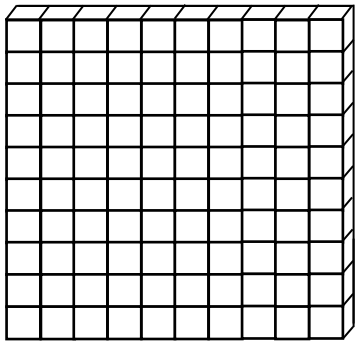
7.

$0.38 = \frac{\quad}{\quad}$



8.

$0.50 = \frac{\quad}{\quad}$



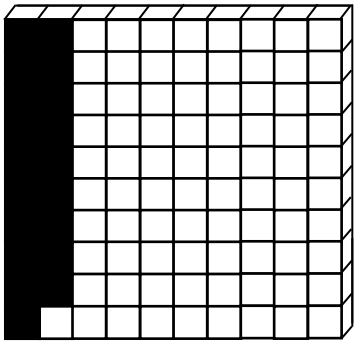
Shade the PROPER FRACTIONS – V1

Answer Key

Directions: Convert the decimals to equivalent proper fractions. Shade the grid to match equivalency.

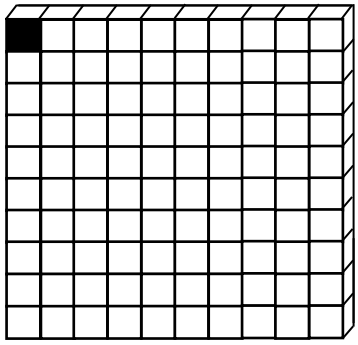
1.

$0.19 = \frac{19}{100}$



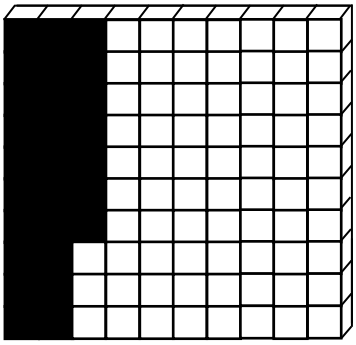
2.

$0.01 = \frac{1}{100}$



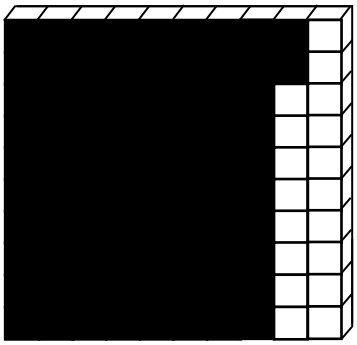
3.

$0.27 = \frac{27}{100}$



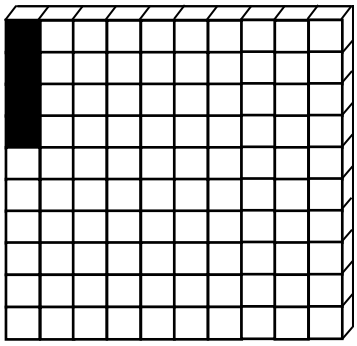
4.

$0.82 = \frac{82}{100}$



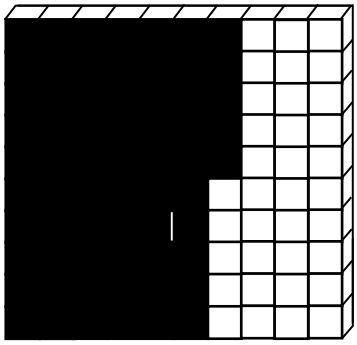
5.

$0.04 = \frac{4}{100}$



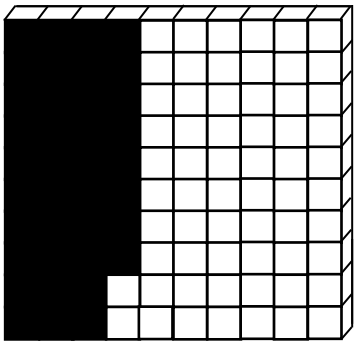
6.

$0.65 = \frac{65}{100}$



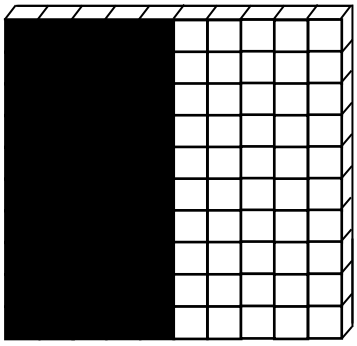
7.

$0.38 = \frac{38}{100}$



8.

$0.50 = \frac{50}{100}$

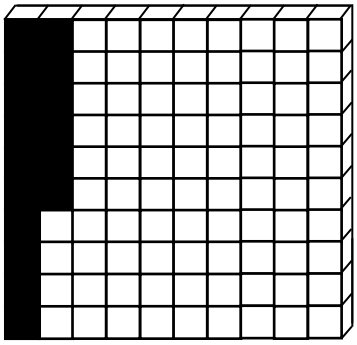


Shade the PROPER FRACTIONS – V2

Directions: Your teacher will provide you with a decimal. **Write** the decimal in the box provided. **Convert** the decimals to equivalent proper fractions. Then, **shade** the grid to match equivalency.

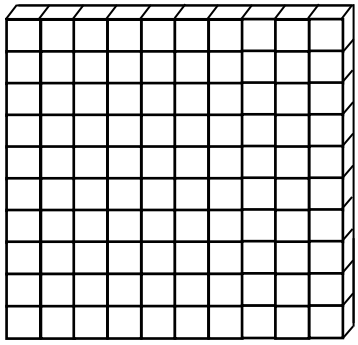
1.

0.16 = $\frac{16}{100}$



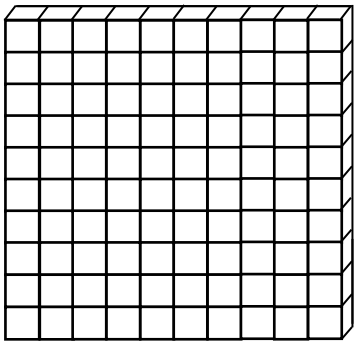
2.

☐ = ___



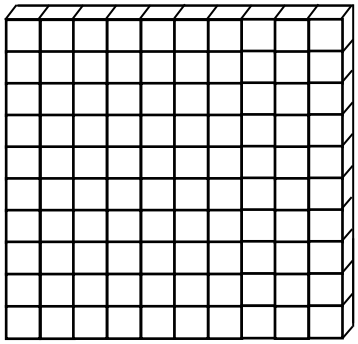
3.

☐ = ___



4.

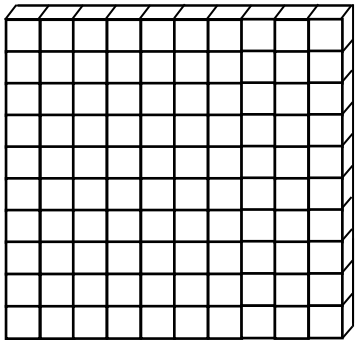
☐ = ___



Directions: Your teacher will provide you with a decimal. **Write** the decimal in the box provided. **Convert** the decimals to equivalent proper fractions. Then, **shade** the grid to match equivalency.

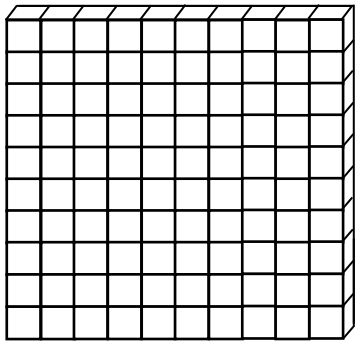
1.

☐ = ___



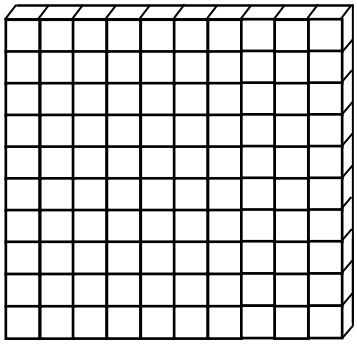
2.

☐ = ___



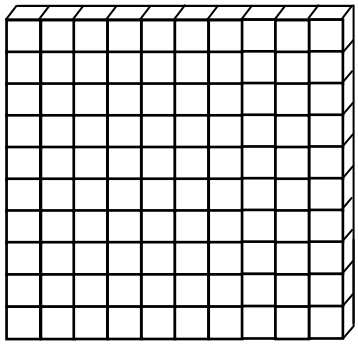
3.

