Name Date Time

LESSON 4•6

A Nature Hike Problem

Pavan, Jonathan, Nisha, and Gloria walked on the sixth-grade nature hike. They finished $\frac{1}{2}$ the length of the trail in the first hour. Then they slowed down. In the second hour, they walked $\frac{1}{2}$ the distance that was left. In the third hour, they moved even more slowly and walked only $\frac{1}{2}$ the remaining distance.

If they continue slowing down at this rate, what fraction of the trail will they walk in their fourth hour of hiking? ______________

Explain or show how you solved the problem.

____

____

____

Name Date Time

LESSON 4•6

A Nature Hike Problem

Pavan, Jonathan, Nisha, and Gloria walked on the sixth-grade nature hike. They finished $\frac{1}{2}$ the length of the trail in the first hour. Then they slowed down. In the second hour, they walked $\frac{1}{2}$ the distance that was left. In the third hour, they moved even more slowly and walked only $\frac{1}{2}$ the remaining distance.

If they continue slowing down at this rate, what fraction of the trail will they walk in their fourth hour of hiking? ______________

Explain or show how you solved the problem.

____

____

____

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Name ____________________ Date ____________ Time ____________

LESSON 4•7

Math Message

Write the following mixed numbers as fractions.

1. $3\frac{1}{4} =$ ______
2. $2\frac{3}{8} =$ ______
3. $5\frac{7}{8} =$ ______
4. $3\frac{5}{6} =$ ______
5. $4\frac{3}{10} =$ ______
6. $2\frac{3}{16} =$ ______

Write the following fractions as mixed numbers.

7. $\frac{19}{2} =$ ______
8. $\frac{17}{3} =$ ______
9. $\frac{27}{4} =$ ______
10. $\frac{21}{8} =$ ______
11. $\frac{24}{5} =$ ______
12. $\frac{34}{9} =$ ______
13. Multiply. Show your work on the back of the page.
    Be prepared to explain how you found your answer. $3\frac{3}{8} * 1\frac{2}{5} =$ ______

Name ____________________ Date ____________ Time ____________

LESSON 4•7

Math Message

Write the following mixed numbers as fractions.

1. $3\frac{1}{4} =$ ______
2. $2\frac{3}{8} =$ ______
3. $5\frac{7}{8} =$ ______
4. $3\frac{5}{6} =$ ______
5. $4\frac{3}{10} =$ ______
6. $2\frac{3}{16} =$ ______

Write the following fractions as mixed numbers.

7. $\frac{19}{2} =$ ______
8. $\frac{17}{3} =$ ______
9. $\frac{27}{4} =$ ______
10. $\frac{21}{8} =$ ______
11. $\frac{24}{5} =$ ______
12. $\frac{34}{9} =$ ______
13. Multiply. Show your work on the back of the page.
    Be prepared to explain how you found your answer. $3\frac{3}{8} * 1\frac{2}{5} =$ ______

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Name Date Time

LESSON 4·7

A Photo Album Page

Name Date Time

LESSON 4·7

Album Photos

$2\frac{1}{2}$ in.

$4\frac{1}{8}$ in.

$2\frac{3}{4}$ in.

$2\frac{1}{8}$ in.

$2\frac{1}{8}$ in.

$2\frac{1}{8}$ in.

4 in.

$3\frac{5}{8}$ in.

Name Date Time

STUDY LINK 4•7

Multiplying Mixed Numbers

SRB 71 72 90

Rename each mixed number as a fraction.

1. $1\frac{4}{5}$ ______ **2.** $2\frac{6}{6}$ ______ **3.** $5\frac{2}{3}$ ______ **4.** $3\frac{1}{2}$ ______

Rename each fraction as a mixed number or whole number.

5. $\frac{12}{4}$ ______ **6.** $\frac{33}{8}$ ______ **7.** $\frac{15}{6}$ ______ **8.** $\frac{20}{3}$ ______

Multiply. Write each answer in simplest form. If possible, write answers as mixed numbers or whole numbers.

