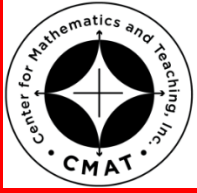


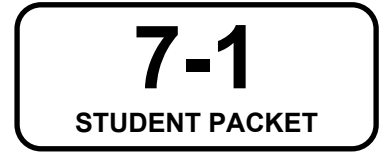
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MathLinks



**MATHLINKS: GRADE 7
STUDENT PACKET 1
FRACTIONS AND DECIMALS**

1.1	Terminating Decimals <ul style="list-style-type: none">• Convert between fractions and terminating decimals.• Compute with simple fractions.	1
1.2	Repeating Decimals <ul style="list-style-type: none">• Explore patterns in repeating decimals.• Convert between fractions and repeating decimals.• Compare, order, and add common fractions and decimals.	7
1.3	Graphing Fractions and Decimals <ul style="list-style-type: none">• Compare and order fractions and decimals.• Locate fractions and decimals on number lines.• Graph ordered pairs.• Scale graphs appropriately.	16
1.4	Skill Builders, Vocabulary, and Review	25

WORD BANK

Word or Phrase	Definition or Description	Example or Picture
benchmark fraction		
coordinate plane		
decimal		
division		
fraction		
ordered pair		
repeating decimal		
terminating decimal		

TERMINATING DECIMALS

Summary

We will learn various strategies to convert between fractions and terminating decimals.

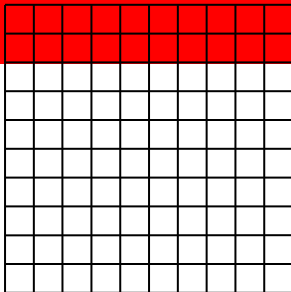
- Goals**
- Convert between fractions and terminating decimals.
 - Compute with simple fractions.

Warmup

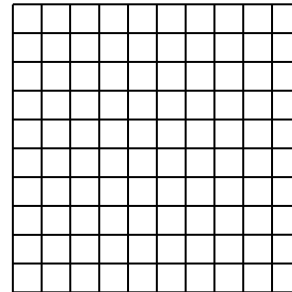
A fraction is a number that is expressible in the form $\frac{a}{b}$ where a is a whole number and b is a positive whole number.

Use the hundred grids to find the decimal equivalents for the following fractions.

1. $\frac{1}{2} = \underline{\hspace{2cm}}$



2. $\frac{1}{4} = \underline{\hspace{2cm}}$



Write the decimal value for each quantity.

3. one-half of a dollar \$ <u> </u>		4. one-fourth of a dollar \$ <u> </u>	
5. $\frac{1}{10} = \underline{\hspace{2cm}}$	6. $\frac{2}{10} = \underline{\hspace{2cm}}$	7. $\frac{7}{10} = \underline{\hspace{2cm}}$	8. $\frac{9}{10} = \underline{\hspace{2cm}}$
9. $\frac{1}{100} = \underline{\hspace{2cm}}$	10. $\frac{2}{100} = \underline{\hspace{2cm}}$	11. $\frac{17}{100} = \underline{\hspace{2cm}}$	12. $\frac{90}{100} = \underline{\hspace{2cm}}$

13. Which of the two values from problems 5 through 12 are equal?

ALL ABOUT FOURTHS

1. What is the relationship between $\frac{1}{2}$ and $\frac{1}{4}$?

2. Here are two different methods to find the decimal equivalent for $\frac{1}{4}$.

Method 1	Method 2
<p>Rename the fraction $\frac{1}{4}$ with a denominator that is a power of 10.</p> $\frac{1}{4} \left(\begin{array}{ c } \hline \square \\ \hline \square \\ \hline \end{array} \right) = \frac{\square}{100}$ <p>Therefore $\frac{1}{4} = \underline{\hspace{2cm}}$.</p>	<p>Use the fact that $\frac{1}{2} = 0.5 = 0.$</p> <p>$\frac{1}{2}$ of $\underline{\hspace{2cm}}$ is $\underline{\hspace{2cm}}$.</p> <p>Therefore $\frac{1}{4} = \underline{\hspace{2cm}}$.</p>

3. Complete the table.

Fraction	$\frac{0}{4}$	$\frac{1}{4}$	$\frac{2}{4}$	$\frac{3}{4}$	$\frac{4}{4}$
Decimal					

4. Show how to use the decimal equivalent for $\frac{1}{4}$ to find the decimal equivalent for $\frac{3}{4}$ by addition or multiplication.

5. Show how to use the decimal equivalent for $\frac{1}{4}$ to find the decimal equivalent for $\frac{3}{4}$ by subtraction.

6. Is it true that $\frac{4}{4} = \frac{2}{2}$? Explain.

BENCHMARK FRACTIONS AND DECIMALS

A benchmark fraction refers to a fraction that is easily recognizable. Benchmark fractions are commonly used in everyday experiences.

Write decimal equivalents for each of the following fractions.

1. $\frac{1}{10} = \underline{\hspace{1cm}}$ $\frac{2}{10} = \underline{\hspace{1cm}}$ $\frac{3}{10} = \underline{\hspace{1cm}}$ $\frac{7}{10} = \underline{\hspace{1cm}}$ $\frac{9}{10} = \underline{\hspace{1cm}}$

Describe an easy way to remember these kinds of fraction-decimal equivalents.

2. $\frac{1}{100} = \underline{\hspace{1cm}}$ $\frac{2}{100} = \underline{\hspace{1cm}}$ $\frac{9}{100} = \underline{\hspace{1cm}}$ $\frac{10}{100} = \underline{\hspace{1cm}}$ $\frac{99}{100} = \underline{\hspace{1cm}}$

Describe an easy way to remember these kinds of fraction-decimal equivalents.

3. $\frac{1}{2} = \underline{\hspace{1cm}}$ $\frac{1}{4} = \underline{\hspace{1cm}}$ $\frac{2}{4} = \underline{\hspace{1cm}}$ $\frac{3}{4} = \underline{\hspace{1cm}}$

Describe an easy way to remember these kinds of fraction-decimal equivalents.

4. What is the relationship between $\frac{1}{5}$ and $\frac{1}{10}$? Use this relationship to find a decimal equivalent for $\frac{1}{5}$.

5. What is the relationship between $\frac{1}{8}$ and $\frac{1}{4}$? Use this relationship to find a decimal equivalent for $\frac{1}{8}$.

USING BENCHMARK FRACTIONS TO FIND DECIMALS

Describe the relationship between each pair of fractions.

1. $\frac{1}{50}$ and $\frac{1}{100}$	2. $\frac{1}{25}$ and $\frac{1}{50}$	3. $\frac{1}{25}$ and $\frac{1}{100}$
---------------------------------------	--------------------------------------	---------------------------------------

Use the facts given to find the decimal equivalents for each fraction.

4.	Fact 1: $\frac{5}{10} = 0.5$ Fact 2: twentieths are half of tenths Show work here:	$\frac{5}{20} = \underline{\hspace{2cm}}$ fraction decimal
5.	Fact 1: $\frac{5}{5} = 1$ Fact 2: $\frac{5}{5} - \frac{1}{5} = \frac{4}{5}$ Show work here:	$\frac{4}{5} = \underline{\hspace{2cm}}$ fraction decimal
6.	Fact 1: $\frac{1}{2} = 0.5$ Fact 2: $\frac{1}{20}$ is one-tenth of $\frac{1}{2}$ Show work here:	$\frac{1}{20} = \underline{\hspace{2cm}}$ fraction decimal

USING BENCHMARK FRACTIONS TO FIND DECIMALS (Continued)

Use your knowledge about basic arithmetic and benchmark fractions to change the following fractions to decimals (no approximations). Do not use the long division algorithm or a calculator. You may do the problems in any order.