☐ = ___



4.

☐ = ___

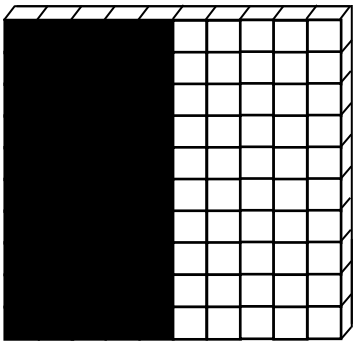


Convert the Proper Fractions to Decimals – V1

Directions: Convert the *proper fractions* to equivalent *decimals* by *dividing* the proper fraction. Shade the grid to match equivalency.

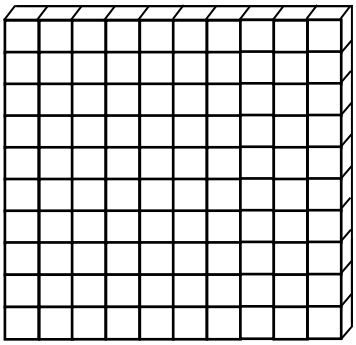
1.

$\frac{1}{2} = 0.5$



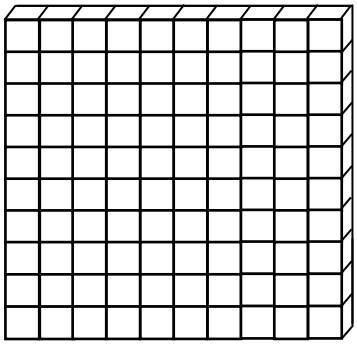
2.

$\frac{2}{5} =$



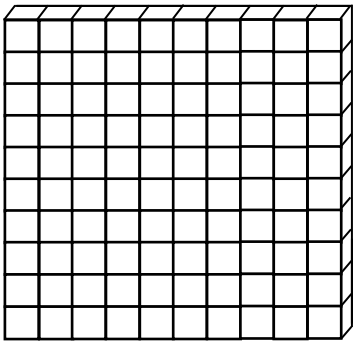
3.

$\frac{1}{5} =$



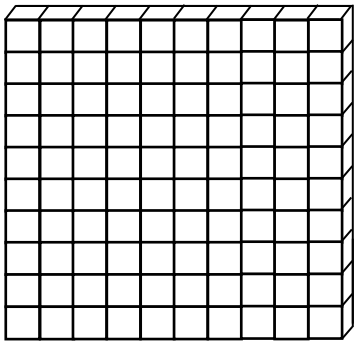
4.

$\frac{1}{2} =$



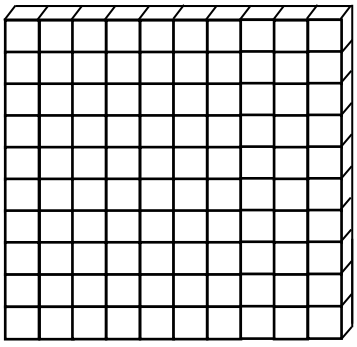
5.

$\frac{1}{3} =$



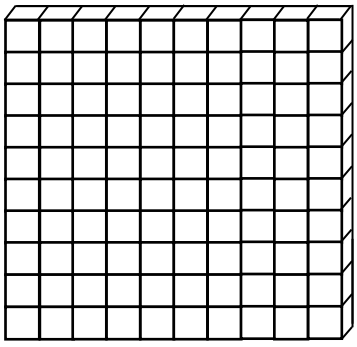
6.

$\frac{1}{4} =$



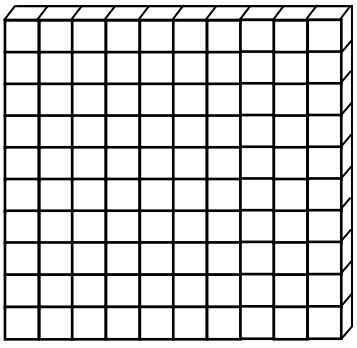
7.

$\frac{3}{10} =$



8.

$\frac{3}{4} =$



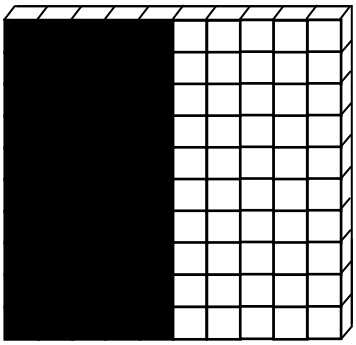
Convert the Proper Fractions to Decimals – V1

Answer Key

Directions: Convert the *proper fractions* to equivalent *decimals* by *dividing* the proper fraction. Shade the grid to match equivalency.

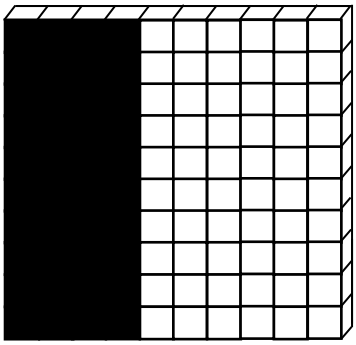
1.

$\frac{1}{2} = 0.5$



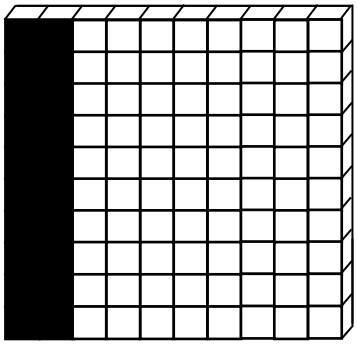
2.

$\frac{2}{5} = 0.4$



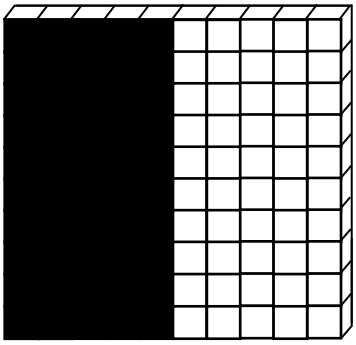
3.

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



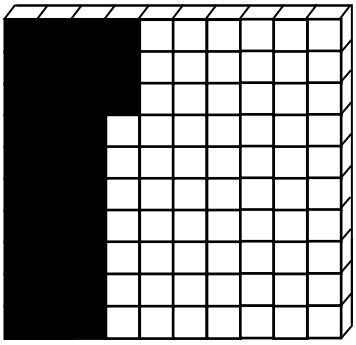
4.

$\frac{1}{2} = 0.5$



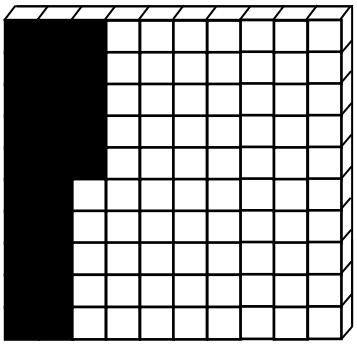
5.

$\frac{1}{3} = 0.\overline{33}$



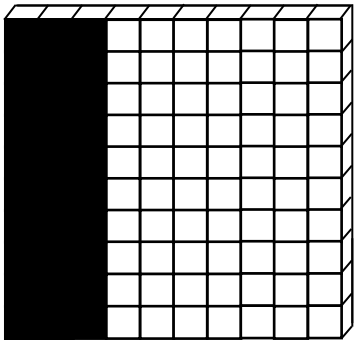
6.

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



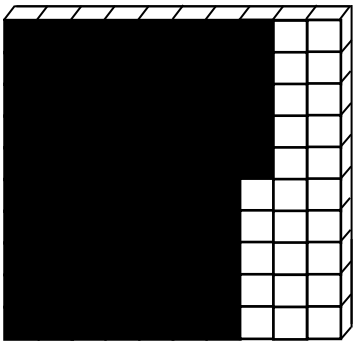
7.

$\frac{3}{10} = 0.3$



8.