9. $5 * \frac{3}{5} =$ ______ **10.** $2\frac{1}{3} * 1\frac{4}{5} =$ ______

11. $\frac{5}{6} * 2\frac{1}{2} =$ ______ **12.** $1\frac{1}{6} * 4\frac{2}{3} =$ ______

13. $3\frac{3}{4} * 2\frac{1}{8} =$ ______ **14.** $7\frac{1}{2} * 2\frac{2}{3} =$ ______

Practice

Solve mentally.

15. $8 * 3.5 =$ ______ **16.** $12 * 5.25 =$ ______ **17.** $4.2 * 15 =$ ______

Name Date Time

LESSON 4•7

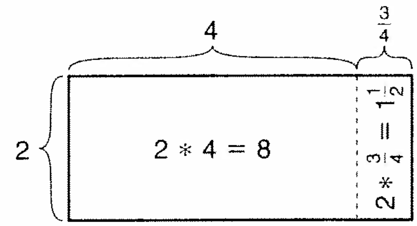
Modeling Multiplication

An area model can help you keep track of partial products.

The area of each smaller rectangle represents a partial product.

Example: $2 * 4\frac{3}{4}$

Find the area of each smaller rectangle.



$$2 * (4 + \frac{3}{4}) = (2 * 4) \quad + \quad (2 * \frac{3}{4})$$

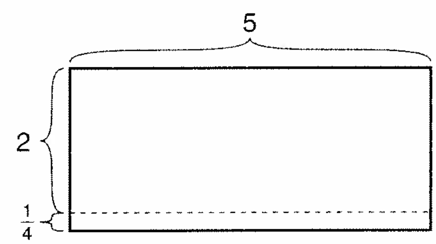
$$2 * 4 = \mathbf{8} \qquad 2 * \frac{3}{4} = \mathbf{1\frac{1}{2}}$$

Then add the two areas to find the area of the largest rectangle. $\mathbf{8} + \mathbf{1\frac{1}{2}} = \mathbf{9\frac{1}{2}}$

So, $2 * 4\frac{3}{4} = 9\frac{1}{2}$

Find the area of each smaller rectangle. Then add the areas.

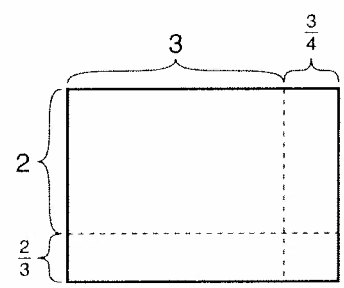
1. $2\frac{1}{4} * 5 = (2 + \frac{1}{4}) * 5$



$2 * 5 =$ ______ $\qquad \frac{1}{4} * 5 =$ ______

So, $2\frac{1}{4} * 5 =$ ______

2. $2\frac{2}{3} * 3\frac{3}{4} = (2 + \frac{2}{3}) * (3 + \frac{3}{4})$

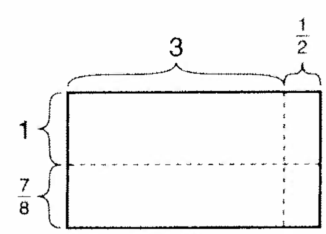


$2 * 3 =$ ______ $\qquad 2 * \frac{3}{4} =$ ______

$\frac{2}{3} * 3 =$ ______ $\qquad \frac{2}{3} * \frac{3}{4} =$ ______

So, $2\frac{2}{3} * 3\frac{3}{4} =$ ______

3. $1\frac{7}{8} * 3\frac{1}{2} = (1 + \frac{7}{8}) * (3 + \frac{1}{2})$



$1 * 3 =$ ______ $\qquad 1 * \frac{1}{2} =$ ______

$\frac{7}{8} * 3 =$ ______ $\qquad \frac{7}{8} * \frac{1}{2} =$ ______

So, $1\frac{7}{8} * 3\frac{1}{2} =$ ______

Name Date Time

LESSON 4•7

Buying an Aquarium

Robert wants to buy an aquarium for his bedroom.

Use the dimensions below to figure out whether Robert has enough floor space for a free-standing aquarium after his furniture is in the room. Ignore doors and windows and work with only total floor space. Robert will need enough space to walk around his furniture. Drawing a floor plan might help.

How much floor space is available after Robert places the furniture but before he buys the aquarium?

____

Does Robert have enough space for the aquarium?