7.	a. $\frac{1}{5}$	b. $\frac{2}{5}$	c. $\frac{3}{5}$	d. $\frac{4}{5}$
8.	a. $\frac{1}{8}$	b. $\frac{3}{8}$	c. $\frac{5}{8}$	d. $\frac{7}{8}$
9.	a. $\frac{1}{20}$	b. $\frac{2}{20}$	c. $\frac{3}{20}$	d. $\frac{9}{20}$
10.	a. $\frac{1}{25}$	b. $\frac{2}{25}$	c. $\frac{5}{25}$	d. $\frac{14}{25}$
11.	a. $\frac{1}{50}$	b. $\frac{2}{50}$	c. $\frac{15}{50}$	d. $\frac{43}{50}$

12. Why do you think these decimals are called “terminating decimals”?

USING DIVISION TO FIND TERMINATING DECIMALS

The fraction notation $\frac{a}{b}$ poses the division problem of dividing a by b . This suggests we can change a fraction to a decimal using long division.

Use division to convert each fraction to a decimal.

<p>Example: $\frac{3}{8}$</p> $ \begin{array}{r} .375 \\ 8 \overline{)3.000} \\ \underline{-24} \\ -60 \\ \underline{-56} \\ 40 \\ \underline{-40} \\ 0 \end{array} $	<p>1. $\frac{7}{8}$</p>	<p>2. $\frac{3}{20}$</p>
<p>3. $\frac{11}{25}$</p>	<p>4. $\frac{3}{50}$</p>	<p>5. $\frac{9}{40}$</p>

6. What did Becca do wrong? She says $\frac{1}{50} = 0.2$. Here is her work.

$$\begin{array}{r}
 .2 \\
 50 \overline{)1.00} \\
 \underline{-100} \\
 0
 \end{array}$$

REPEATING DECIMALS

Summary

We will change thirds, sixths, and ninths to decimals and explore patterns in repeating decimals. We will continue to convert between fractions and decimals. We will continue to compare, order, and add simple fractions and decimals.

Goals

- Explore patterns in repeating decimals.
- Convert between fractions and repeating decimals.
- Compare, order, and add common fractions and decimals.

Warmup

Change the following fractions to decimals using any method.

1. $\frac{1}{2}$	2. $\frac{1}{4}$	3. $\frac{1}{8}$	4. $\frac{1}{10}$
5. $\frac{17}{100}$	6. $\frac{23}{50}$	7. $\frac{1}{25}$	8. $\frac{4}{5}$

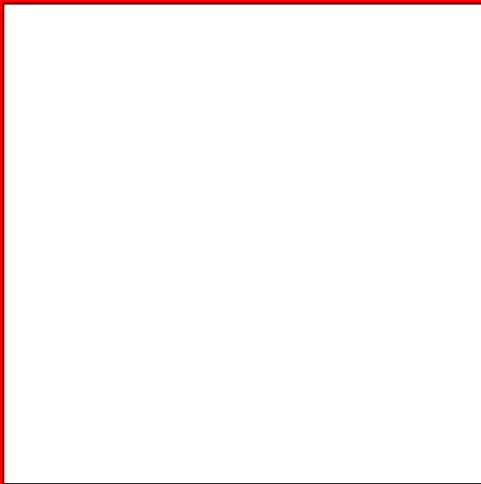
9. List all of the decimal values above in order from least to greatest.

_____ < _____ < _____ < _____ < _____ < _____ < _____

INVESTIGATING ONE-THIRD

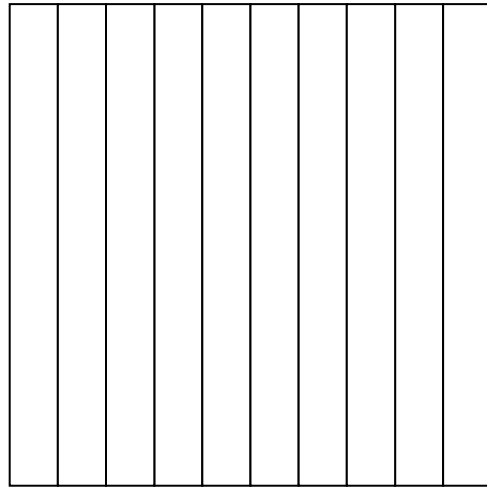
Each of these large squares represents one square unit.

1.



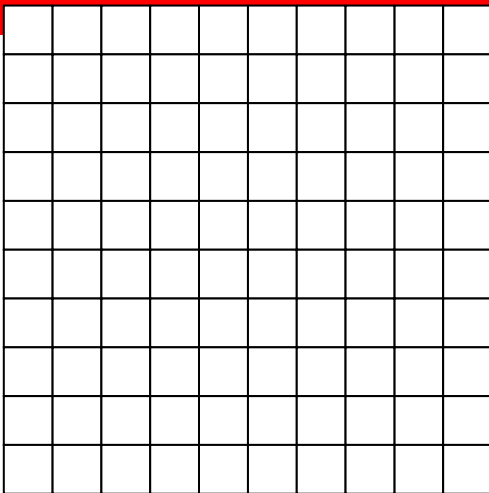
This square represents one whole. Shade one-third of it. This illustrates that _____ of a whole = $\frac{1}{3}$.

2.



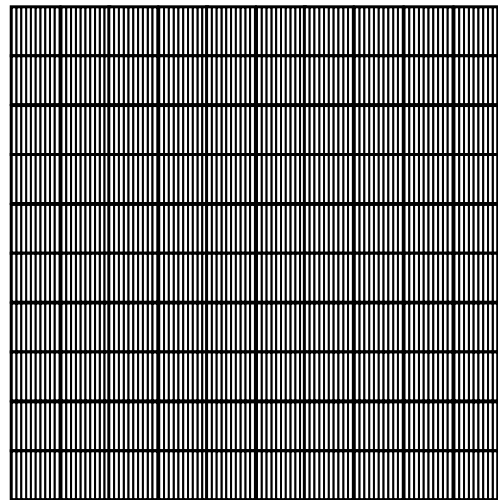
This square is divided into tenths. Shade one-third of the whole. This illustrates that _____ tenths + _____ of a tenth = $\frac{1}{3}$.

3.



This square is divided into _____. Shade one-third of the whole. This illustrates that _____ tenths + _____ hundredths + _____ of a hundredth = $\frac{1}{3}$.

4.



This square is divided into _____. Shade one-third of the whole. This illustrates that _____ tenths + _____ hundredths + _____ thousandths + _____ of a thousandth = $\frac{1}{3}$.

INVESTIGATING ONE-THIRD (Continued)

5. The previous page illustrates that $\frac{1}{3}$ *cannot* be written as a fraction with a denominator of 10, 100, or 1,000. Explain why this is true.

6. Divide to find decimal approximations for $\frac{1}{3}$ to one, two, and three decimal places.

<p>a.</p> $\begin{array}{r} 3 \overline{)1.0} \end{array}$ <p>This shows that $\frac{1}{3} \approx$ _____ .</p>	<p>b.</p> $\begin{array}{r} 3 \overline{)1.00} \end{array}$ <p>This shows that $\frac{1}{3} \approx$ _____ .</p>	<p>c.</p> $\begin{array}{r} 3 \overline{)1.000} \end{array}$ <p>This shows that $\frac{1}{3} \approx$ _____ .</p>
--	---	--

7. Explain what happens if we keep dividing to more places.

A repeating decimal is a decimal that ends in repetitions of the same block of digits. To show a repeating pattern whose digits are not all zero, use a series of dots (...) or a repeat bar.

When the repeating pattern consists of only zeros, we usually omit the zeros. In this case, the repeating decimal is said to be terminating.

8. Show some different decimal representations of $\frac{1}{3}$ using a series of dots.

$$\frac{1}{3} = 0.33\dots = 0.333\dots = \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

9. Show some different decimal representations of $\frac{1}{3}$ using a repeat bar.

$$\frac{1}{3} = 0.\overline{3} = 0.3\overline{3} = \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

THIRDS AND NINTHS

Use the given facts to find the decimal equivalents for each fraction. Show work as needed.