$\frac{3}{4} = 0.75$



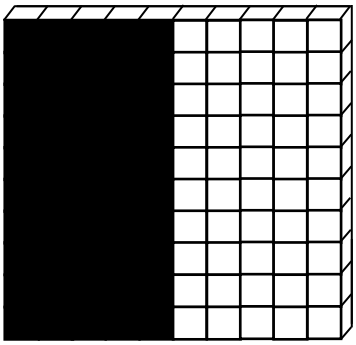
Convert the Proper Fractions to Decimals to Percents – V2

Directions: Convert the *proper fractions* to equivalent *decimals* by *dividing* the proper fraction. Then, write the percent on the line provided. Shade the grid to match equivalency.

1.

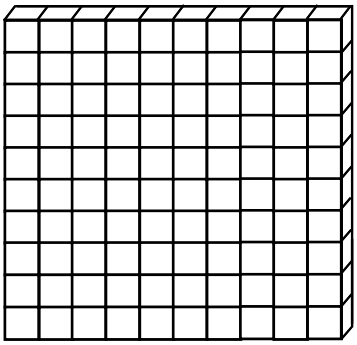
$\frac{1}{2} = 0.5$

50%



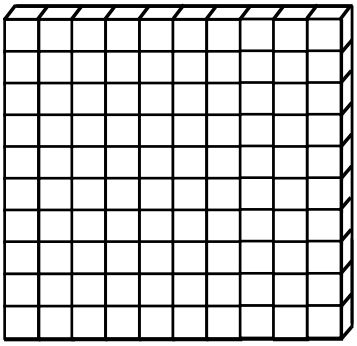
2.

$\frac{2}{5} =$ _____



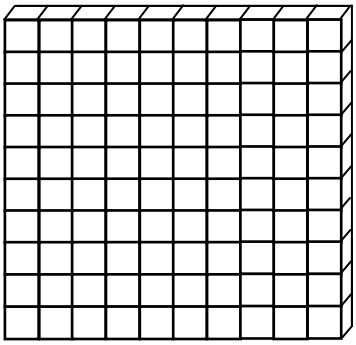
3.

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



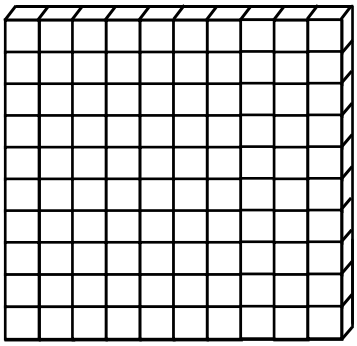
4.

$\frac{1}{100} =$ _____



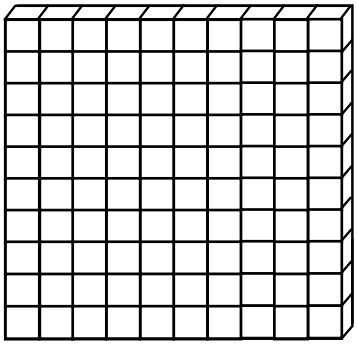
5.

$\frac{1}{3} =$ _____



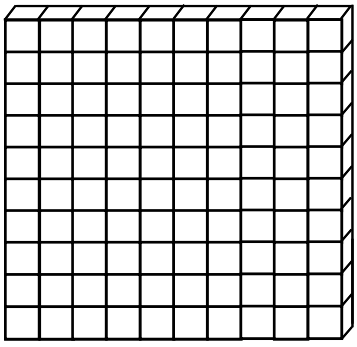
6.

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



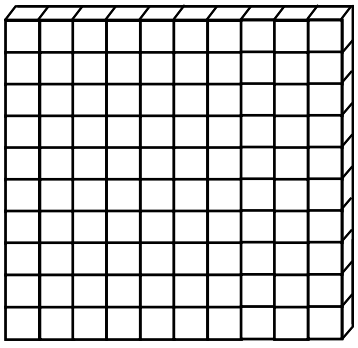
7.

$\frac{9}{100} =$ _____



8.

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



Convert the Proper Fractions to Decimals to Percents – V2

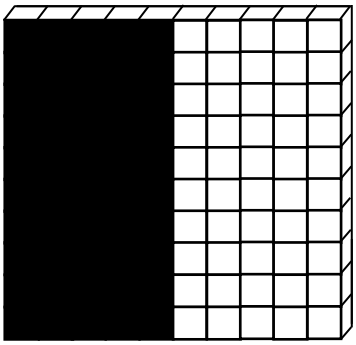
SOLUTIONS

Directions: Convert the *proper fractions* to equivalent *decimals* by *dividing* the proper fraction. Then, write the percents on the line provided. Shade the grid to match equivalency.

1.

$\frac{1}{2} = 0.5$

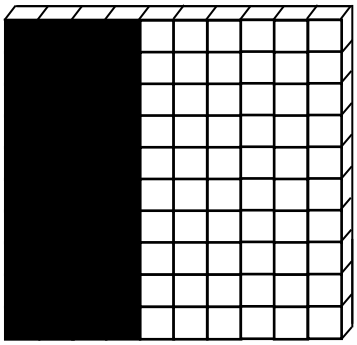
50%



2.

$\frac{2}{5} = 0.4$

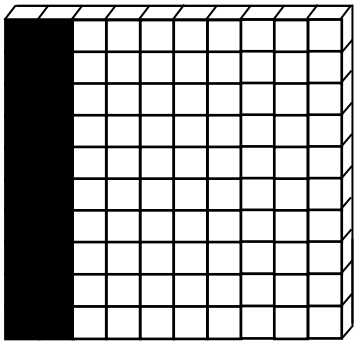
40%



3.

$\frac{1}{5} = 0.20$

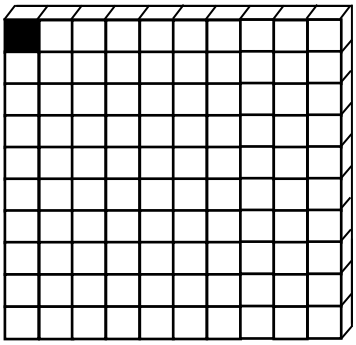
20%



4.

$\frac{1}{100} = 0.01$

1%

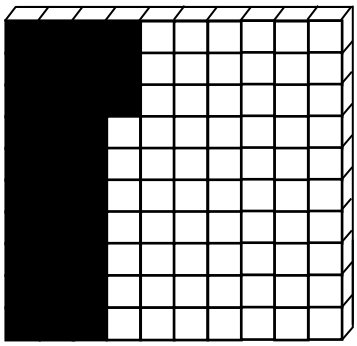


5.

$\frac{1}{3} = 0.\overline{33}$

33%

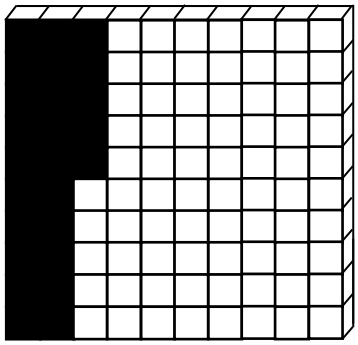
33.3%



6.

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

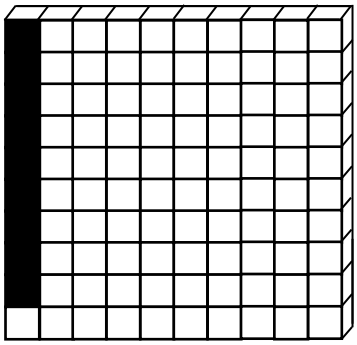
25%



7.

$\frac{9}{100} = 0.09$

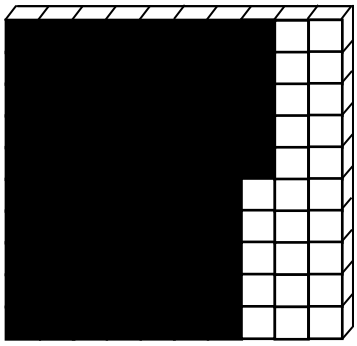
9%



8.

$\frac{3}{4} = 0.75$

75%



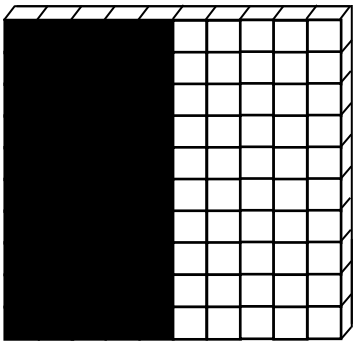
Convert the Proper Fractions to Decimals to Percents – V3

Directions: Your teachers will provide you with a proper fraction. Place the fraction in the box provided. Convert the *proper fractions* to equivalent *decimals* by *dividing* the proper fraction. Then, write the equivalent percent on the line provided. Shade the grid to match equivalency.