____

	Length (ft)	Width (ft)	Area (ft^2)
Room	$9\frac{1}{2}$	$9\frac{3}{4}$	
Desk	$3\frac{1}{4}$	$2\frac{1}{2}$	
Bed	$6\frac{1}{4}$	$3\frac{3}{4}$	
Dresser	$3\frac{1}{4}$	$2\frac{1}{4}$	
Bookcase	$1\frac{1}{4}$	$3\frac{1}{2}$	
Aquarium	2	1	

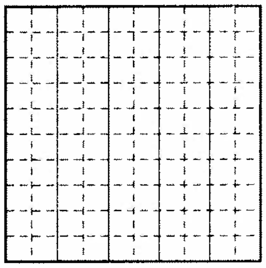
Name Date Time

STUDY LINK 4•8

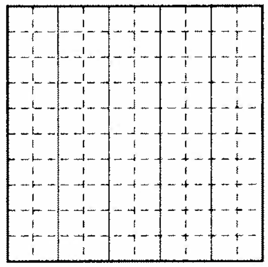
Fractions, Decimals, and Percents

Fill in the missing numbers below. Then shade each large square to represent all three of the equivalent numbers below it. Each large square is worth 1.

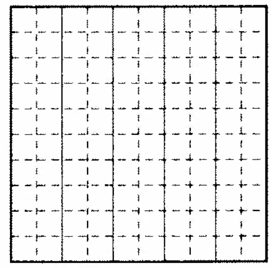
SRB 53 54 59 60

1. 

$\frac{4}{5} = \frac{\square}{10} =$ ____%

2. 

$\frac{6}{8} = \frac{\square}{100} =$ ____%

3. 

$30\% = \frac{\square}{100} = \frac{\square}{10}$

Rename the fractions as decimals.

4. $\frac{7}{14} =$ ______ **5.** $\frac{6}{8} =$ ______ **6.** $\frac{5}{20} =$ ______ **7.** $1\frac{4}{5} =$ ______

Rename the decimals as fractions in simplest form.

8. 0.4 = ______ **9.** 0.10 = ______ **10.** 0.68 = ______ **11.** 0.25 = ______

Rename the fractions as percents.

12. $\frac{25}{50} =$ ______ **13.** $\frac{6}{24} =$ ______ **14.** $\frac{18}{30} =$ ______ **15.** $\frac{19}{20} =$ ______

Rename the percents as fractions in simplest form.

16. $50\% = \frac{\square}{100} =$ ______ **17.** $40\% = \frac{\square}{100} =$ ______

18. $100\% = \frac{\square}{100} =$ ______ **19.** $180\% = \frac{\square}{100} =$ ______

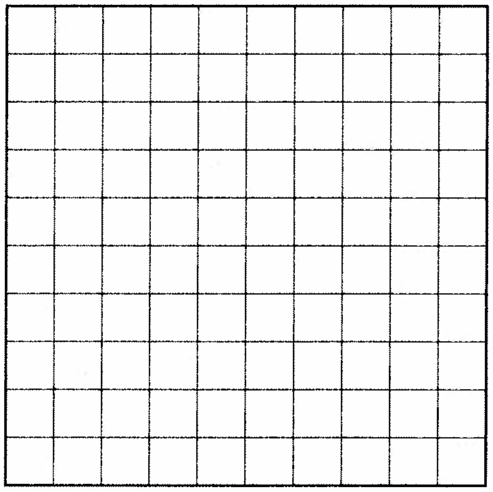
Experiment

People often don't realize that fractions, decimals, and percents are numbers. To them, numbers are whole numbers like 1, 5, or 100. Try the following experiment: Ask several adults to name four numbers between 1 and 10. Then ask several children. Keep a record of all responses on the back of this page. How many named fractions, decimals, or percents? Now ask the same people to name four numbers between 1 and 3. Report your findings.