1.	<p>Fact 1: $\frac{1}{3} = 0.333\dots$</p> <p>Fact 2: $\frac{2}{3}$ is twice $\frac{1}{3}$</p> <p>Show work:</p>	$\left. \begin{array}{l} \text{Fact 1: } \frac{1}{3} = 0.333\dots \\ \text{Fact 2: } \frac{2}{3} \text{ is twice } \frac{1}{3} \end{array} \right\} \longrightarrow$	$\frac{2}{3} = \underline{\hspace{2cm}}$ fraction decimal
2.	<p>Fact 1: $\frac{1}{3} = 0.333\dots$</p> <p>Fact 2: $\frac{1}{9}$ is _____ of $\frac{1}{3}$</p> <p>Show work:</p>	$\left. \begin{array}{l} \text{Fact 1: } \frac{1}{3} = 0.333\dots \\ \text{Fact 2: } \frac{1}{9} \text{ is } \underline{\hspace{1cm}} \text{ of } \frac{1}{3} \end{array} \right\} \longrightarrow$	$\frac{1}{9} = \underline{\hspace{2cm}}$ fraction decimal
3.	<p>Fact 1: $\frac{1}{9} = 0.\underline{\hspace{1cm}}$</p> <p>Fact 2: $\frac{2}{9}$ is _____ $\frac{1}{9}$</p> <p>Show work:</p>	$\left. \begin{array}{l} \text{Fact 1: } \frac{1}{9} = 0.\underline{\hspace{1cm}} \\ \text{Fact 2: } \frac{2}{9} \text{ is } \underline{\hspace{1cm}} \frac{1}{9} \end{array} \right\} \longrightarrow$	$\frac{2}{9} = \underline{\hspace{2cm}}$ fraction decimal
4.	<p>Fact 1: $\frac{1}{9} = 0.\underline{\hspace{1cm}}$</p> <p>Fact 2: $\frac{4}{9}$ is _____ $\frac{2}{9}$</p> <p>Show work:</p>	$\left. \begin{array}{l} \text{Fact 1: } \frac{1}{9} = 0.\underline{\hspace{1cm}} \\ \text{Fact 2: } \frac{4}{9} \text{ is } \underline{\hspace{1cm}} \frac{2}{9} \end{array} \right\} \longrightarrow$	$\frac{4}{9} = \underline{\hspace{2cm}}$ fraction decimal

5. Find decimal equivalents for ninths using a pattern you may observe.

$\frac{3}{9} \rightarrow$

$\frac{5}{9} \rightarrow$

$\frac{6}{9} \rightarrow$

$\frac{7}{9} \rightarrow$

$\frac{8}{9} \rightarrow$

$\frac{9}{9} \rightarrow$

SIXTHS

1. Use division to find decimal approximations for $\frac{1}{6}$ to two, three, and four decimal places.

<p>a.</p> $6 \overline{)1.00}$ <p>This shows that $\frac{1}{6} \approx$ _____ .</p>	<p>b.</p> $6 \overline{)1.000}$ <p>This shows that $\frac{1}{6} \approx$ _____ .</p>	<p>c.</p> $6 \overline{)1.0000}$ <p>This shows that $\frac{1}{6} \approx$ _____ .</p>
--	---	--

2. Does it appear that $\frac{1}{6}$, when converted to a decimal by division, results in a terminating or a repeating decimal? Explain.

3. Show some different decimal representations for $\frac{1}{6}$ using a series of dots.

$$\frac{1}{6} = 0.16\dots = 0.1666\dots = \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

4. Show some different decimal representations for $\frac{1}{6}$ using the repeat bar.

$$\frac{1}{6} = 0.\overline{16} = 0.1\overline{66} = \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

5. Why do you think it is necessary to show more than two decimal places for $\frac{1}{6}$?

COMPARING FRACTIONS AND DECIMALS

Copy the decimal equivalents for the following fractions from the previous pages.

$\frac{1}{3} = \underline{\hspace{2cm}}$	$\frac{1}{6} = \underline{\hspace{2cm}}$	$\frac{1}{9} = \underline{\hspace{2cm}}$
--	--	--

1. Dilbert thinks that since $\frac{1}{6} = 0.1666\dots = 0.1\bar{6}$, then $\frac{1}{4} = 0.1444\dots = 0.1\bar{4}$. Explain why he is wrong.

Use the symbols $<$, $=$, or $>$ to compare the fractions.

2. $\frac{1}{9} \underline{\hspace{1cm}} \frac{7}{9}$	3. $\frac{1}{3} \underline{\hspace{1cm}} \frac{1}{9}$	4. $\frac{1}{3} \underline{\hspace{1cm}} \frac{3}{9}$
5. $\frac{1}{3} \underline{\hspace{1cm}} 0.\bar{3}$	6. $0.\bar{3} \underline{\hspace{1cm}} \frac{3}{9}$	7. $0.3 \underline{\hspace{1cm}} 0.333$
8. $0.\bar{3} \underline{\hspace{1cm}} 0.3$	9. $\frac{1}{3} \underline{\hspace{1cm}} 0.3$	10. $\frac{1}{3} \underline{\hspace{1cm}} 0.333$
11. $\frac{1}{6} \underline{\hspace{1cm}} 0.2$	12. $0.1\bar{6} \underline{\hspace{1cm}} \frac{2}{12}$	13. $0.\bar{2} \underline{\hspace{1cm}} \frac{2}{9}$

14. Order the following from least to greatest. (Hint: two numbers have the same value, so it does not matter which of these is listed first.)

$\frac{1}{6}$ $\frac{2}{3}$ 0.222 $\frac{2}{9}$ 0.2 $0.1\bar{6}$

_____, _____, _____, _____, _____, _____

PRACTICE WITH FRACTIONS AND DECIMALS

Copy the decimal equivalents for the following fractions from the previous pages.

$\frac{1}{3} = \underline{\hspace{2cm}}$	$\frac{1}{6} = \underline{\hspace{2cm}}$	$\frac{1}{9} = \underline{\hspace{2cm}}$
--	--	--

Change the fractions to equivalent decimals.

1. $\frac{5}{9}$	2. $\frac{6}{9}$	3. $\frac{7}{9}$	4. $\frac{8}{9}$
5. $\frac{2}{6}$	6. $\frac{3}{6}$	7. $\frac{4}{6}$	8. $\frac{5}{6}$

Use the symbols $<$, $=$, or $>$ to compare.

9. $\frac{1}{3} \underline{\hspace{1cm}} \frac{1}{6}$	10. $\frac{3}{7} \underline{\hspace{1cm}} \frac{3}{8}$	11. $\frac{2}{6} \underline{\hspace{1cm}} \frac{3}{9}$
12. $0.56 \underline{\hspace{1cm}} \frac{5}{9}$	13. $0.42 \underline{\hspace{1cm}} 0.\overline{4}$	14. $\frac{5}{8} \underline{\hspace{1cm}} \frac{5}{9}$

15. Order the following from least to greatest. (Hint: Two numbers have the same value, so it does not matter which of these is listed first.)

$\frac{1}{3}$ $\frac{4}{9}$ 0.333 $\frac{2}{9}$ 0.3 $0.\overline{3}$

_____, _____, _____, _____, _____, _____

FRACTIONS OR DECIMALS?

	Add each fraction expression	Change each fraction expression to a decimal expression and add
1.	$= \frac{1}{2} + \frac{1}{4}$ $= \frac{2}{4} + \frac{1}{4} = \underline{\hspace{2cm}}$	$0.5 + 0.25 \longrightarrow \begin{array}{r} 0.5 \\ +0.25 \\ \hline \end{array}$
2.	$\frac{2}{5} + \frac{3}{10}$	
3.	$\frac{1}{4} + \frac{3}{8}$	
4.	$\frac{1}{3} + \frac{2}{3}$	
5.	$\frac{1}{3} + \frac{1}{6}$	

6. Which problems above were easier to add as fractions? Explain.

7. Which problems above were easier to add as decimals? Explain.

BELIEVE IT OR NOT

Use the given facts to find the decimal equivalents for each fraction.

1.	Fact 1: $\frac{1}{3} = 0.333\dots$ Fact 2: $\frac{3}{3}$ is three times $\frac{1}{3}$ Work:	} →	$\frac{3}{3} = \underline{\hspace{2cm}}$ fraction decimal
This shows that $\frac{3}{3} = 1$ can also be written as 0._____. Therefore, 0._____ = 1.			

