

**Chapter**  
**5**
**Fair Game Review**

Using the numbers from the table, find and state the rule in words.

1.

$x$	$y$
1	4
2	5
3	6
4	7

2.

$x$	$y$
2	6
4	12
6	18
8	24

3.

$x$	$y$
12	2
24	14
36	26
48	38

4.

$x$	$y$
4	2
5	$\frac{5}{2}$
6	3
7	$\frac{7}{2}$

5. The table shows the results of buying pretzels from a vending machine. The  $x$  column is the amount you put into the machine. The  $y$  column is the change you receive back from the machine. Complete the table and state the rule in words.

$x$	$y$
0.65	0
0.70	0.05
0.75	0.10
1.00	

**Chapter  
5****Fair Game Review** (continued)

Evaluate the expression.

6.  $\frac{5}{9} \cdot \frac{1}{3}$

7.  $\frac{8}{15} \cdot \frac{3}{4}$

8.  $\frac{1}{8} \cdot \frac{1}{9}$

9.  $\frac{2}{3} \div \frac{9}{10}$

10.  $\frac{7}{8} \div \frac{11}{16}$

11.  $\frac{3}{10} \div \frac{2}{5}$

12. You have 8 cups of flour. A recipe calls for  $\frac{2}{3}$  cup of flour. Another recipe calls for  $\frac{1}{4}$  cup of flour. How much flour do you have left after making the recipes?

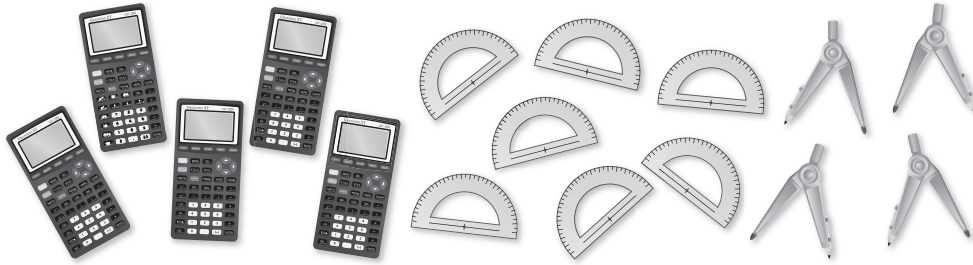
**5.1****Ratios**

For use with Activity 5.1

**Essential Question** How can you represent a relationship between two quantities?

**1 ACTIVITY:** Comparing Quantities

**Work with a partner.** Use the collection of objects to complete each statement.



There are \_\_\_\_\_ graphing calculators to \_\_\_\_\_ protractors.

There are \_\_\_\_\_ protractors to \_\_\_\_\_ graphing calculators.

There are \_\_\_\_\_ compasses to \_\_\_\_\_ protractors.

There are \_\_\_\_\_ graphing calculators to \_\_\_\_\_ compasses.

There are \_\_\_\_\_ protractors to \_\_\_\_\_ total objects.

The number of graphing calculators is \_\_\_\_\_ of the total number of objects.

**2 ACTIVITY:** Playing Garbage Basketball

**Work with a partner.**


- **Take turns shooting a ball or other object into a wastebasket from a reasonable distance.**
- **Organize the numbers of shots you made and shots you missed in a chart.**


**5.1 Ratios (continued)**

- a. Write a statement similar to those in Activity 1 that describes the relationship between the number of shots you made and the number of shots you missed.
  
- b. Write a statement similar to those in Activity 1 that describes the relationship between the number of shots you made and the total number of shots.
  
- c. What fraction of your shots did you make? What fraction did you miss?


**3 ACTIVITY: Reading a Diagram**


Work with a partner. You mix different amounts of paint to create new colors. Write a statement that describes the relationship between the amounts of paint shown in each diagram.

a. Blue 


Green 


There are \_\_\_\_\_ parts blue for every \_\_\_\_\_ parts green.

b. Orange 

Yellow 

There are \_\_\_\_\_ for every \_\_\_\_\_.


c. Red 


Blue 

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

d. White 

Purple 

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**5.1 Ratios (continued)****4 ACTIVITY: Describing Relationships**

**Work with a partner. Use a table or a diagram to represent the relationship between the two quantities.**

- a. For every 3 boys standing in a line, there are 4 girls.
  