Name Date Time

LESSON 4·8

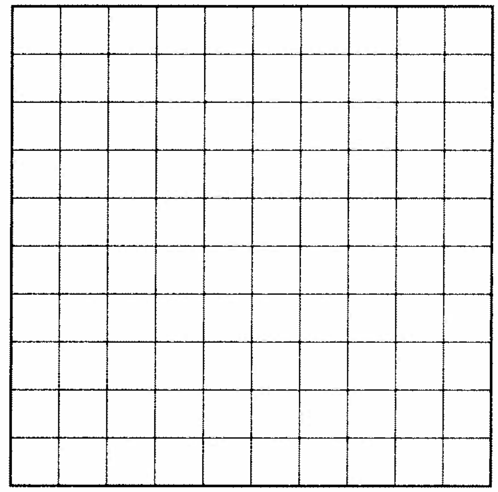
Renaming Fractions



Fraction: $\frac{\square}{100}$

Decimal: ________

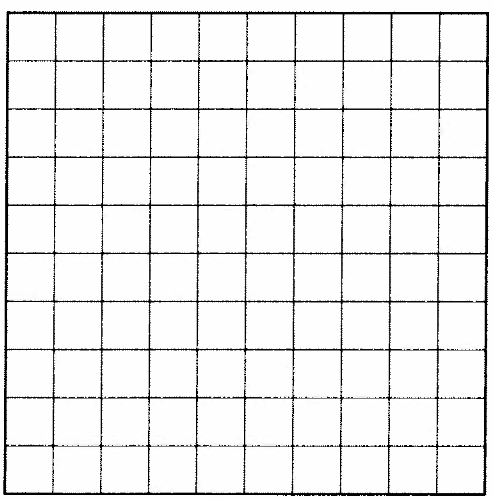
Percent: ________%



Fraction: $\frac{\square}{100}$

Decimal: ________

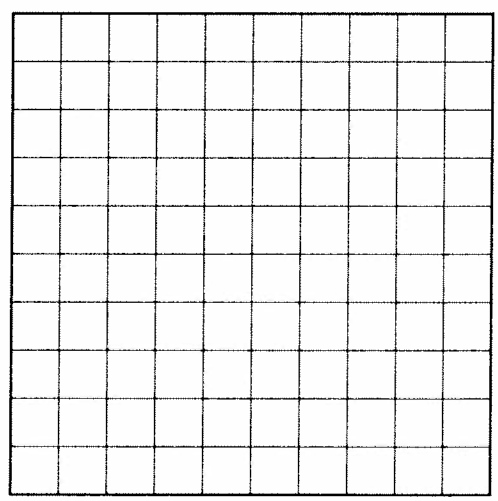
Percent: ________%



Fraction: $\frac{\square}{100}$

Decimal: ________

Percent: ________%



Fraction: $\frac{\square}{100}$

Decimal: ________

Percent: ________%

Name ______________________ Date ______________ Time ______________

STUDY LINK 4·9

Decimals, Percents, and Fractions

SRB 59 60

Rename each decimal as a percent.

1. 0.65 = ________ **2.** 0.334 = ________ **3.** 0.02 = ________

4. 0.4 = ________ **5.** 2.7 = ________ **6.** 3.09 = ________

Rename each percent as a decimal.

7. 27% = ________ **8.** 53.9% = ________ **9.** 8% = ________

10. 60% = ________ **11.** 180% = ________ **12.** 115% = ________

Use division to rename each fraction as a decimal to the nearest hundredth.
Then rename the decimal as a percent.

13. $\frac{7}{8}$ = 0.________ = ________% **14.** $\frac{5}{12}$ = 0.________ = ________%

Name _______________ Date _______________ Time _______________

LESSON 4·9

Fractions, Decimals, and Percents

Write each fraction or decimal as a percent.

1. $\frac{11}{50}$ = ________ **2.** $\frac{3}{5}$ = ________ **3.** $\frac{7}{8}$ = ________

4. 0.45 = ________ **5.** 0.745 = ________ **6.** 0.0925 = ________

Write each percent as a decimal.

7. 65% = ________ **8.** 4% = ________ **9.** 9.2% = ________

10. $15\frac{1}{2}$% = ________ **11.** 20% = ________ **12.** 2% = ________

13. Enter your results from Problems 11 and 12 on the appropriate lines below. Then complete the pattern.

200%	20%	2%	0.2%	0.02%	0.002%
________	________	________	________	________	________

Percents Greater Than and Less Than 1%

You can apply the meaning of *percent* and a power-of-10 strategy to rename percents greater than or less than 1 percent as equivalent decimals.