2.	Fact 1: $\frac{1}{6} = 0.16666\dots$ Fact 2: $\frac{1}{3} = \frac{2}{6} = 0.33333\dots$ Work:	} →	$\frac{3}{6} = \underline{\hspace{2cm}}$ fraction decimal
This shows that $\frac{3}{6} = \frac{1}{2}$ can also be written as 0._____. Therefore, 0._____ = $\frac{1}{2}$.			

3.	Fact 1: $1 = 0.999\dots$ Fact 2: $\frac{5}{6} = 1 - \frac{1}{6}$ Work:	} →	$\frac{5}{6} = \underline{\hspace{2cm}}$ fraction decimal
4.	Fact 1: $\frac{1}{3} = 0.30 + 0.030 + 0.0030\dots$ Fact 2: $\frac{1}{6}$ is one-half of $\frac{1}{3}$ Work:	} →	$\frac{1}{6} = \underline{\hspace{2cm}}$ fraction decimal

GRAPHING FRACTIONS AND DECIMALS

Summary	Goals
<p>We will order fractions and decimals. We will graph fractions and decimals on a number line. We will graph ordered pairs in the first quadrant of the coordinate plane.</p>	<ul style="list-style-type: none"> Compare and order fractions and decimals. Locate fractions and decimals on number lines. Graph ordered pairs. Scale graphs appropriately.

Warmup

- Draw a circle around each number that represents a decimal that terminates.
- Draw a square around each number that represents a decimal that does not terminate.
- Insert $<$, $>$, or $=$ to make each statement true.

1. $\frac{1}{2}$ _____ $\frac{1}{6}$ \longrightarrow Think $\left\{ \begin{array}{l} \frac{1}{2} = \underline{\hspace{2cm}} \\ \frac{1}{6} = \underline{\hspace{2cm}} \end{array} \right.$

2. $0.\bar{3}$ _____ 0.3 3. $\frac{1}{3}$ _____ 0.33

4. $\frac{3}{9}$ _____ $\frac{3}{8}$ 5. $\frac{7}{8}$ _____ $\frac{14}{16}$

6. $\frac{3}{5}$ _____ 0.35 7. $0.\bar{4}$ _____ $\frac{2}{5}$

These are unit fractions: $\frac{1}{4}$, $\frac{1}{9}$, $\frac{1}{21}$. These are not unit fractions: $\frac{3}{4}$, $\frac{7}{15}$, $\frac{3}{2}$, $3\frac{5}{8}$.

8. List three unit fractions from problems 1 through 7 above. _____
9. In your own words, explain unit fraction.

ORDERING DECIMALS ON A NUMBER LINE

1. Circle all of the numbers that have the same value as 0.7.

$\frac{7}{10}$ 7 tens $\frac{70}{100}$ 0.07 70 hundredths 0.700 7 tenths 0.70

Order these numbers from least to greatest.

2. 0.2340 0.76 0.9 0.2222 0.00088

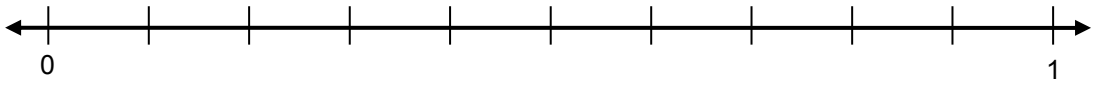
_____ < _____ < _____ < _____ < _____

3. 0.6 0.43 0.08 0.043 0.154

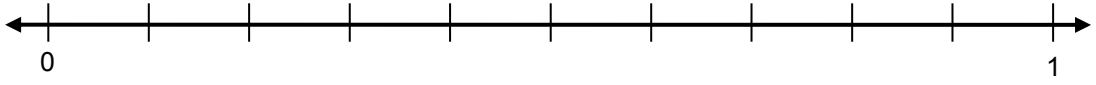
_____ < _____ < _____ < _____ < _____

Below each number line, write the number that corresponds to each tick mark. Then write the letters above the line to estimate the placement of the given numbers.

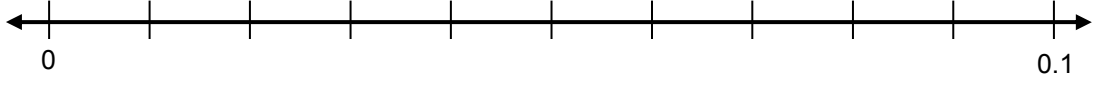
4. A. 0.11 B. 0.35 C. 0.42 D. 0.99 E. 0.01



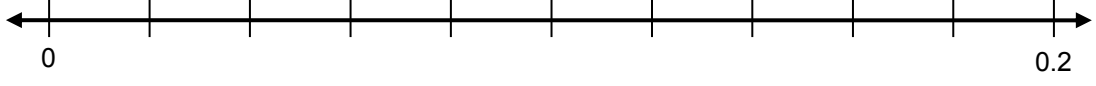
5. F. 0.71 G. 0.85 H. 0.42 J. 0.50 K. 0.05



6. L. 0.015 M. 0.021 N. 0.049 P. 0.069 Q. 0.099



7. R. 0.115 S. 0.121 T. 0.149 U. 0.10 V. 0.20



STRATEGIES FOR ORDERING FRACTIONS

Use the symbol for “is less than” to order each group of fractions, and explain a general strategy for comparing the fractions within each group. Use the word list below to complete the sentences.

	Fractions	Ordering Strategy
1.	$\frac{1}{8}, \frac{1}{4}, \frac{1}{5}$ _____ < _____ < _____	These are called _____ fractions. Describe a sense-making strategy for comparing these kinds of fractions.
2.	$\frac{3}{5}, \frac{3}{4}, \frac{3}{8}$ _____ < _____ < _____	These fractions all have a common _____. Extend the strategy used in problem 1. Describe a sense-making strategy for comparing these kinds of fractions.
3.	$\frac{3}{12}, \frac{1}{12}, \frac{8}{12}$ _____ < _____ < _____	These fractions all have a common _____. Describe a sense-making strategy for comparing these kinds of fractions.
4.	$\frac{7}{8}, \frac{3}{4}, \frac{4}{5}$ _____ < _____ < _____	These fractions are all _____ minus a unit fraction. Describe a sense-making strategy for comparing these kinds of fractions.
5.	$\frac{17}{25}, \frac{3}{10}, \frac{4}{8}$ _____ < _____ < _____	Fractions that are easily recognizable, like $\frac{1}{2}$, are called _____ fractions. Describe a sense-making strategy for comparing other fractions to $\frac{1}{2}$.

Word List				
numerator	denominator	benchmark	unit	one

ORDERING FRACTIONS ON A NUMBER LINE 1

Estimate the location of each number on the number line below.

0 1 $\frac{1}{2}$ $\frac{1}{4}$ $\frac{6}{8}$ $\frac{6}{10}$ $\frac{6}{7}$ $\frac{7}{8}$



1. Which benchmark fractions did you locate on your number line?
2. Explain how you located $\frac{6}{8}$ on the number line.
3. Explain how you located $\frac{6}{7}$ and $\frac{7}{8}$ on the number line.

ORDERING FRACTIONS ON A NUMBER LINE 2

Estimate the location of each number on the number line below.

0 1 $\frac{3}{4}$ $\frac{3}{7}$ $\frac{3}{9}$ $\frac{1}{6}$ $\frac{16}{20}$ $\frac{17}{21}$



1. Which benchmark fractions did you locate on your number line?

2. Explain how you located $\frac{3}{7}$ and $\frac{3}{9}$ on the number line.

3. Explain how you located $\frac{16}{20}$ and $\frac{17}{21}$ on the number line.

GRAPHING ORDERED PAIRS

A plane can be visualized as a set of points forming a two-dimensional flat surface, and extends without end in all directions.

- Use vocabulary in the word list on the right to help you complete the paragraph. You might use some words more than once.