  
  
  
  
  
  
  
  
  
- b. For each vote Brian received, Sasha received 6 votes.
  
  
  
  
  
  
  
  
  
  
- c. A class counts the number of vehicles that pass by its school from 1:00 to 2:00 P.M. There are 3 times as many cars as trucks.
  
  
  
  
  
  
  
  
  
  
- d. A hand sanitizer contains 5 parts aloe for every 2 parts distilled water.

**What Is Your Answer?**

5. **IN YOUR OWN WORDS** How can you represent a relationship between two quantities? Give examples to support your explanation.
  
  
  
  
  
  
  
  
  
  
6. **MODELING** You make 48 pints of pink paint by using 5 pints of red paint for every 3 pints of white paint. Use a diagram to find the number of pints of red paint and white paint in your mixture. Explain.

**5.1**

**Practice**  
For use after Lesson 5.1

Write the ratio. Explain what the ratio means.

1. forks to spoons



2. toothbrushes : toothpaste



Use the table to write the ratio. Explain what the ratio means.

Marble	Number
Blue	8
Red	4
Purple	6

3. red to purple

4. blue to red

5. purple : marbles

6. marbles : blue

7. There are 22 events at an indoor track and field meet. The ratio of track events to field events is 8 : 3. How many of the events are track events?

**5.2**

**Ratio Tables**  
For use with Activity 5.2

**Essential Question** How can you find two ratios that describe the same relationship?

**1 ACTIVITY:** Making a Mixture

**Work with a partner. A mixture calls for 1 cup of lemonade and 3 cups of iced tea.**

- a. How many total cups does the mixture contain? \_\_\_\_\_ cups  
For every \_\_\_\_\_ cup of lemonade, there are \_\_\_\_\_ cups of iced tea.
- b. How do you make a larger batch of this mixture? Describe your procedure and use the table below to organize your results. Add more columns to the table if needed.

<b>Cups of Lemonade</b>						
<b>Cups of Iced Tea</b>						
<b>Total Cups</b>						

- c. Which operations did you use to complete your table? Do you think there is more than one way to complete the table? Explain.
- d. How many total cups are in your final mixture? How many of those cups are lemonade? How many are iced tea? Compare your results with those of other groups in your class.

**5.2 Ratio Tables (continued)**

- e. Suppose you take a sip from every group's final mixture. Do you think all the mixtures should taste the same? Do you think the color of all the mixtures should be the same? Explain your reasoning.
- f. Why do you think it is useful to use a table when organizing your results in this activity? Explain.

**2 ACTIVITY: Using a Multiplication Table**

Work with a partner. Use the information in Activity 1 and the multiplication table below.

	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>	<b>11</b>	<b>12</b>
<b>1</b>	1	2	3	4	5	6	7	8	9	10	11	12
<b>2</b>	2	4	6	8	10	12	14	16	18	20	22	24
<b>3</b>	3	6	9	12	15	18	21	24	27	30	33	36
<b>4</b>	4	8	12	16	20	24	28	32	36	40	44	48

- a. A mixture contains 8 cups of lemonade. How many cups of iced tea are in the mixture?
- b. A mixture contains 21 cups of iced tea. How many cups of lemonade are in the mixture?
- c. A mixture has a total of 40 cups. How many cups are lemonade? How many cups are iced tea?
- d. Explain how a multiplication table may have helped you in Activity 1.



**5.2 Ratio Tables (continued)****3 ACTIVITY:** Using More than One Ratio to Describe a Quantity

Work with a partner.

- a. Find the ratio of pitchers of lemonade to pitchers of iced tea.



- b. How can you divide the pitchers into equal groups? Is there more than one way? Use your results to describe the entire collection of pitchers.
- c. Three more pitchers of lemonade are added. Is there more than one way to divide the pitchers into equal groups? Explain.
- d. The number of pitchers of lemonade and iced tea are doubled. Can you use the ratio in part (b) to describe the entire collection of pitchers? Explain.

**What Is Your Answer?**

4. **IN YOUR OWN WORDS** How can you find two ratios that describe the same relationship? Give examples to support your explanation.

**5.2****Practice**

For use after Lesson 5.2

Find the missing value(s) in the ratio table. Then write the equivalent ratios.