1.

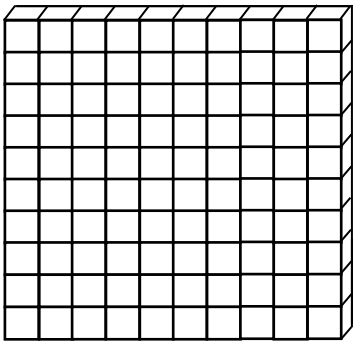
$\frac{1}{2}$ = 0.5

50%



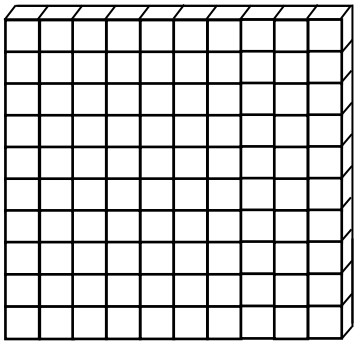
2.

___ = _____



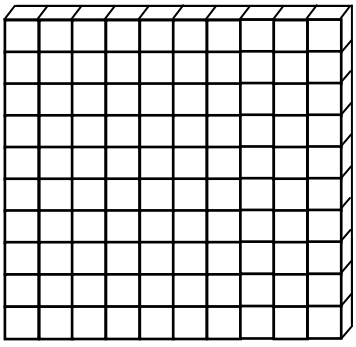
3.

___ = _____



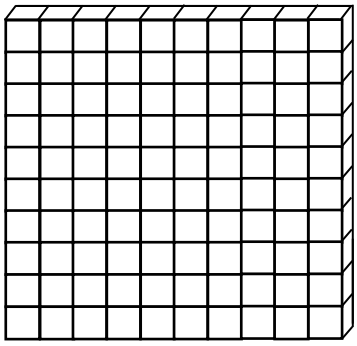
4.

___ = _____



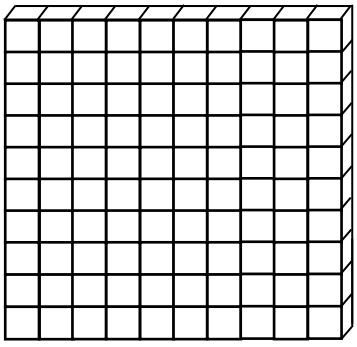
5.

___ = _____



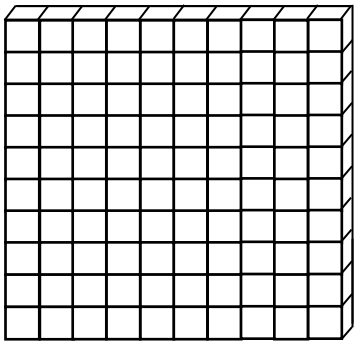
6.

___ = _____



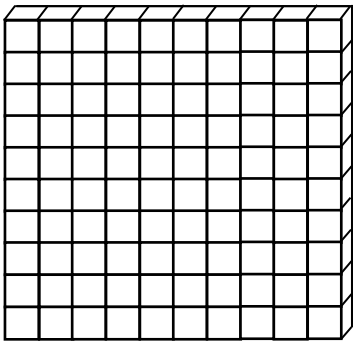
7.

___ = _____



8.

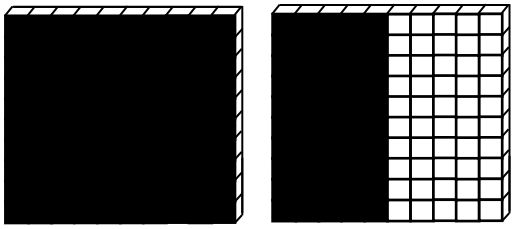
___ = _____



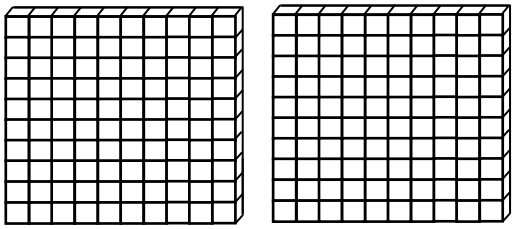
Convert the Improper Fractions to Decimals – V1

Directions: Convert the *improper fractions* to equivalent *decimals* by *dividing* the improper fraction. Shade the grid to match equivalency.

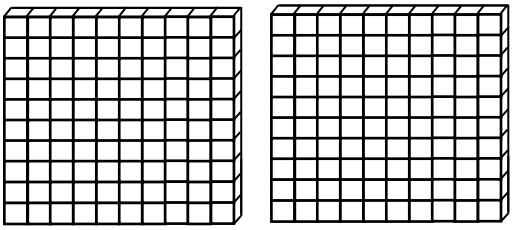
1. $\frac{3}{2} = 1.5$



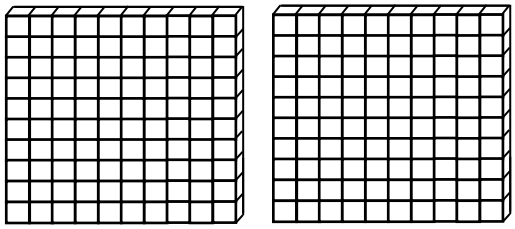
2. $\frac{5}{4} =$



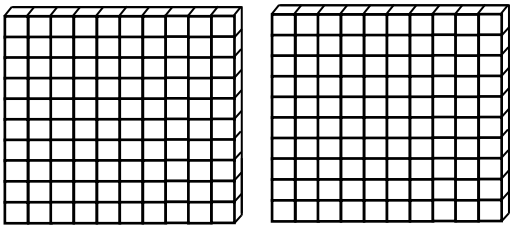
3. $\frac{7}{5} =$



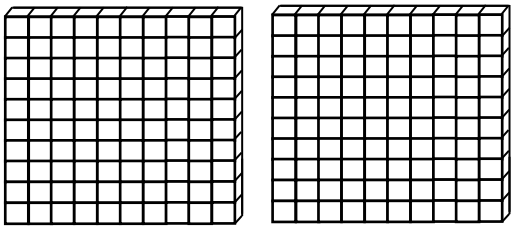
4. $\frac{9}{5} =$



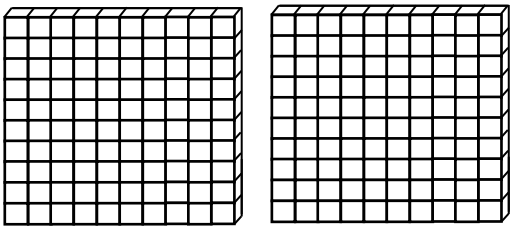
5. $\frac{3}{2} =$



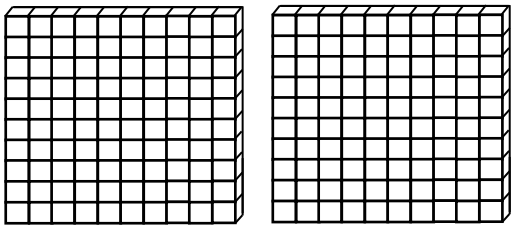
6. $\frac{4}{3} =$



7. $\frac{4}{2} =$



8. $\frac{5}{5} =$

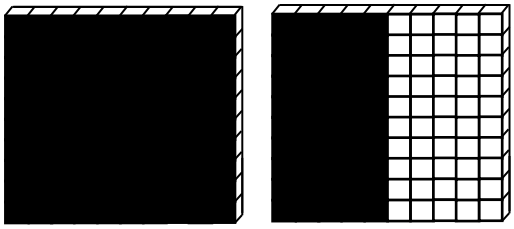


Convert the Improper Fractions to Decimals – V1

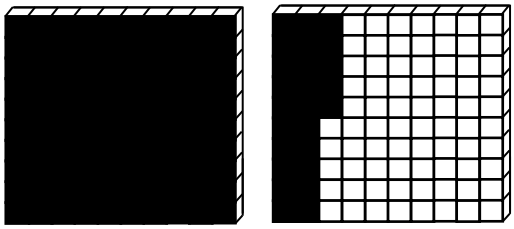
Answer Key

Directions: Convert the *improper fractions* to equivalent *decimals* by *dividing* the improper fraction. Shade the grid to match equivalency.