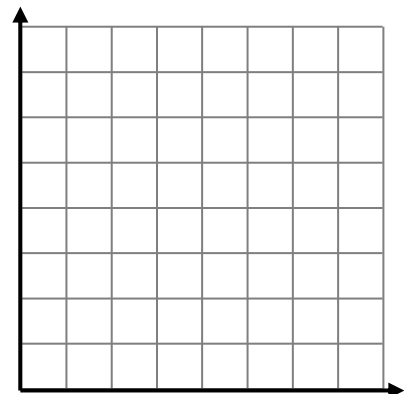
A _____ is a plane with horizontal and vertical number lines, called axes, meeting at a point called the _____. The _____ axis is frequently referred to as the x -axis. The _____ axis is frequently referred to as the y -axis. Points in the coordinate plane are named by pairs of numbers, called _____, written as (x, y) . The x -coordinate represents the location in relation to the y -axis in the _____ direction. The y -coordinate represents the location in relation to the x -axis in the _____ direction.

Word List

- coordinate plane
- horizontal
- ordered pairs
- origin
- vertical

- The origin is represented by the ordered pair (_____, _____).
- On the grid below, assume the side length of each small square is one unit.
 - Label the x -axis and number it from the origin. (0, 1, 2, etc.)
 - Label the y -axis and number it from the origin. (0, 1, 2, etc.)
 - Graph the ordered pairs and label them with the given letters.

$A(0, 0)$ $B(6, 6)$ $C(1, 7)$ $D(7, 1)$
 $E(4, 0)$ $F(0, 4)$ $G(8, 5)$ $H(5, 8)$



- How will you remember that we count on the horizontal axis (x -axis) first when graphing ordered pairs?

SCALING NUMBER LINES AND GRAPHS

For problems 1 and 2, label the tick marks on each number line below with an appropriate scale. Then locate all the points by writing the letter above the tick mark.

1.	A. 4	B. 12	C. 26	D. 30	E. 38
2.	F. 15	G. 30	H. 50	J. 65	K. 90

3. Find the values for L , M , and N on the number line below.

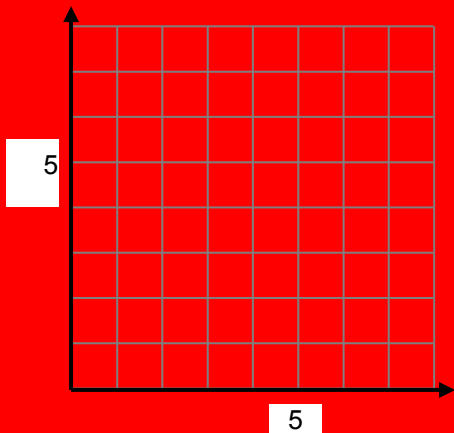
For problems 4 and 5, mark the axes with an appropriate scale. Then graph and label with corresponding letters all the ordered pairs on the coordinate plane.

<p>4. $A(10, 12)$ $B(6, 16)$ $C(0, 10)$ $D(4, 0)$ $E(5, 3)$ $F(1, 13)$</p> <div style="text-align: center; padding: 20px;"> </div>	<p>5. $G(10, 20)$ $H(20, 40)$ $J(0, 60)$ $K(80, 0)$ $L(25, 25)$ $M(55, 5)$</p> <div style="text-align: center; padding: 20px;"> </div>
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GRAPHING PUZZLES

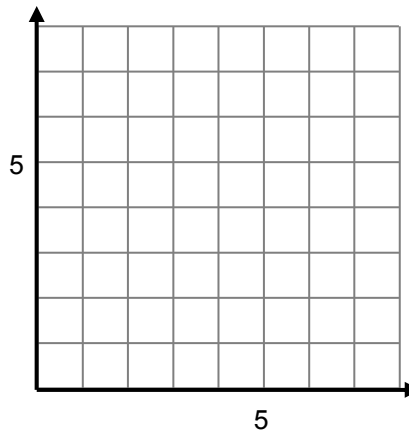
For this page, only consider whole number coordinates. Graph the ordered pairs (x, y) that meet the criteria and fit on the grid. List all of the ordered pairs that you graphed.

1. $x = 4$
 $y < 6$



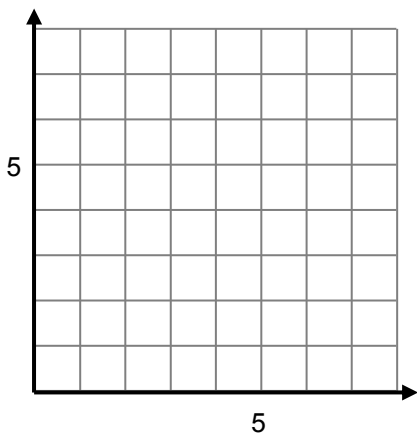
Ordered pairs:

2. x is odd
 $y \leq 1$



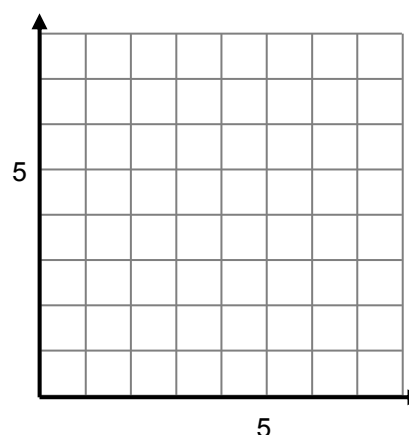
Ordered pairs:

3. x is even
 y is a multiple of 3



Ordered pairs:

4. x is a factor of 6
 $y = 8$

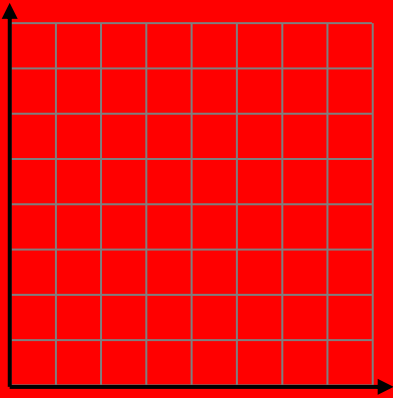


Ordered pairs:

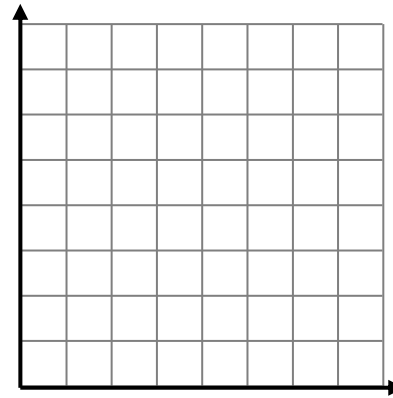
GRAPHING FRACTION AND DECIMAL COORDINATES

Mark the axes with an appropriate scale. Then graph and label with corresponding letters all the ordered pairs on the coordinate plane.

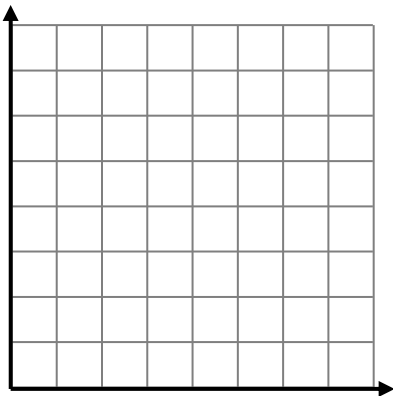
1. $A\left(\frac{1}{2}, \frac{1}{4}\right)$ $B\left(0, \frac{3}{4}\right)$ $C\left(\frac{1}{4}, 0\right)$
 $D\left(1\frac{1}{2}, 1\frac{1}{4}\right)$ $E\left(2, 1\frac{3}{4}\right)$ $F\left(0, 1\frac{1}{4}\right)$



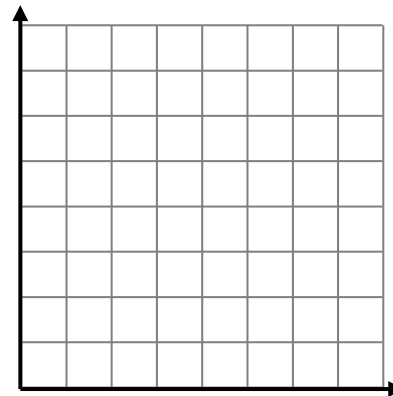
2. $G\left(\frac{1}{2}, \frac{1}{8}\right)$ $H\left(0, \frac{3}{8}\right)$ $J\left(\frac{7}{8}, 0\right)$
 $K\left(1\frac{1}{2}, 1\frac{1}{4}\right)$ $L\left(2, 1\frac{7}{8}\right)$ $M(0, 2)$



3. $A(0.6, 0.8)$ $B(0.1, 0.4)$ $C(0, 0.6)$
 $D(0.5, 0)$ $E(0.3, 0.2)$ $F(0.1, 0.7)$



4. $G(1, 0.2)$ $H(1.2, 0.6)$ $J(0.8, 1.6)$
 $K(0, 1.4)$ $L(0.6, 0)$ $M(1.6, 0.2)$



SKILL BUILDERS, VOCABULARY AND REVIEW

SKILL BUILDER 1

Match the equation with the property of arithmetic that it illustrates.