1. 

<b>Kids</b>	3	
<b>Adults</b>	1	3

2. 

<b>Basketballs</b>	5	
<b>Footballs</b>	10	20

3. 

<b>Apples</b>	4	16
<b>Oranges</b>	5	

4. 

<b>CDs</b>		30
<b>DVDs</b>	9	27

5. 

<b>Regular</b>	2		32
<b>Decaf</b>	3	12	

6. 

<b>Scooters</b>	1	5	
<b>Bikes</b>		15	75

7. You read 1 chapter every hour. You read for 3 hours after school. How many chapters did you read?

# 5.3

## Rates

For use with Activity 5.3

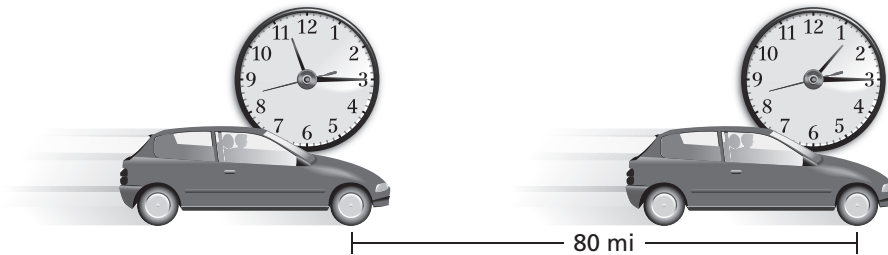
**Essential Question** How can you use rates to describe changes in real-life problems?

**1 ACTIVITY:** Stories Without Words

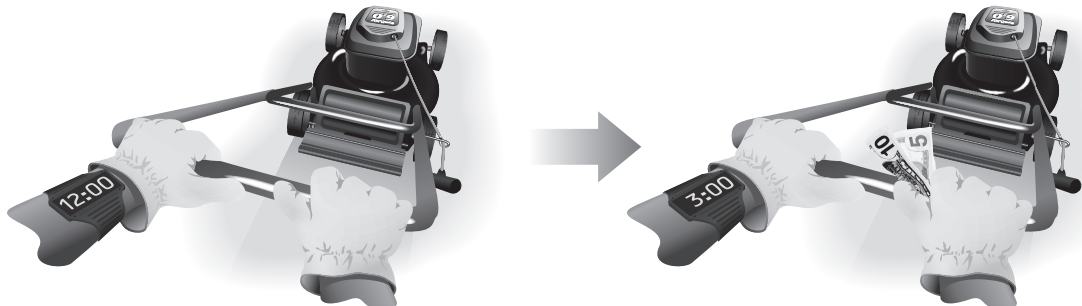
Work with a partner. Each diagram shows a story problem.

- Describe the story problem in your own words.
- Write the rate indicated by the diagram. What are the units?

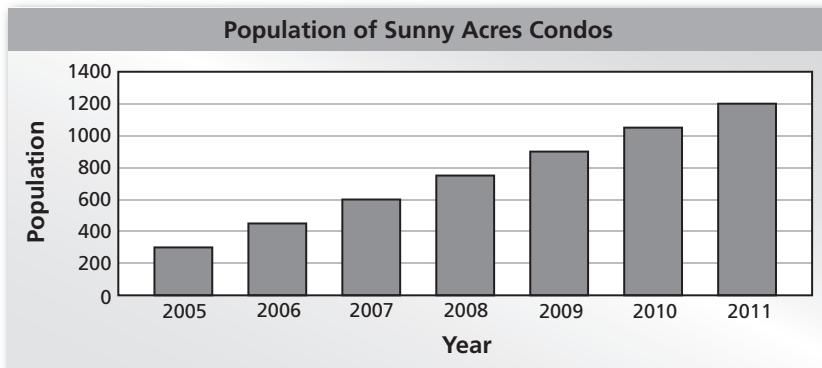
a.



b.

