

4th Quarter

Mad Minute Averages					
Name First Last		Date 3-20-17			
Wk of 3-20	Wk of 3-27	Wk of 4-4	Wk of 4-10		
Mon. 34 = 85%	Mon. 35 = 88%	Mon. Iowa Test	Mon. 34 = 85%		
Tues. 36 = 90%	Tues. 36 = 90%	Tues. 32 = 80%	Tues. 32 = 80%		
Wed. 38 = 95%	Wed. 33 = 83%	Wed. 31 = 78%	Wed. Field Trip		
Thurs. 40 = 100%	Thurs. Ch 9 Quiz	Thurs. 33 = 83%	Thurs. No class		
Fri. Ch 9 Quiz	Fri. 32 = 80%	Fri. Mad Minute	Fri. Good Fri.		
Wk of 4-17	Wk of 4-24	Wk of 5-1			
Mon. Easter	Mon. 27 = 68%	Mon. 29 = 78%	Mon.		
Tues. 31 = 78%	Tues. 25 = 63%	Tues. 32 = 80%	Tues.		
Wed. 28 = 70%	Wed. Ch 10 Quiz	Wed.	Wed.		
Thurs. 34 = 85%	Thurs. 23 = 58%	Thurs.	Thurs.		
Fri. Ch 10 Quiz	Fri. Mr. D absent	Fri.	Fri.		
Mon.	Tues.	Wed.	Thurs.	Fri.	
Mon.	Tues.	Wed.	Thurs.	Fri.	
Week	Average	Parent Signature	Week	Average	Parent Signature
x one	37 = 93%		mixed six		
- two	34 = 85%		x seven		
mixed three	32 = 80%		eight		
x four	33 = 83%		nine		
- five	31 = 78%		ten		



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Study Guide and Intervention

Ratios

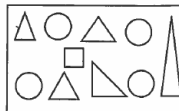
A ratio is a comparison of two numbers by division. A common way to express a ratio is as a fraction in simplest form. Ratios can also be written in other ways. For example, the ratio $\frac{2}{3}$ can be written as 2 to 3, 2 out of 3, or 2:3.

EXAMPLES Refer to the diagram at the right.

- Write the ratio that compares the number of circles to the number of triangles.

circles $\rightarrow \frac{4}{5}$
triangles $\rightarrow \frac{5}{5}$ The GCF of 4 and 5 is 1.

So, the ratio of circles to triangles is $\frac{4}{5}$, 4 to 5, or 4:5.
For every 4 circles, there are 5 triangles.



- Write the ratio that compares the number of circles to the total number of figures.

circles $\rightarrow \frac{4}{10}$
total figures $\rightarrow \frac{10}{10}$ The GCF of 4 and 10 is 2.

The ratio of circles to the total number of figures is $\frac{2}{5}$, 2 to 5, or 2:5.
For every two circles, there are five total figures.

A rate is a ratio of two measurements having different kinds of units. When a rate is simplified so that it has a denominator of 1, it is called a unit rate. "per" \rightarrow one in denominator

- EXAMPLE 3** Write the ratio 20 students to 5 computers as a unit rate.

$\frac{20 \text{ students}}{5 \text{ computers}} \xrightarrow{\div 5} \frac{4 \text{ students}}{1 \text{ computer}}$ Divide the numerator and the denominator by 5 to get a denominator of 1.

The ratio written as a unit rate is 4 students to 1 computer.

EXERCISES

Write each ratio as a fraction in simplest form.

- 2 guppies out of 6 fish $\frac{2g}{6f} = \frac{1g}{3f}$ 1 guppy 3 fish
- 12 puppies to 15 kittens $\frac{12p}{15k} = \frac{4p}{5k}$ 4 puppies 5 kittens
- 5 boys out of 10 students $\frac{5b}{10s} = \frac{1b}{2s}$ 1 boy 2 students

Write each ratio as a unit rate.