- _____ 1. $15 + 4 + 5 = 15 + 5 + 4$
- _____ 2. $(8 + 13) + 7 = 8 + (13 + 7)$
- _____ 3. $25 \cdot 6 \cdot 4 = 6 \cdot 25 \cdot 4$
- _____ 4. $7(10 + 8) = 7(10) + 7(8)$
- _____ 5. $8 \cdot (5 \cdot 3) = (8 \cdot 5) \cdot 3$

- a. Associative Property of Addition
- b. Associative Property of Multiplication
- c. Commutative Property of Addition
- d. Commutative Property of Multiplication
- e. Distributive Property

Name the property that illustrates why the expressions in columns A and B are equivalent. Then explain why each expression in column B is easier to compute.

	A	B	Property and Explanation
6.	$45 + 59 + 55$	$45 + 55 + 59$	
7.	$20 \cdot (5 \cdot 7)$	$(20 \cdot 5) \cdot 7$	
8.	$4(100 - 1)$	$4(100) - 4(1)$	

Use one or more properties of arithmetic to compute efficiently.

<p>9. $50 \cdot 18 \cdot 2$</p> <p>Properties used:</p>	<p>10. $8(300 + 4)$</p> <p>Properties used:</p>	<p>11. $48 + 97 + 52$</p> <p>Properties used:</p>
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SKILL BUILDER 2

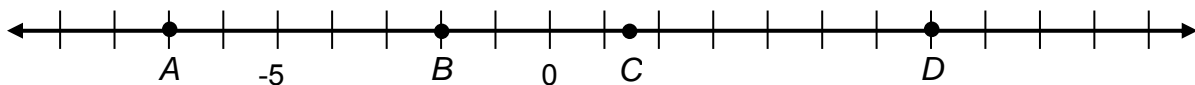
Compute.

1. $459 - 423$	2. $45 \cdot 87$
3. $87 + 342$	4. $624 \div 4$
5. $1224 \div 51$	6. $124 \cdot 201$

Use one or more properties of arithmetic to compute efficiently.

7. $25 \cdot 73 \cdot 4$	8. $7(500 - 4)$	9. $59 + 36 + 64$
Properties used:	Properties used:	Properties used:

10. Find the values for A , B , C , and D on the number line below.



SKILL BUILDER 3

In each arrow diagram, write the **multiplier** that can be used to justify that the ratios are equivalent.

<p>1. $\begin{matrix} & 2 \text{ to } 5 & \\ \times \text{---} & \curvearrowright & \times \text{---} \\ & 6 \text{ to } 15 & \end{matrix}$</p>	<p>2. $\begin{matrix} & 7 : 3 & \\ \times \text{---} & \curvearrowright & \times \text{---} \\ & 49 : 21 & \end{matrix}$</p>	<p>3. $\begin{matrix} & 24 : 16 & \\ \times \text{---} & \curvearrowright & \times \text{---} \\ & 3 : 2 & \end{matrix}$</p>
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4. Lou keeps pet turtles and frogs in his terrarium in a ratio of 1 : 3.

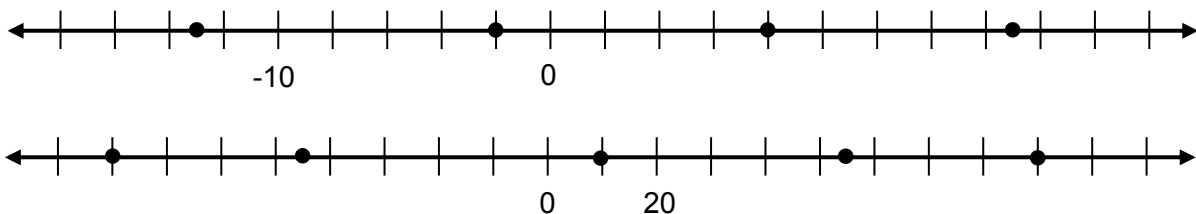
- a. Create a table for this situation.
- b. The ratio of frogs to total number of animals in his terrarium is ____ to ____.
- c. Choose two ratios from your table that are equivalent to the ratio in part (c) and explain with diagrams or words why they are equivalent.

Number of Turtles	Number of Frogs	Total Number of Pets
1		
	6	

5. For an art project in her class, Mrs. Olson wants each group to have 5 markers and 3 compasses.

- a. What is the ratio of markers to compasses needed for this project? Write the ratio in three ways.
- b. If she has 6 groups of students in her class, how many of each tool will she have distributed?

6. Label and find the values for points on the number line below.



SKILL BUILDER 4

Change each decimal to a fraction in simplest form.

1. 0.5	2. 0.25	3. 0.125
--------	---------	----------

4. Circle all of the numbers that have the same value as 0.20.

20 tenths	0.2	$\frac{2}{10}$	2 tens	$\frac{2}{100}$	0.02	20 hundredths	0.200
-----------	-----	----------------	--------	-----------------	------	---------------	-------

Order these numbers from least to greatest.

5.	0.8	0.214	0.08	0.0214	0.42
	_____	< _____	< _____	< _____	< _____
6.	0.19	0.019	0.91	0.901	0.109
	_____	< _____	< _____	< _____	< _____

7. Write three fractions that are equivalent to $\frac{1}{4}$.

Use <, =, or > to make each statement true.

8.	$5\frac{3}{4}$ _____ $\frac{25}{5}$	9.	$\frac{17}{2}$ _____ $\frac{25}{3}$	10.	$\frac{13}{4}$ _____ $\frac{14}{4}$
----	-------------------------------------	----	-------------------------------------	-----	-------------------------------------

SKILL BUILDER 5

Write decimal equivalents for each of the following benchmark fractions.

1. $\frac{1}{4}$	2. $\frac{2}{4}$	3. $\frac{3}{4}$	4. $\frac{4}{4}$
------------------	------------------	------------------	------------------

Use the fact that $\frac{1}{4} = 0.25$, and the relationship between $\frac{1}{8}$ and $\frac{1}{4}$ to find the decimal equivalents for the fractions below.

5. $\frac{1}{8}$	6. $\frac{2}{8}$	7. $\frac{3}{8}$	8. $\frac{5}{8}$
------------------	------------------	------------------	------------------

Use the fact that $\frac{1}{100} = 0.01$, and the relationship between $\frac{1}{50}$ and $\frac{1}{100}$ to find the decimal equivalents for the fractions below. Then use long division to verify each decimal equivalent.

9. $\frac{1}{50}$	10. $\frac{3}{50}$	11. $\frac{23}{50}$	12. $\frac{48}{50}$
$50 \overline{)1.00}$			

SKILL BUILDER 6

Use the symbols $<$, $=$, $>$ to compare each pair of numbers.