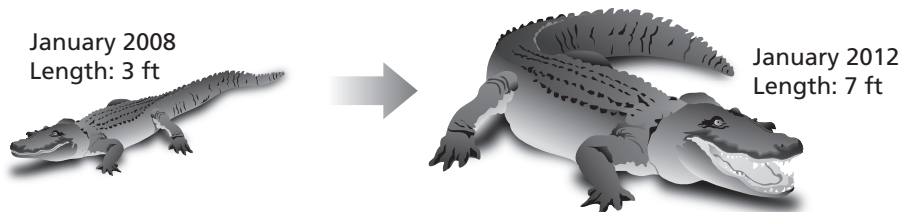


c.



**5.3 Rates (continued)**

d.



**2 ACTIVITY: Finding Equivalent Rates**

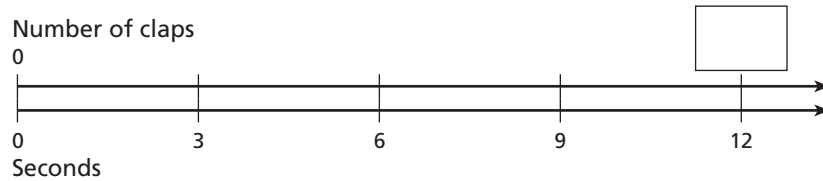
Work with a partner. Use the diagrams in Activity 1. Explain how you found each answer.

- a. How many miles does the car travel in 1 hour?
  
  
  
  
  
  
  
- b. How much money does the person earn every hour?
  
  
  
  
  
  
  
- c. How much does the population of Sunny Acres Condos increase each year?
  
  
  
  
  
  
  
- d. How many feet does the alligator grow per year?

**5.3 Rates (continued)****3 ACTIVITY:** Using a Double Number Line

**Work with a partner. Count the number of times you can clap your hands in 12 seconds. Have your partner keep track of the time and record your results.**

- a. Use the results to complete the double number line.



- b. Explain how to use the double number line to find the number of times you clap your hands in 6 seconds and in 4 seconds.
- c. Find the number of times you can clap your hands in 1 minute. Explain how you found your answer.
- d. How can you find the number of times you can clap your hands in 2 minutes? 3 minutes? Explain.

**What Is Your Answer?**

4. **IN YOUR OWN WORDS** How can you use rates to describe changes in real-life problems? Give examples to support your explanation.
5. **MODELING** Use a double number line to model each story in Activity 1. Show how to use the double number line to answer each question in Activity 2. Why is a double number line a good problem-solving tool for these types of problems?

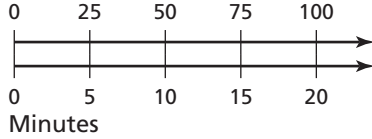
# 5.3

## Practice

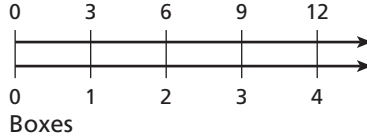
For use after Lesson 5.3

Write a rate that represents the situation.

1. Calories



2. Dollars



Write a unit rate for the situation.

3. 9 strikes in 3 innings

4. 117 points in 13 minutes

Decide whether the rates are equivalent.

5. 30 beats per 20 seconds,  
90 beats per 60 seconds

6. 15 pages in 20 minutes,  
10 pages in 15 minutes

7. One of the valves on the Hoover Dam releases 40,000 gallons of water per second. What is the rate in gallons per minute?

**5.4****Comparing and Graphing Ratios**

For use with Activity 5.4

**Essential Question** How can you compare two ratios?**1 ACTIVITY:** Comparing Ratio Tables

Work with a partner.

- You make colored frosting by adding 3 drops of red food coloring for every 1 drop of blue food coloring.
  - Your teacher makes colored frosting by adding 5 drops of red food coloring for every 3 drops of blue food coloring.
- a. Complete the ratio table for each frosting mixture.