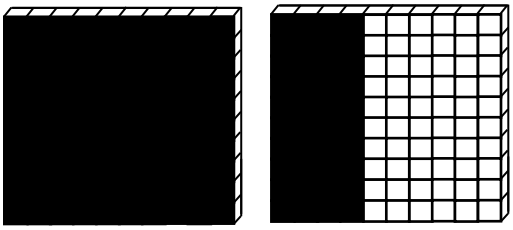
1. $\frac{3}{2} = 1.5$



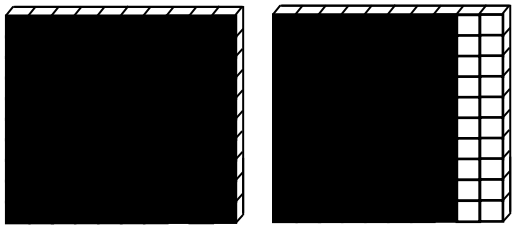
2. $\frac{5}{4} = 1.25$



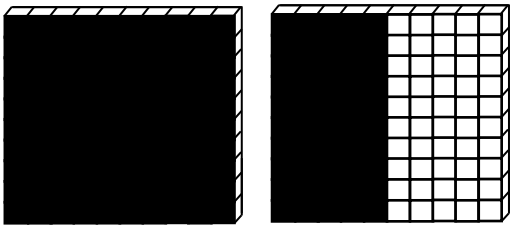
3. $\frac{7}{5} = 1.4$



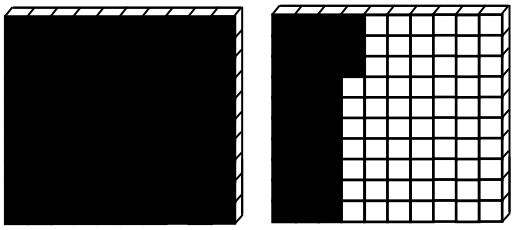
4. $\frac{9}{5} = 1.8$



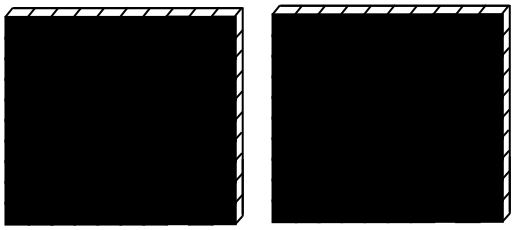
5. $\frac{3}{2} = 1.5$



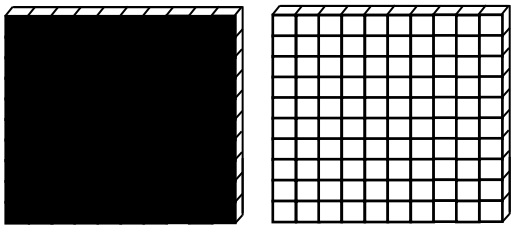
6. $\frac{4}{3} = 1.\overline{33}$



7. $\frac{4}{2} = 2.0$



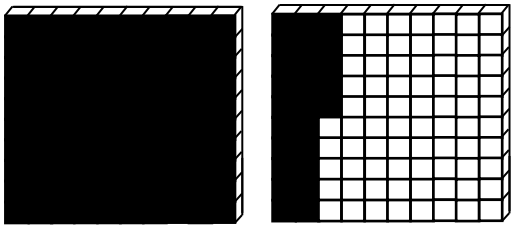
8. $\frac{5}{5} = 1.00$



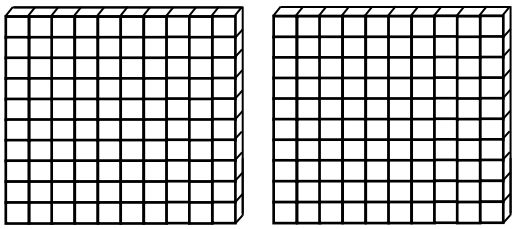
Convert the Improper Fractions to Decimals – V2

Directions: Your teacher will provide you with an improper fraction. Place the improper fraction in the box provided. Convert the *improper fraction* to an equivalent *decimal* by *dividing* the improper fraction. Shade the grid to match equivalency.

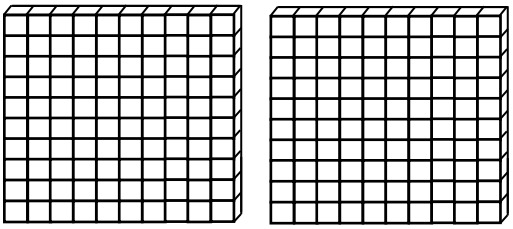
1. $\frac{5}{4} = 1.25$



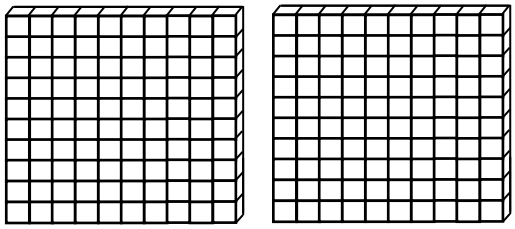
2. $\frac{\quad}{\quad} =$ $\frac{\quad}{\quad} =$



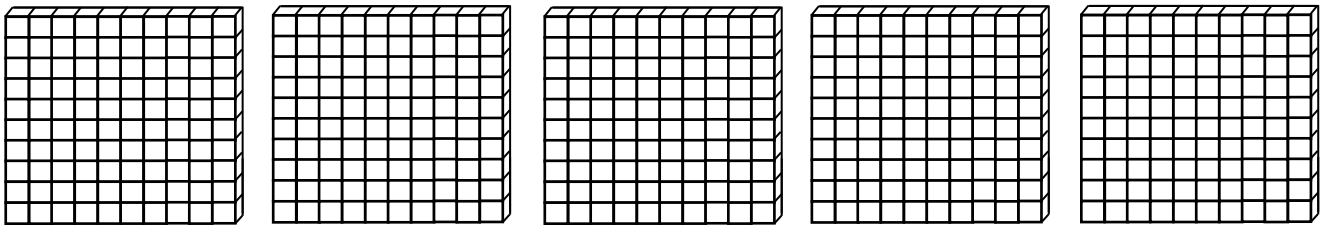
3. $\frac{\quad}{\quad} =$



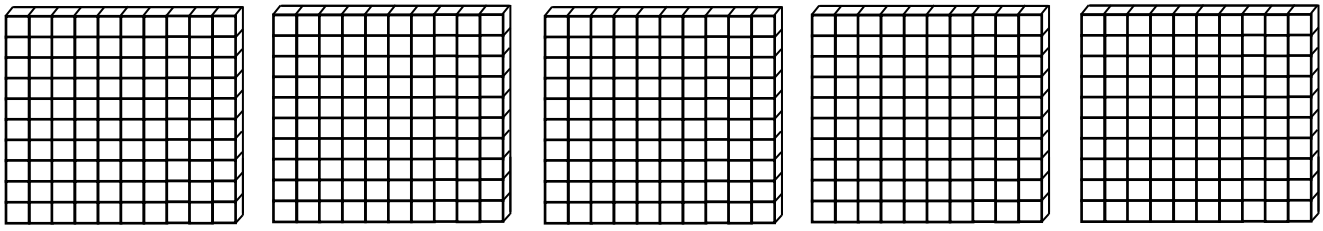
4. $\frac{\quad}{\quad} =$



5. $\frac{\quad}{\quad} =$



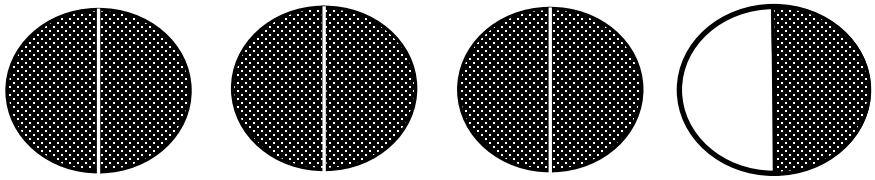
6. $\frac{\quad}{\quad} =$



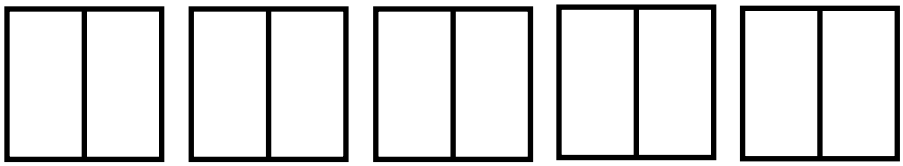
Shade the Mixed Numbers, Improper Fractions and Decimals – V1

Directions: Convert the **mixed number** to an equivalent *improper fraction* and a *decimal*.
Shade the figure to match equivalency.