1. $\frac{1}{3}$ _____ $0.\overline{3}$	2. $\frac{1}{6}$ _____ $\frac{1}{9}$	3. $\frac{1}{6}$ _____ 0.1666
4. 0.11 _____ $\frac{1}{9}$	5. $\frac{2}{18}$ _____ $\frac{1}{9}$	6. 0.333 _____ $\frac{3}{9}$


7. Order these numbers from least to greatest.

0.44 $\frac{4}{9}$ $\frac{2}{3}$ 0.4 0.6 $\frac{1}{6}$

_____ $<$ _____ $<$ _____ $<$ _____ $<$ _____ $<$ _____

8. Estimate the location of each number on the number line below.

$\frac{2}{3}$ $\frac{5}{3}$ $1\frac{9}{10}$ 1.1 0.5 1.5



9. Write an inequality statement to show the order of the numbers in problem 8.

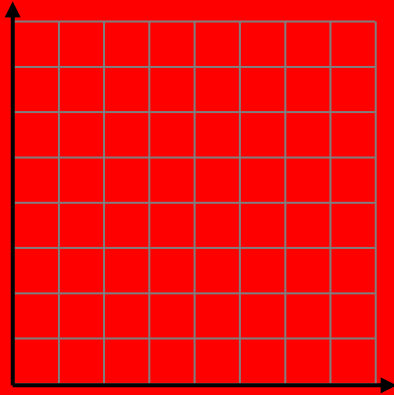
_____ $<$ _____ $<$ _____ $<$ _____ $<$ _____ $<$ _____

SKILL BUILDER 7

Mark the axes with an appropriate scale. Then graph and label with corresponding letters all the ordered pairs on the coordinate plane.

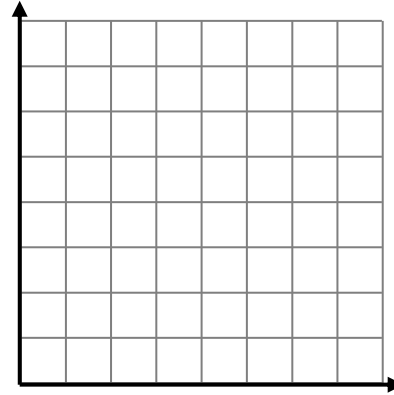
1. $A(1, 5)$ $B(0, 3)$ $C(4, 8)$

$D(1, 0)$ $E(0, 6)$ $F(7, 2)$



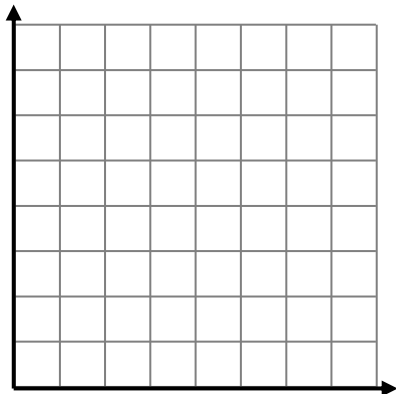
2. $G(0.5, 1)$ $H(0, 2.5)$ $J(4, 0)$

$K(1.5, 1)$ $L(2, 1.5)$ $M(1, 2)$



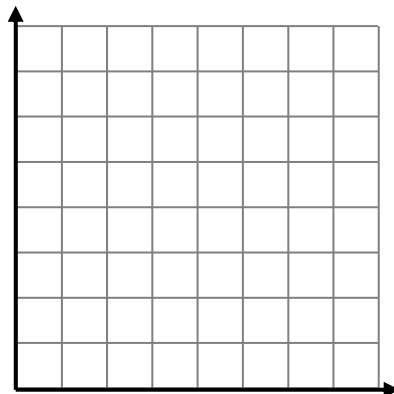
3. $A\left(\frac{1}{3}, 1\frac{2}{3}\right)$ $B\left(0, \frac{2}{3}\right)$ $C(1, 0)$

$D\left(1\frac{1}{3}, \frac{1}{3}\right)$ $E\left(0, 1\frac{2}{3}\right)$ $F\left(1, 2\frac{1}{3}\right)$

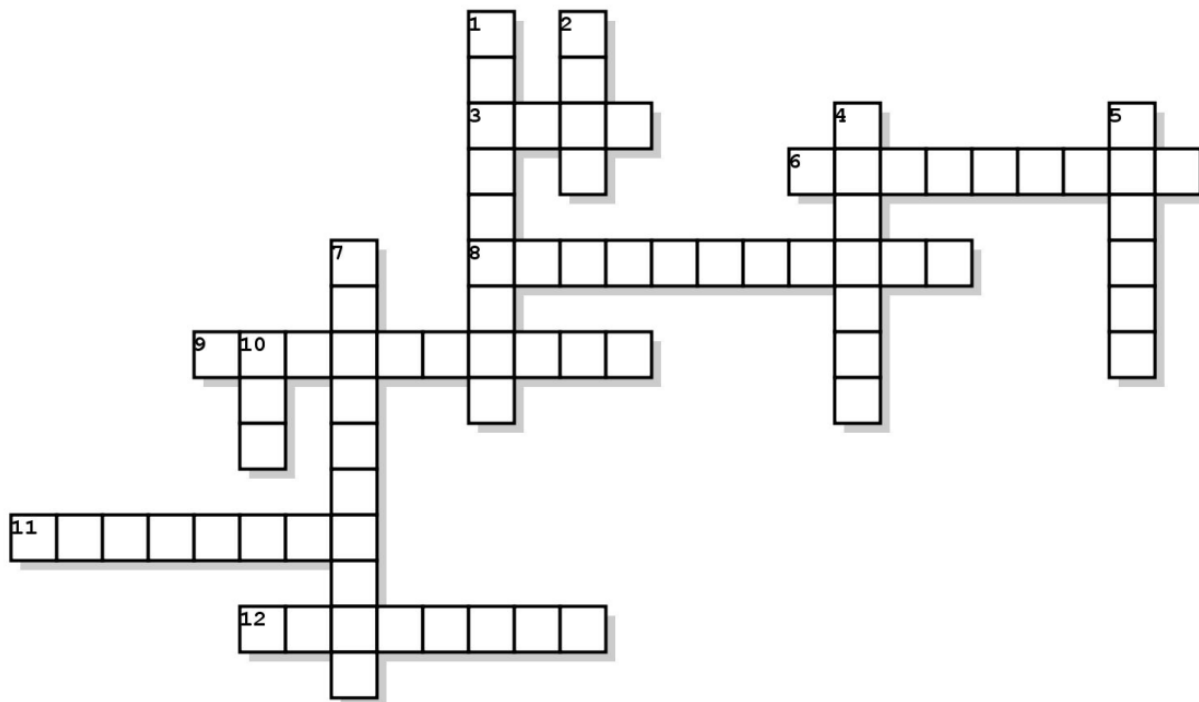


4. $G\left(\frac{1}{4}, 1\frac{1}{2}\right)$ $H\left(0, \frac{2}{4}\right)$ $J\left(\frac{3}{4}, 0\right)$

$K\left(1\frac{1}{8}, 1\frac{1}{4}\right)$ $L\left(2, 1\frac{7}{8}\right)$ $M(1, 2)$



FOCUS ON VOCABULARY



Across

- 3 Coordinate
- 6 Easily recognizable fraction
- 8 Decimals such as 1.5, 0.322, 0.20
- 9 _____ plane
- 11 Operation indicated by a fraction bar
- 12 Number indicated by the quotient of two whole numbers.

Down

- 1 Decimals, such as 0.16666... or $1.\bar{3}$
- 2 Fractions, such as $\frac{1}{5}$, $\frac{1}{9}$, $\frac{1}{12}$
- 4 Every fraction can be written as an equivalent repeating or terminating _____.
- 5 Its coordinates are (0, 0)
- 7 Direction of x-axis
- 10 Numerator of a unit fraction

(For word hints, see the word bank and other vocabulary used in this packet.)

SELECTED RESPONSE

Show your work on a separate sheet of paper and choose the best answer(s).