Your Frosting	
Drops of Blue	Drops of Red
1	
2	
3	
4	
5	

Your Teacher's Frosting	
Drops of Blue	Drops of Red
3	
6	
9	
12	
15	

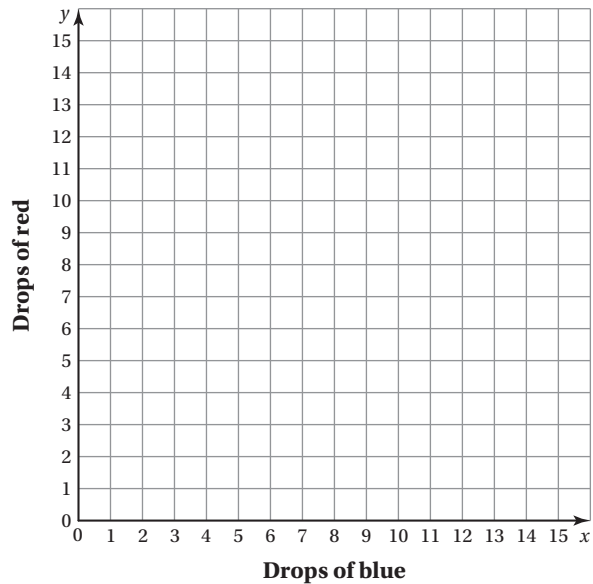
- b. Whose frosting is bluer? Whose frosting is redder? Justify your answers.
- c. **STRUCTURE** Insert and complete a new column for each ratio table above that shows the total number of drops. How can you use this column to answer part (b)?

**5.4 Comparing and Graphing Ratios (continued)**

**2 ACTIVITY: Graphing from a Ratio Table**

Work with a partner.

- a. Explain how you can use the values from the ratio table for your frosting to create a graph in the coordinate plane.
  
- b. Use the values in the table to plot the points. Then connect the points and describe the graph. What do you notice?



- c. What does the line represent?

**3 ACTIVITY: Comparing Graphs From Ratio Tables**

Work with a partner. The graph on the next page shows the values from the ratio table for your teacher’s frosting.

- a. Complete the table and the graph on the next page.
  
- b. Explain the relationship between the entries in the ratio table and the points on the graph.

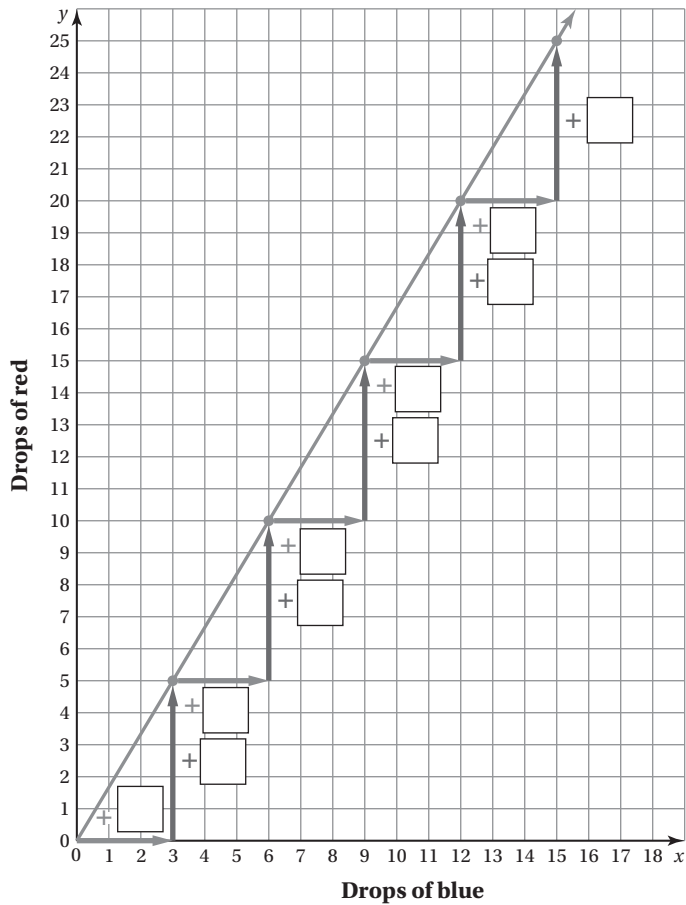
Your Teacher’s Frosting	
Drops of Blue	Drops of Red
3	
6	
9	
12	
15	



**5.4 Comparing and Graphing Ratios (continued)**

c. How is this graph similar to the graph in Activity 2? How is it different?

d. How can you use the graphs to determine whose frosting has more red or blue in it? Explain.



**What Is Your Answer?**

4. **IN YOUR OWN WORDS** How can you compare two ratios?

5. **PRECISION** Your teacher’s frosting mixture has 7 drops of blue in it. How can you use the graph to find how many drops of red are needed to make the frosting? Is your answer exact? Explain.