Example:	**Example:**
Write 125% as a decimal.	Write 0.15% as a decimal.
125% means 125 *per hundred.*	0.15% means 0.15 *per hundred.*
or $\frac{125}{100}$	or $\frac{0.15}{100}$
= 125 ÷ 100	= 0.15 ÷ 100
= 1.25.	= 0.00.15

Write each percent as a decimal.

14. 375% = ________ **15.** 278% = ________ **16.** $400\frac{1}{2}$% = ________

17. 0.165% = ________ **18.** 0.03% = ________ **19.** 0.005% = ________

Name Date Time

LESSON 4•10

Math Message

1. Find the equivalent decimal and percent for each of the fractions in the table below. Use a mental math and/or paper-and-pencil strategy to complete the table.

Fraction	Decimal	Percent
$\frac{1}{10}$		
$\frac{1}{4}$		
$\frac{13}{25}$		
$\frac{6}{30}$		
$\frac{51}{75}$		

2. There were 90 questions on the math final exam. Max correctly answered 72 questions. What percent of the questions did he answer correctly? ________

Name Date Time

LESSON 4•10

Math Message

1. Find the equivalent decimal and percent for each of the fractions in the table below. Use a mental math and/or paper-and-pencil strategy to complete the table.

Fraction	Decimal	Percent
$\frac{1}{10}$		
$\frac{1}{4}$		
$\frac{13}{25}$		
$\frac{6}{30}$		
$\frac{51}{75}$		

2. There were 90 questions on the math final exam. Max correctly answered 72 questions. What percent of the questions did he answer correctly? ________

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Name Date Time

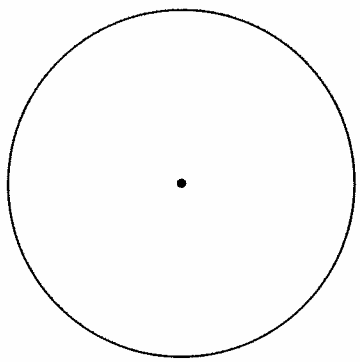
STUDY LINK 4·10

Circle Graphs

Use estimation to make a circle graph displaying the data in each problem. (*Hint:* For each percent, think of a simple fraction that is close to the value of the percent. Then estimate the size of the sector for each percent.) Remember to graph the smallest sector first.

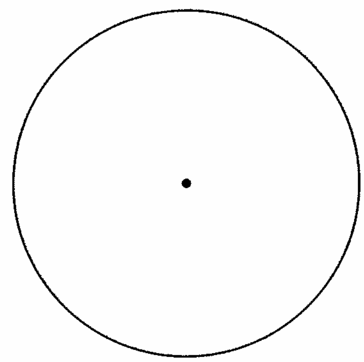
1. According to the 2000 Census, 21.2% of the U.S. population was under the age of 15, 12.6% was age 65 or older, and 66.2% was between the ages of 15 and 64.

Age of U.S. Population



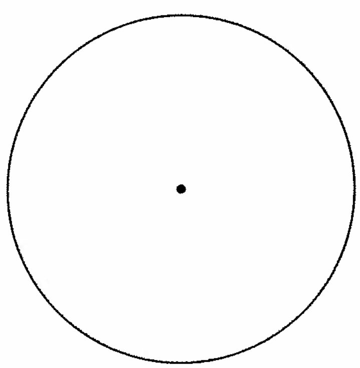
2. In 2004, NASA's total budget was $15.4 billion. 51% was spent on Science, Aeronautics, and Exploration. 48.8% was spent on Space Flight Capabilities, and 0.2% was spent on the Inspector General.

NASA Budget



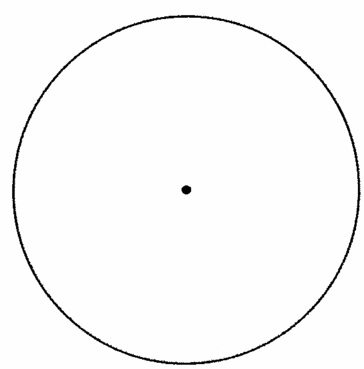
3. 98.3% of households in the United States have at least one television.

Households with TV



4. The projected school enrollment for the United States in 2009 is 72 million students. 23.2% will be in college, 22.9% will be in high school, and 53.9% will be in Grades Pre-K–8.