1. Which number below is equal to $\frac{3}{8}$?

A. 0.125

B. 0.375

C. 0.38

D. 0.625

2. Choose all the numbers below that are equal to 0.25.

A. $\frac{1}{4}$

B. $\frac{1}{8}$

C. $\frac{5}{20}$

D. $\frac{25}{100}$

3. Choose all statements below that are true.

A. $\frac{1}{3} = 0.3$

B. $\frac{1}{3} = 0.33$

C. $\frac{1}{3} > 0.33$

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

4. Choose the set of numbers below that are ordered from least to greatest.

A. $\frac{5}{6}$, $\frac{1}{6}$, 0.2, $\frac{3}{10}$

B. $\frac{1}{6}$, 0.2, $\frac{3}{10}$, $\frac{5}{6}$

C. $\frac{5}{6}$, $\frac{3}{10}$, 0.2, $\frac{1}{6}$

D. 0.2, $\frac{1}{6}$, $\frac{3}{10}$, $\frac{5}{6}$

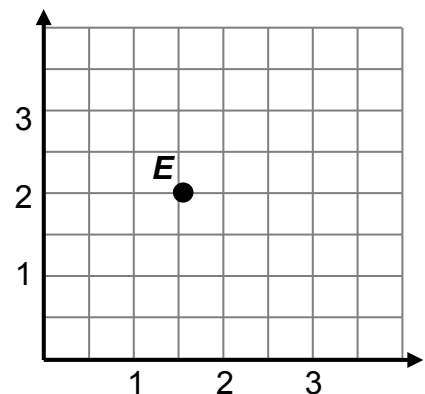
5. Which of the following ordered pairs represents the location of point *E*? Choose all that apply.

A. (3, 4)

B. $(1\frac{1}{2}, 2)$

C. (1.5, 2)

D. (2, 1.5)



KNOWLEDGE CHECK

Show your work on a separate sheet of paper and write your answers on this page.

1.1 Terminating Decimals

Change the following fractions to decimals, and circle the fractions that have equal value.

1. $\frac{7}{8}$	2. $\frac{2}{5}$	3. $\frac{35}{50}$	4. $\frac{4}{10}$
------------------	------------------	--------------------	-------------------

5. What is the fraction equivalent for 0.18?

1.2 Repeating Decimals

6. Order the following from least to greatest.

$\frac{1}{3}$

0.61

0.33

$\frac{2}{3}$

0.3

0.6

_____ < _____ < _____ < _____ < _____ < _____

7. Which is greater, $\frac{2}{3}$ or 0.60? Explain.

1.3 Graphing Fractions and Decimals

8. Estimate the location of each number on the number line below.

0.5

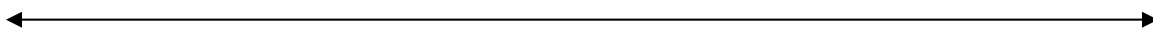
0.05

$\frac{5}{11}$

$\frac{5}{4}$

$1\frac{1}{4}$

1.30



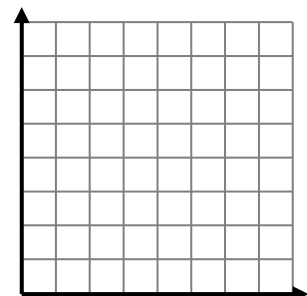
9. Mark the axes with an appropriate scale. Then locate all ordered pairs by marking a dot and labeling the letter on the coordinate plane.

A (1.5, 3)

B (3, 2)

C (1, $1\frac{1}{3}$)

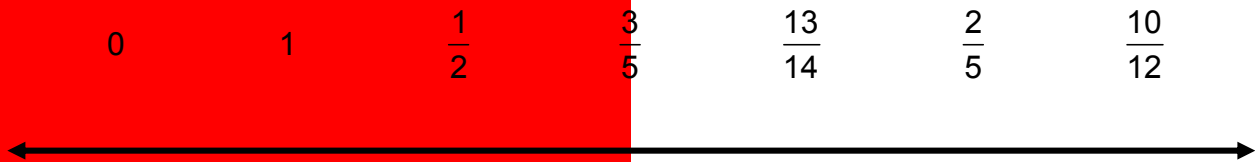
D (0, 0)



HOME-SCHOOL CONNECTION

Here are some problems to review with your young mathematician.

- Describe two different methods to convert $\frac{3}{4}$ into a decimal.
- How can you use the fact that $\frac{1}{8} = 0.125$ to find the decimal equivalent of $\frac{5}{8}$?
- Estimate the location of each number on the number line below.



- Create 5 ordered pairs in the space below with the following conditions. Then mark the axes with an appropriate scale and locate your ordered pairs with a point and writing the letter on the coordinate plane.

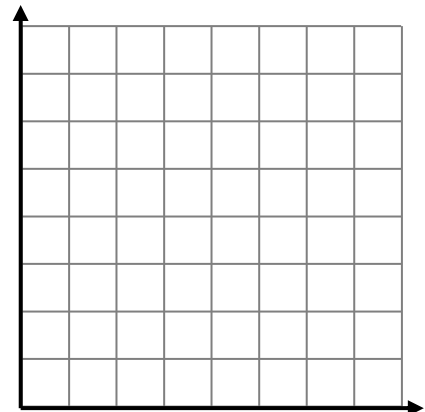
J lies on the vertical axis. *J* (_____, _____)

K lies on the horizontal axis. *K* (_____, _____)

L is to the right of *J* and above *K*. *L* (_____, _____)

M has two fraction coordinates. *M* (_____, _____)

N has two decimal coordinates. *N* (_____, _____)



Parent (or Guardian) Signature _____

HOME-SCHOOL CONNECTION (Continued)

Dear Parent (or Guardian),

This year, your student will be taking a mathematics course that is fully aligned with the Common Core State Standards in Mathematics for Grade 7. The primary topics in this course will center around number sense and proportional reasoning. Students will also study expressions and equations, geometry, and probability and statistics.

We encourage you to join your student's teacher and school as a partner in your young mathematician's progress. A major portion of the work in this course will be the completion of sixteen packets (such as this one) throughout the year. Each packet will take about two weeks to complete. Some of this work will be done in class, and some will be assigned for homework. You can take an active role by reviewing the packet and asking your student to explain some problems to you. This will allow your student to practice communicating about mathematics, and give you an opportunity to find out what is being taught in the classroom. Your signature will indicate to the teacher that you have reviewed the work together.

If you see that your student does not fully understand a concept, please encourage your student to use the Resource Guide that accompanies the program as a reference and to ask the teacher for additional help.

Thank you in advance for your support. We hope you enjoy watching your student grow mathematically this year.

Sincerely,

The Writing Team at the Center for Mathematics and Teaching

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COMMON CORE STATE STANDARDS – MATHEMATICS

STANDARDS FOR MATHEMATICAL CONTENT

4.NF.2*	Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as $\frac{1}{2}$. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols $>$, $=$, or $<$, and justify the conclusions, e.g., by using a visual fraction model.
4.NF.5*	Express a fraction with denominator 10 as an equivalent fraction with denominator 100, and use this technique to add two fractions with respective denominators 10 and 100. <i>For example, express $\frac{3}{10}$ as $\frac{30}{100}$, and add $\frac{3}{10} + \frac{4}{100} = \frac{34}{100}$.</i>
4.NF.6*	Use decimal notation for fractions with denominators 10 or 100. <i>For example, rewrite 0.62 as $\frac{62}{100}$; describe a length as 0.62 meters; locate 0.62 on a number line diagram.</i>
4.NF.7*	Compare two decimals to hundredths by reasoning about their size. Recognize that comparisons are valid only when the two decimals refer to the same whole. Record the results of comparisons with the symbols $>$, $=$, or $<$, and justify the conclusions, e.g., by using a visual model.
5.NF.1*	Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators. <i>For example, $\frac{2}{3} + \frac{5}{4} = \frac{8}{12} + \frac{15}{12} = \frac{23}{12}$. (In general, $\frac{a}{b} + \frac{c}{d} = \frac{ad + bc}{bd}$.)</i>
6.NS.2*	Fluently divide multi-digit numbers using the standard algorithm.
6.NS.3*	Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.
7.NS.2d	Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers: Convert a rational number to a decimal using long division; know that the decimal form of a rational number terminates in 0s or eventually repeats.

*Review of content essential for success in 7th grade.

STANDARDS FOR MATHEMATICAL PRACTICE

MP3	Construct viable arguments and critique the reasoning of others.
MP8	Look for and express regularity in repeated reasoning.



9 7 8 1 6 1 4 4 5 0 2 4 5

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