**5.4****Practice**

For use after Lesson 5.4

Determine which is the better buy.

1.

Iced Tea	A	B
Cost (dollars)	3	4
Refills	2	3

2.

Lunch Meat	A	B
Cost (dollars)	10	6
Pounds	2	1

3.

Movie Rental	A	B
Cost (dollars)	12	11
Rentals	4	3

4.

Buns	A	B
Cost (dollars)	6	5
Packages	3	2

5.

CDs	A	B
Cost (dollars)	60	72
CDs	6	8

6.

Flash Drive	A	B
Cost (dollars)	18	35
Flash Drives	3	5

7. You are making cookies. One recipe calls for 4 cups of chocolate morsels for 3 batches of cookies. A second recipe calls for 5 cups of chocolate morsels for 4 batches of cookies. Which cookies will contain more chocolate morsels?

**5.5**

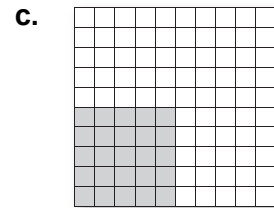
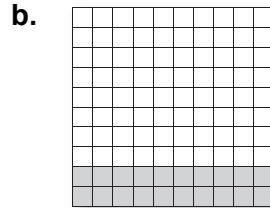
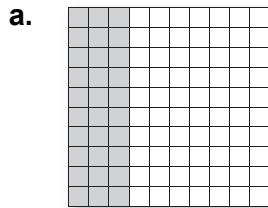
**Percents**  
For use with Activity 5.5

**Essential Question** What is the connection between ratios, fractions, and percents?

**1 ACTIVITY: Writing Ratios**

Work with a partner.

- Write the fraction of the squares that are shaded.
- Write the ratio of the number of shaded squares to the total number of squares.
- How are the ratios and the fraction related?
- When can you write ratios as fractions?



**2 ACTIVITY: Writing Percents as Fractions**

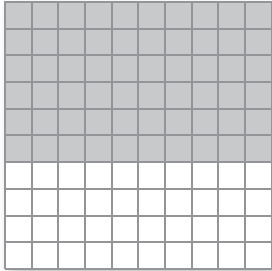
Work with a partner.

- What percent of each diagram in Activity 1 is shaded?

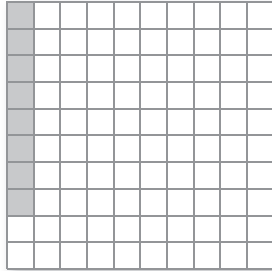
**5.5** Percents (continued)

- What percent of each diagram below is shaded? Write each percent as a fraction in simplest form.

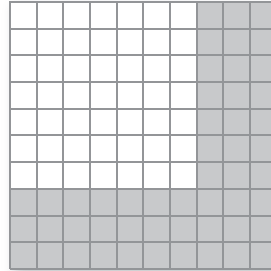
a.



b.



c.



**3** **ACTIVITY:** Writing Fractions as Percents

Work with a partner. Draw a model to represent the fraction. How can you write the fraction as a percent?

a.  $\frac{2}{5}$

b.  $\frac{7}{10}$

c.  $\frac{3}{5}$

**5.5 Percents (continued)**

d.  $\frac{3}{4}$

e.  $\frac{3}{25}$

**What Is Your Answer?**

4. **IN YOUR OWN WORDS** What is the connection between ratios, fractions, and percents? Give an example with your answer.

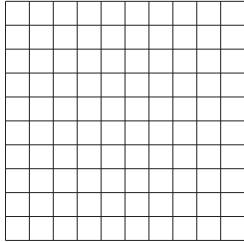
5. **REASONING** Your score on a test is 110%. What does this mean?

**5.5****Practice**

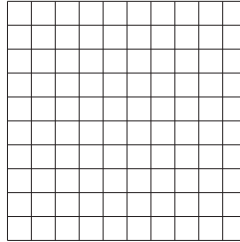
For use after Lesson 5.5

Use a 10-by-10 grid to model the percent.

1. 43%



2. 89%



Write the percent as a fraction or mixed number in simplest form.

3. 55%

4. 140%

5. 12.5%

6. 0.6%

Write the fraction or mixed number as a percent.