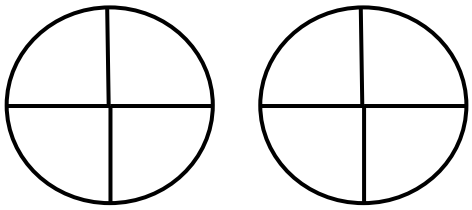
1. $3\frac{1}{2} = \frac{7}{2} = 3.5$



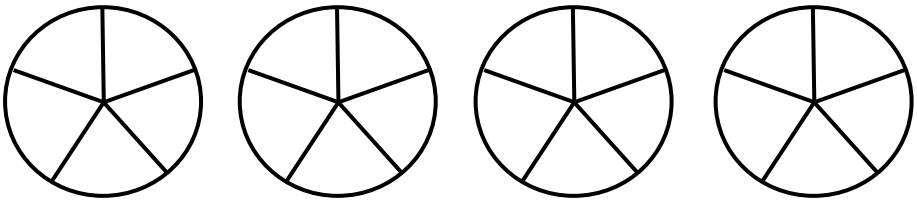
2. $4\frac{1}{2} = \frac{\quad}{\quad} =$



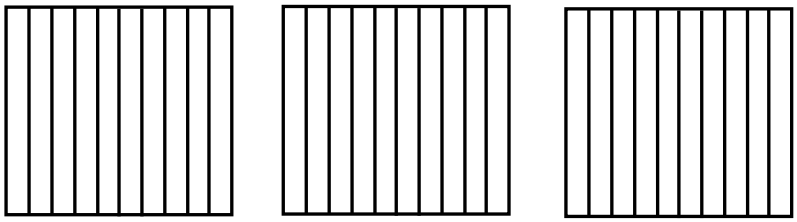
3. $1\frac{1}{4} = \frac{\quad}{\quad} =$



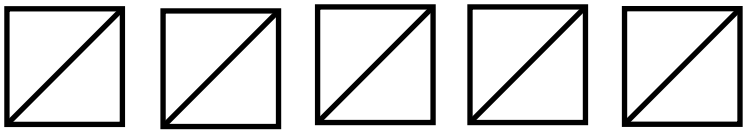
4. $3\frac{2}{5} = \frac{\quad}{\quad} =$



5. $2\frac{1}{10} = \frac{\quad}{\quad} =$



6. $5\frac{1}{2} = \frac{\quad}{\quad} =$

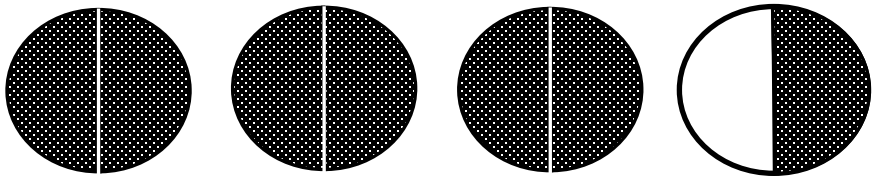


Shade the Mixed Numbers, Improper Fractions and Decimals – V1

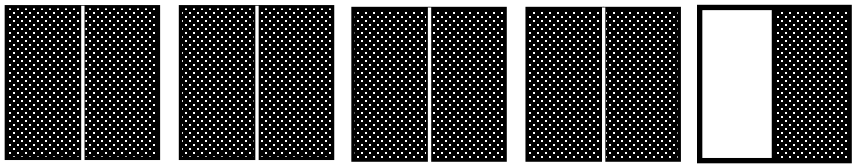
Answer Key

Directions: Convert the **mixed number** to an equivalent *improper fraction* and a *decimal*.
Shade the figure to match equivalency.

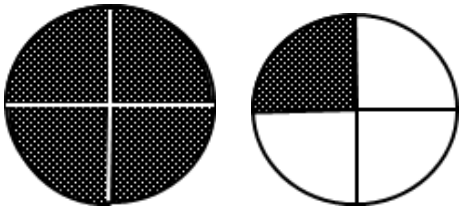
1. $3\frac{1}{2} = \frac{7}{2} = 3.5$



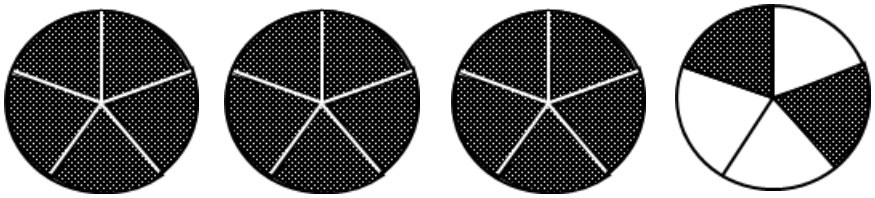
2. $4\frac{1}{2} = \frac{9}{2} = 4.5$



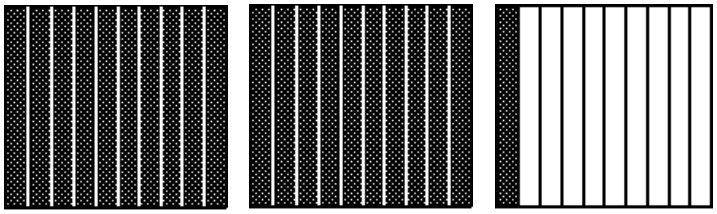
3. $1\frac{1}{4} = \frac{5}{4} = 1.25$



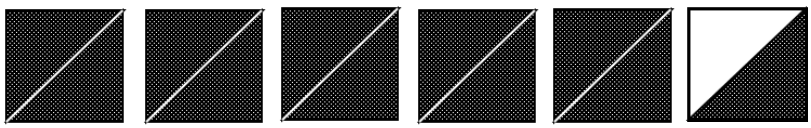
4. $3\frac{2}{5} = \frac{17}{5} = 3.4$



5. $2\frac{1}{10} = \frac{21}{10} = 2.1$



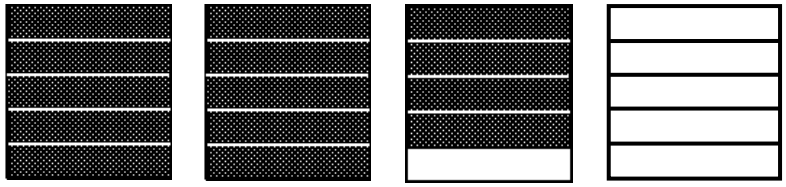
6. $5\frac{1}{2} = \frac{11}{2} = 5.5$



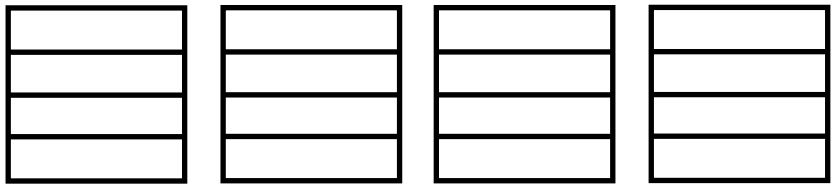
Shade the Mixed Numbers, Improper Fractions and Decimals – V2

Directions: Your teacher will provide you with a mixed number. **Write** the mixed number in the box provided. **Convert** the mixed number to an equivalent improper fraction and decimal. Then, **shade** the grid to match equivalency.