U.S. School Enrollment



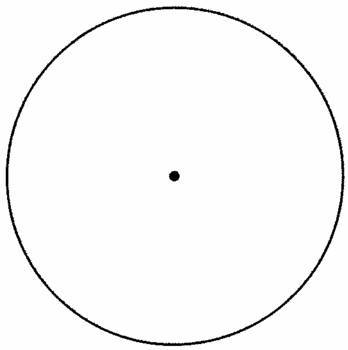
Name Date Time

LESSON 4·10

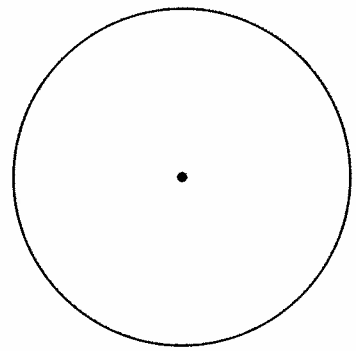
Estimating and Measuring Sector Size

Shade the circles below to represent your estimate of the given percent or fraction. Then check your estimates using the Percent Circle on the Geometry Template.

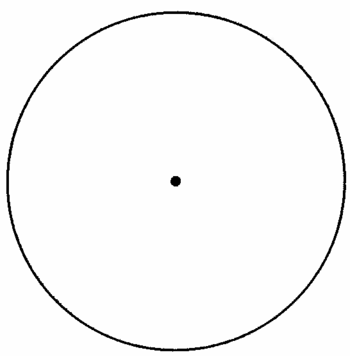
55%



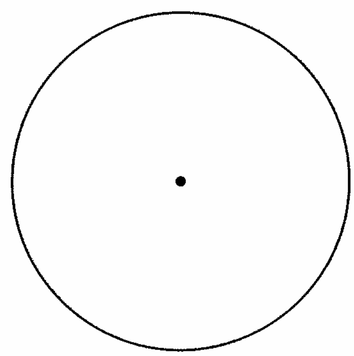
22%



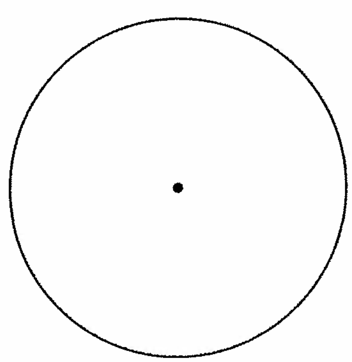
$\frac{2}{3}$



$\frac{1}{6}$



Starting with the smallest sector, use the Percent Circle to create a circle graph that shows 10% blue, 4% red, 60% green, and 26% yellow. Label each sector with the percent it represents.



Name Date Time

STUDY LINK 4•11

Percent Problems

SRB 49 50

The results of a survey about children's weekly allowances are shown at the right.

Amount of Allowance	Percent of Children
$0	30%
$1–$4	20%
$5	25%
$6 or more	25%

1. Lincoln School has about 500 students. Use the survey results to complete this table.

Amount of Allowance	Predicted Number of Students at Lincoln
$0	
$1–$4	
$5	
$6 or more	

2. The sixth grade at Lincoln has about 60 students. Use the survey results to complete this table.

Amount of Allowance	Predicted Number of Sixth-Grade Students at Lincoln
$0	
$1–$4	
$5	
$6 or more	

A rule of thumb for changing a number of meters to yards is to add the number of meters to 10% of the number of meters.

Examples: 5 m is about 5 + (10% of 5), or 5.5, yd.
10 m is about 10 + (10% of 10), or 11, yd.

3. Use this rule of thumb to estimate how many yards are in the following numbers of meters.

a. 3 m is about 3 + (10% of 3), or ________, yd.

b. 8 m is about 8 + (10% of 8), or ________, yd.

c. 20 m is about 20 + (10% of 20), or ________, yd.

Name Date Time

LESSON 4•11

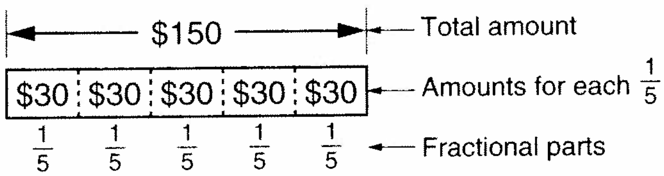
Modeling Fractional Parts of a Number

SRB 87

You can use a diagram to model fractional parts of a number.