7.  $\frac{3}{4}$

8.  $\frac{23}{40}$

9.  $\frac{53}{200}$

10.  $8\frac{9}{25}$

11. You answered 85% of the questions on the quiz correctly. What fraction of the questions did you answer correctly?

**5.6**

**Solving Percent Problems**

For use with Activity 5.6

**Essential Question** How can you use mental math to find the percent of a number?



"I have a secret way for finding 21% of 80."



"10% is 8, and 1% is 0.8."



"So, 21% is  $8 + 8 + 0.8 = 16.8$ ."

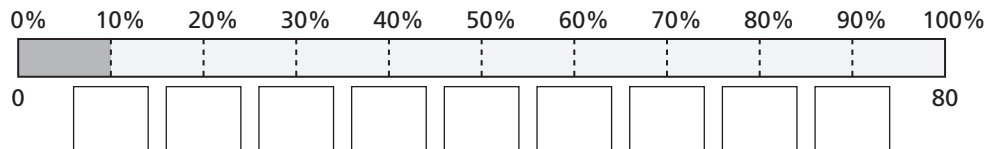
**1 ACTIVITY:** Finding 10% of a Number

Work with a partner.

- a. How did Newton know that 10% of 80 is 8?

Write 10% as a fraction.

**Method 1:** Use a model.



**Method 2:** Use multiplication.

- b. How do you move the decimal point to find 10% of a number?

**5.6 Solving Percent Problems (continued)**

**2 ACTIVITY:** Finding 1% of a Number

Work with a partner.

- a. How did Newton know that 1% of 80 is 0.8?
  
  
  
  
  
  
  
  
  
  
- b. How do you move the decimal point to find 1% of a number?

**3 ACTIVITY:** Using Mental Math

Work with a partner. Use mental math to find each percent of a number.

- a. 12% of 40
- b. 19% of 50

**4 ACTIVITY:** Using Mental Math

Work with a partner. Use mental math to find each percent of a number.

- a. 20% tip for a \$30 meal
- b. 18% tip for a \$30 meal
  
  
  
  
  
  
  
  
  
  
- c. 6% sales tax on a \$20 shirt
- d. 9% sales tax on a \$20 shirt



**5.6 Solving Percent Problems (continued)**

- e. 6% service charge for a \$200 boxing ticket
- f. 2% delivery fee for a \$200 boxing ticket
- g. 21% bonus on a total of 40,000 points
- h. 38% bonus on a total of 80,000 points

**What Is Your Answer?**

5. **IN YOUR OWN WORDS** How can you use mental math to find the percent of a number?
6. Describe two real-life examples of finding a percent of a number.
7. How can you use 10% of a number to find 20% of the number? 30%? Explain your reasoning.

**5.6****Practice**

For use after Lesson 5.6

Find the percent of the number.

1. 30% of 50                      2. 12% of 85                      3. 2% of 96

4. 150% of 66                      5. 7% of 120                      6. 3% of 15

Complete the statement using  $<$ ,  $>$ , or  $=$ .

7. 70% of 80 \_\_\_\_\_ 80% of 70                      8. 92% of 30 \_\_\_\_\_ 48% of 75

9. You make homemade lip balm. About 11% of the lip balm is made from beeswax. You make  $4\frac{2}{5}$  teaspoons of the lip balm. About how many teaspoons of beeswax do you need? Round your answer to the nearest tenth.

**5.7****Converting Measures**

For use with Activity 5.7

**Essential Question** How can you compare lengths between the customary and metric systems?

**1 ACTIVITY:** Customary Measure History

**Work with a partner.**

- a. Match the measure of length with its historical beginning.

<i>Length</i>	<i>Historical Beginning</i>
Inch	The length of a human foot
Foot	The width of a human thumb
Yard	The distance a human can walk in 1000 paces (1 pace = 2 steps)
Mile	The distance from a human nose to the end of an outstretched human arm

- b. Use a ruler to measure your thumb, arm, and foot. How do your measurements compare to your answers from part (a)? Are they close to the historical measures?

You already know how to convert measures within the customary and metric systems.