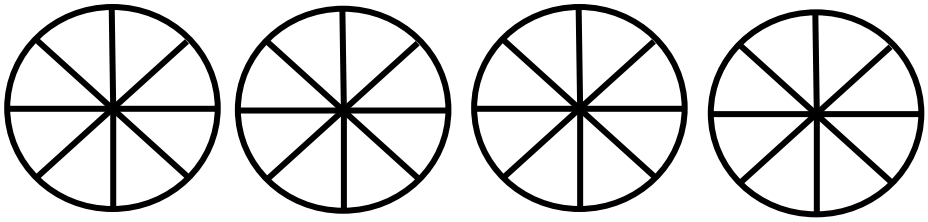
1. $2\frac{4}{5} = \frac{14}{5} = 2.8$



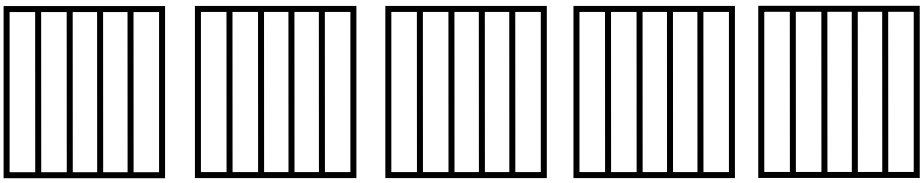
2. $\frac{\quad}{4} = \frac{\quad}{\quad} =$



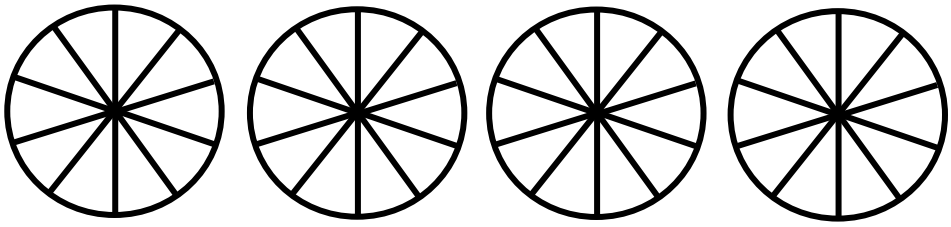
3. $\frac{\quad}{8} = \frac{\quad}{\quad} =$



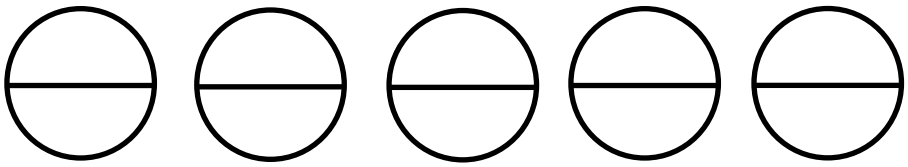
4. $\frac{\quad}{5} = \frac{\quad}{\quad} =$



5. $\frac{\quad}{10} = \frac{\quad}{\quad} =$



6. $\frac{\quad}{2} = \frac{\quad}{\quad} =$



Proper Fractions to Decimal Practice

Directions: Convert each proper fraction to an equivalent decimal by dividing.

1. $\frac{1}{2} = 0.5$
2. $\frac{1}{5} =$ ____
3. $\frac{1}{2} =$ ____

Roll fraction to the **Right**.

Numerator becomes the *dividend*. *Denominator* is the *divisor*.

$$2\overline{)1.0} = 0.5$$

$$\underline{1\ 0}$$

$$0$$

4. $\frac{1}{4} =$ ____
5. $\frac{3}{5} =$ ____
6. $\frac{1}{3} =$ ____

Directions: Convert each proper fraction to an equivalent decimal by dividing.

1. $\frac{1}{5} = 0.2$
2. $\frac{1}{2} =$ ____
3. $\frac{2}{5} =$ ____

$$5\overline{)1.0} = 0.2$$

$$\underline{1.0}$$

$$0$$

4. $\frac{1}{4} =$ ____
5. $\frac{2}{3} =$ ____
6. $\frac{1}{3} =$ ____

Proper Fractions to Decimal Practice

Answer Key

Directions: **Convert** each proper fraction to an equivalent decimal by dividing.

1. $\frac{1}{2} = 0.5$

$$2\overline{)1.0} \quad 0.5$$
$$1\,0$$
$$0$$

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

$$5\overline{)1.0} \quad 0.2$$
$$1\,0$$
$$0$$

3. $\frac{1}{2} = 0.5$

$$2\overline{)1.0} \quad 0.5$$
$$1\,0$$
$$0$$

Roll fraction to the **Right**.

Numerator becomes the *dividend*. *Denominator* is the *divisor*.

Students can tell if they roll the fraction to the **left** and *not* the **right** - *incorrect*. The decimal is *greater* than one whole – 1.0.

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

$$4\overline{)1.00} \quad 0.25$$
$$8$$
$$20$$
$$20$$
$$0$$

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

$$5\overline{)3.0} \quad 0.6$$
$$3\,0$$
$$0$$

6. $\frac{1}{3} = 0.\overline{33}$

$$3\overline{)1.00} \quad 0.\overline{33}$$
$$9$$
$$10$$
$$9$$
$$1$$

Bar above decimal designates those numbers in quotient that repeat indefinitely.

Directions: **Convert** each proper fraction to an equivalent decimal by dividing.

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

$$5\overline{)1.0} \quad 0.2$$
$$1.0$$
$$0$$

2. $\frac{1}{2} = 0.5$

$$2\overline{)1.0} \quad 0.5$$
$$1\,0$$
$$0$$

3. $\frac{2}{5} = 0.4$

$$5\overline{)2.0} \quad 0.4$$
$$2\,0$$
$$0$$

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

$$4\overline{)1.00} \quad 0.25$$
$$8$$
$$20$$
$$20$$
$$0$$

5. $\frac{2}{3} = 0.\overline{66}$

$$3\overline{)2.00} \quad 0.\overline{66}$$
$$1\,8$$
$$20$$
$$18$$
$$2$$

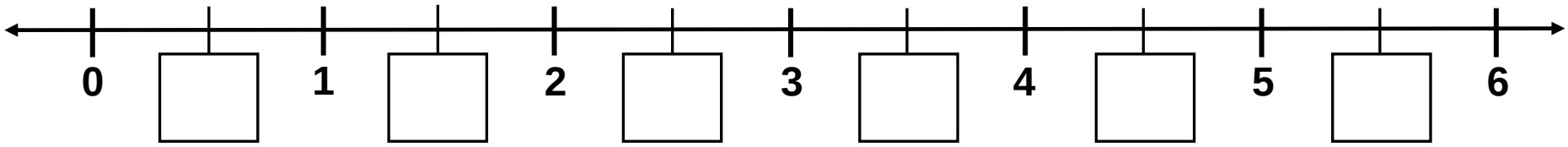
6. $\frac{1}{3} = 0.\overline{33}$

$$3\overline{)1.00} \quad 0.\overline{33}$$
$$9$$
$$10$$
$$9$$
$$1$$

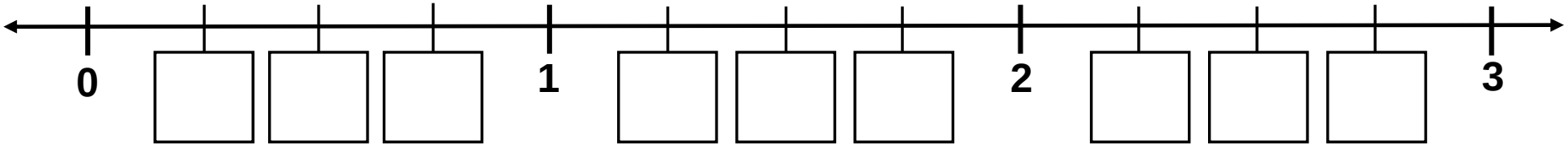
Fractional Number Lines: Blank – Zero and Open

Use for Guided and Independent Fractional Number Line Practice

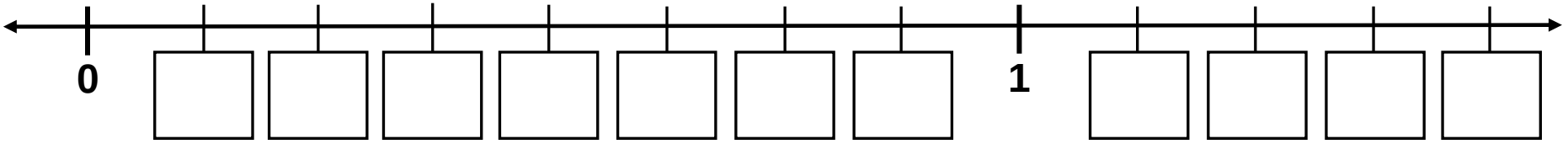
A.)