Example: Find $\frac{4}{5}$ of \$150.

First, think about \$150 being divided equally among 5 people.



One Way

$\frac{1}{5}$ of \$150 = \$30

$\frac{4}{5}$ of \$150

= 4 ∗ ($\frac{1}{5}$ of \$150)

= 4 ∗ \$30 = \$120

$\frac{4}{5}$ of \$150 = \$120

Another Way

$\frac{5}{5}$ of \$150 = \$150

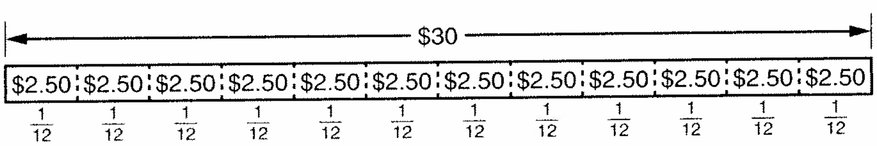
$\frac{1}{5}$ of \$150 = \$30

$\frac{5}{5} - \frac{1}{5} = \frac{4}{5}$

\$150 − \$30 = \$120

---

1. Use the diagram to find the amounts.

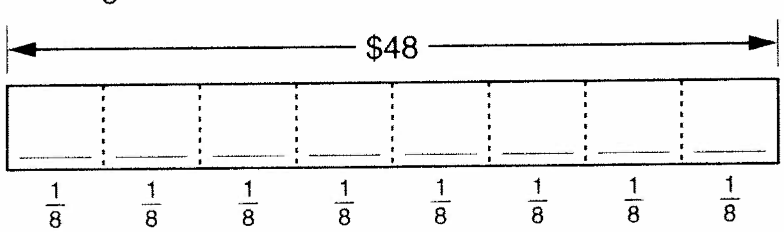


$\frac{3}{12}$ of \$30 = ______ $\frac{9}{12}$ of \$30 = ______ $\frac{1}{3}$ of \$30 = ______

$\frac{2}{3}$ of \$30 = ______ $\frac{1}{6}$ of \$30 = ______ $\frac{5}{12}$ of \$30 = ______

$\frac{7}{12}$ of \$30 = ______ $\frac{1}{4}$ of \$30 = ______ $\frac{5}{6}$ of \$30 = ______

2. Complete the diagram below. Then find the amounts.



$\frac{1}{8}$ of \$48 = ______ $\frac{7}{8}$ of \$48 = ______ $\frac{3}{8}$ of \$48 = ______

$\frac{1}{4}$ of \$48 = ______ $\frac{1}{2}$ of \$48 = ______ $\frac{3}{4}$ of \$48 = ______

Name Date Time

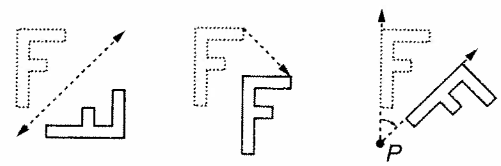
STUDY LINK 4•12

Unit 5: Family Letter

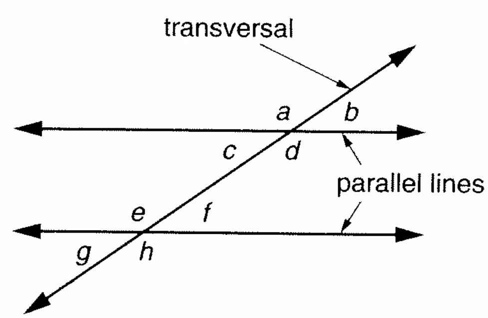
Geometry: Congruence, Constructions, and Parallel Lines

In *Fourth* and *Fifth Grade Everyday Mathematics,* students used a compass and straightedge to construct basic shapes and create geometric designs. In Unit 5 of *Sixth Grade Everyday Mathematics,* students will review some basic construction techniques and then devise their own methods for copying triangles and quadrilaterals and for constructing parallelograms. The term *congruent* will be applied to their copies of line segments, angles, and 2-dimensional figures. Two figures are congruent if they have the *same size* and the *same shape.*

Another approach to congruent figures in Unit 5 is through isometry transformations. These are rigid motions that take a figure from one place to another while preserving its size and shape. Reflections (flips), translations (slides), and rotations (turns) are basic isometry transformations (also known as rigid motions). A figure produced by an isometry transformation (the image) is congruent to the original figure (the preimage).