**Equivalent Customary Lengths**

$$1 \text{ ft} = 12 \text{ in.} \qquad 1 \text{ yd} = 3 \text{ ft} \qquad 1 \text{ mi} = 5280 \text{ ft}$$

**Equivalent Metric Lengths**

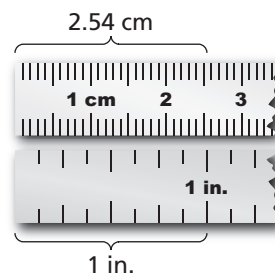
$$1 \text{ m} = 1000 \text{ mm} \qquad 1 \text{ m} = 100 \text{ cm} \qquad 1 \text{ km} = 1000 \text{ m}$$

You will learn how to convert between the two systems.

**Converting Between Systems**

$$1 \text{ in.} = 2.54 \text{ cm}$$

$$1 \text{ mi} \approx 1.61 \text{ km}$$



**5.7** Converting Measures (continued)**2** **ACTIVITY:** Comparing Measures

Work with a partner. Answer each question. Explain your answer. Use a diagram in your explanation.

	<i>Metric</i>	<i>Customary</i>
a. <b>Car Speed:</b> Which is faster?	80 km/h	60 mi/h
b. <b>Trip Distance:</b> Which is farther?	200 km	200 mi
c. <b>Human Height:</b> Who is taller?	180 cm	5 ft 8 in.
d. <b>Wrench Width:</b> Which is wider?	8 mm	5/16 in.
e. <b>Swimming Pool Depth:</b> Which is deeper?	1.4 m	4 ft

**5.7** Converting Measures (continued)

**3 ACTIVITY:** Changing Units in a Rate

Work with a partner. Change the units of the rate by multiplying by a “Magic One.” Write your answer as a unit rate. Show your work.

<i>Original Rate</i>		<i>Magic One</i>		<i>New Units</i>		<i>Unit Rate</i>
a. $\frac{\$120}{\text{h}}$	×	$\frac{\boxed{\phantom{000}}}{\boxed{\phantom{000}}}$	=	$\frac{\boxed{\phantom{000}}}{\boxed{\phantom{000}}}$	=	$\frac{\$ \boxed{\phantom{000}}}{1 \text{ min}}$
b. $\frac{\$3}{\text{min}}$	×	$\frac{\boxed{\phantom{000}}}{\boxed{\phantom{000}}}$	=	$\frac{\boxed{\phantom{000}}}{\boxed{\phantom{000}}}$	=	$\frac{\$ \boxed{\phantom{000}}}{1 \text{ h}}$
c. $\frac{12 \text{ in.}}{\text{ft}}$	×	$\frac{\boxed{\phantom{000}}}{\boxed{\phantom{000}}}$	=	$\frac{\boxed{\phantom{000}}}{\boxed{\phantom{000}}}$	=	$\frac{\boxed{\phantom{000}} \text{ in.}}{1 \text{ yd}}$
d. $\frac{2 \text{ ft}}{\text{week}}$	×	$\frac{\boxed{\phantom{000}}}{\boxed{\phantom{000}}}$	=	$\frac{\boxed{\phantom{000}}}{\boxed{\phantom{000}}}$	=	$\frac{\boxed{\phantom{000}} \text{ ft}}{1 \text{ yr}}$

**What Is Your Answer?**

4. One problem-solving strategy is called *Working Backwards*. What does this mean? How can you use this strategy to find the rates in Activity 3?

5. **IN YOUR OWN WORDS** How can you compare lengths between the customary and the metric systems? Give examples with your description.

**5.7****Practice**

For use after Lesson 5.7

Complete the statement.

1. 3 m  $\approx$  \_\_\_\_\_ ft

2. 32 cm  $\approx$  \_\_\_\_\_ in.

3. 16 qt  $\approx$  \_\_\_\_\_ L

4.  $\frac{50 \text{ mi}}{\text{h}} \approx \frac{\boxed{\phantom{000}} \text{ km}}{\text{h}}$

5.  $\frac{25 \text{ gal}}{\text{min}} = \frac{\boxed{\phantom{000}} \text{ qt}}{\text{sec}}$

6.  $\frac{1000 \text{ m}}{\text{sec}} = \frac{\boxed{\phantom{000}} \text{ km}}{\text{min}}$

7. Your doctor prescribes you to take 400 milligrams of medicine every 8 hours. How many ounces of medicine do you take in a day?