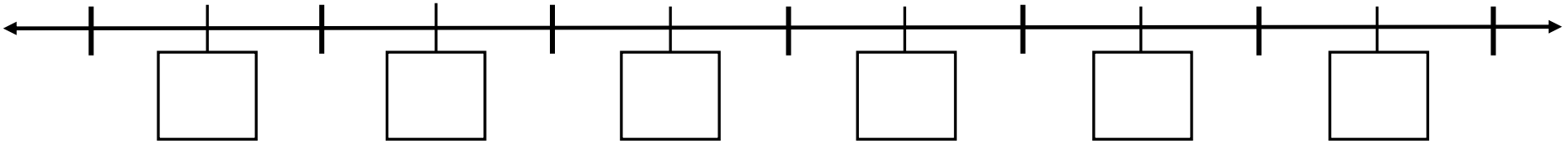
B.)



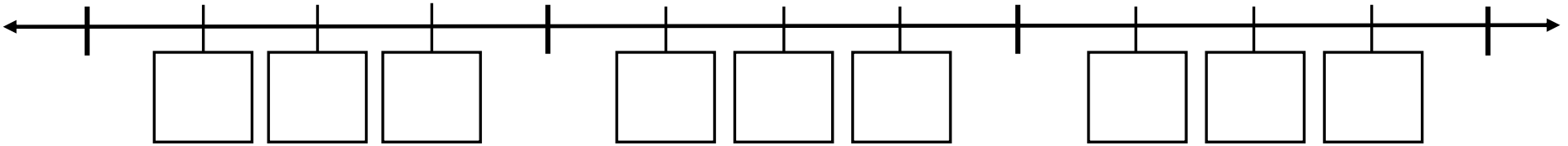
C.)



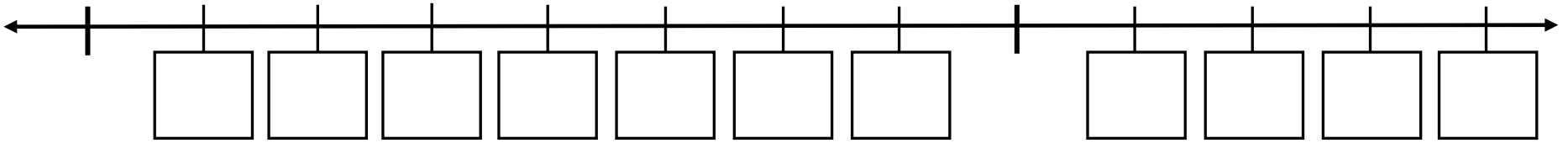
D.)



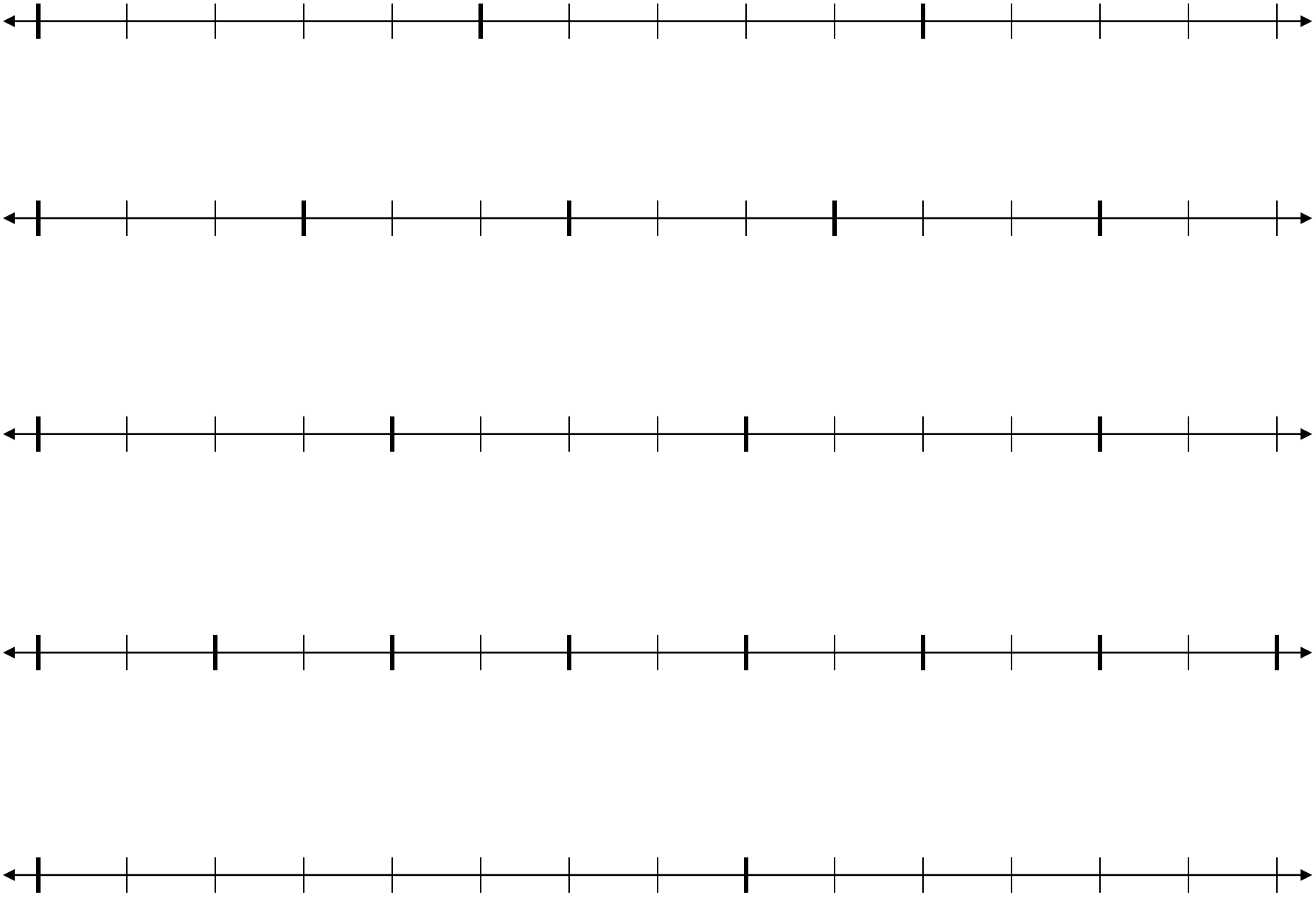
E.)



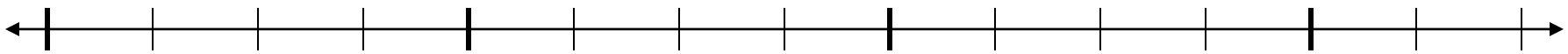
F.)

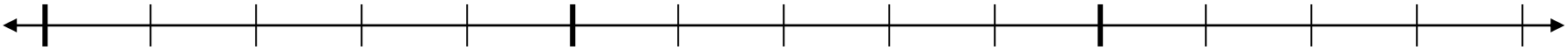


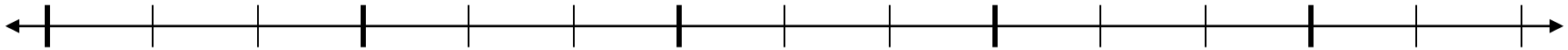
Blank Number Lines – VERSION A: Write all Proper and Improper Fractions, Decimals and Mixed Numbers.

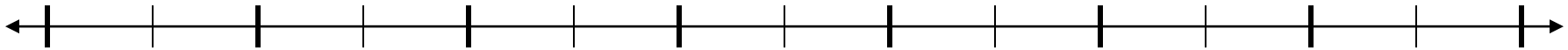


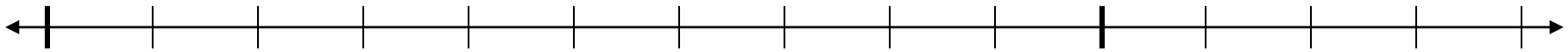
<u>Number Lines – VERSION B</u>: Write all Proper and Improper Fractions, Decimals and Mixed Numbers.











<u>Number Lines – VERSION C</u>: Write all Proper and Improper Fractions, Decimals and Mixed Numbers.