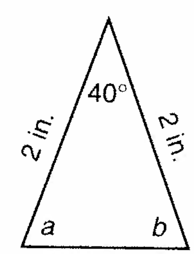
Students will continue to work with the Geometry Template, a tool that was introduced in *Fifth Grade Everyday Mathematics.* The Geometry Template contains protractors and rulers for measuring and cutouts for drawing geometric figures. Students will review how to measure and draw angles using the full-circle and half-circle protractors.



If the measure of any one angle is given, the measures of all the others can be found without measuring.

Students will also use a protractor to construct circle graphs that represent data collections. This involves converting the data to percents of a total, finding the corresponding degree measures around a circle, and drawing sectors of the appropriate size.

Measures often can be determined without use of a measuring tool. Students will apply properties of angles and sums of angles to find unknown measures in figures similar to those at the right.



The sum of the angles in a triangle is 180°. Angles *a* and *b* have the same measure, 70°.

One lesson in Unit 5 is a review and extension of work with the coordinate grid. Students will plot and name points on a 4-quadrant coordinate grid and use the grid for further study of geometric shapes.

Please keep this Family Letter for reference as your child works through Unit 5.

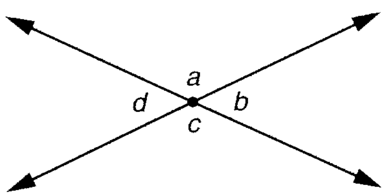
Math Tools

Your child will use a compass and a straightedge to construct geometric figures. A compass is used to draw a circle, or part of a circle, called an arc. A straightedge is used only to draw straight lines, not for measuring. The primary difference between a compass-and-straightedge construction and a drawing or sketch of a geometric figure is that measuring is not allowed in constructions.

Vocabulary

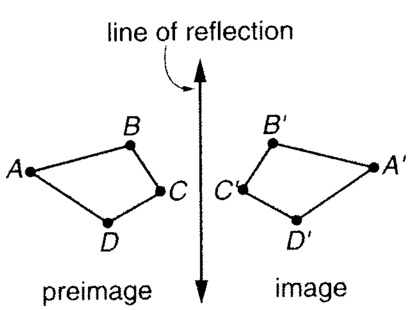
Important terms in Unit 5:

adjacent angles Two angles with a common side and vertex that do not otherwise overlap. In the diagram, angles *a* and *b* are adjacent angles. So are angles *b* and *c*, *d* and *a*, and *c* and *d*.



congruent Figures that have exactly the same size and shape are said to be congruent to each other. The symbol ≅ means "is congruent to."

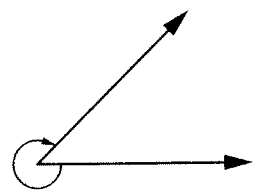
line of reflection (mirror line) A line halfway between a figure (preimage) and its reflected image. In a reflection, a figure is flipped over the line of reflection.



ordered pair Two numbers, or coordinates, used to locate a point on a rectangular coordinate grid. The first coordinate *x* gives the position along the horizontal axis of the grid, and the second coordinate *y* gives the position along the vertical axis. The pair is written (x,y).

reflection (flip) The flipping of a figure over a line (line of reflection) so its image is the mirror image of the original (preimage).

reflex angle An angle measuring between 180° and 360°.



rotation (turn) A movement of a figure around a fixed point or an axis; a turn.

supplementary angles Two angles whose measures add to 180°. Supplementary angles do not need to be adjacent.

translation (slide) A transformation in which every point in the image of a figure is at the same distance in the same direction from its corresponding point in the figure. Informally called a slide.

vertical (opposite) angles The angles made by intersecting lines that do not share a common side. Same as opposite angles. Vertical angles have equal measures. In the diagram, angles 1 and 3 are vertical angles. They have no sides in common. Similarly, angles 4 and 2 are vertical angles.