- 6 eggs for 3 people
- \$12 for 4 pounds
- 40 pages in 8 days

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10-1 Practice: Word Problems

Ratios

<p>1. FOOTBALL In the NFL 2001-2002 season, the Miami Dolphins won 11 games and the Oakland Raiders won 10 games. What is the ratio of wins for the Dolphins to wins for the Raiders?</p> $\frac{D}{R} = \frac{11}{10} = \frac{11}{10}$	<p>2. GARDENING Rod has 10 rosebushes, 2 of which produce yellow roses. Write the ratio of yellow rosebushes out of 10 rosebushes in simplest form.</p> <p>2 yellow : 2 = 1 10 total : 2 = 5 Out of 5 rosebushes, one is yellow.</p>
<p>3. TENNIS Nancy and Lisa played 20 sets of tennis. Nancy won 12 of them. Write the ratio of Nancy's wins to the total number of sets in simplest form.</p>	<p>4. AGES Oscar is 16 years old and his sister Julia is 12 years old. What will be the ratio of Oscar's age to Julia's age in 2 years? Write as a fraction in simplest form.</p> <p>In 2 years O = 16 + 2 = 18 : 2 = 9 J = 12 + 2 = 14 : 2 = 7</p>
<p>5. MOVIES Four friends paid a total of \$32 for movie tickets. What is the ratio for 4 people written as a unit rate?</p> <p>\$32 ÷ 4 = \$8 4 people ÷ 4 = 1 person</p>	<p>6. WORKING At a warehouse, the employees can unload 18 trucks in 6 hours. What is the unit rate for unloading trucks?</p>
<p>7. ANIMALS A reindeer can run 96 miles in 3 hours. At this rate, how far can a reindeer run in 1 hour? Explain.</p> <p>unit rate 96 mi ÷ 3 = 32 mi 3 hr ÷ 3 = 1 hr</p>	<p>8. SHOPPING Jenny wants to buy cereal that comes in large and small boxes. The 32-ounce box costs \$4.16, and the 14-ounce box costs \$2.38. Which box is less expensive per ounce? Explain.</p> <p>\$4.16 ÷ 32oz = 32 4.16 -32 -96 -96 0 \$0.13 per oz</p> <p>\$2.38 ÷ 14oz = 14 2.38 -14 -98 -98 0 \$0.17 per oz</p>

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10-2 Study Guide and Intervention

Solving Proportions

A proportion is an equation stating that two ratios are equivalent. For example, the ratios $\frac{1}{2}$ and $\frac{3}{6}$ are equivalent, so the equation $\frac{1}{2} = \frac{3}{6}$ is a proportion. In order for two ratios to form a proportion, their cross products must be equal.

1 × 6 is one cross product
2 × 3 is the other cross product
1 × 6 = 6
2 × 3 = 6
The cross products are equal.

When one value in a proportion is unknown, you can use cross products to solve the proportion.

EXAMPLE 1 Solve $\frac{2}{6} = \frac{n}{15}$.
2 × n = 6 × 4
2n = 20
Divide each side by 2.
n = 10
The solution is 10.

EXAMPLE 2 Solve $\frac{3}{4} = \frac{b}{12}$.
3 × 12 = 4 × b
36 = 4b
Divide each side by 4.
9 = b
The solution is 9.

EXERCISES

Determine whether each pair of ratios form a proportion. Explain your reasoning.

1. $\frac{3}{8} = \frac{16}{32}$ Yes, these ratios form a proportion since their cross products are the same.
3(16) = 5(6) → 30 = 30

Solve each proportion.

2. $\frac{2}{3} = \frac{4}{n}$ → 2n = 12 → n = 6
3. $\frac{5}{10} = \frac{15}{n}$ → 5n = 150 → n = 30
4. $\frac{3}{4} = \frac{12}{n}$ → 3n = 48 → n = 16
5. $\frac{4}{2} = \frac{y}{2}$ → y = 2
6. $\frac{3}{4} = \frac{9}{16}$ → 3(16) = 4(9) → 48 = 36 (No)
7. $\frac{1}{9} = \frac{4}{18}$ → 1(18) = 9(4) → 18 = 36 (No)
8. $\frac{d}{16} = \frac{3}{8}$ → 8d = 48 → d = 6
9. $\frac{2}{5} = \frac{15}{13}$ → 2(13) = 5(15) → 26 = 75 (No)
10. $\frac{2}{9} = \frac{8}{9}$ → 2(9) = 9(8) → 18 = 72 (No)
11. $\frac{0.1}{2} = \frac{0.6}{13}$ → 0.1(13) = 2(0.6) → 1.3 = 1.2 (No)
12. $\frac{0.1}{2} = \frac{0.6}{13}$ → 0.1(13) = 2(0.6) → 1.3 = 1.2 (No)

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10-2 Practice: Word Problems
Solving Proportions

1. SCHOOL The ratio of boys to girls in history class is 4 to 5. How many girls are in the class if there are 12 boys in the class? Explain.	2. FACTORIES A factory produces 6 motorcycles in 9 hours. Write a proportion and solve it to find how many hours it takes to produce 16 motorcycles.
3. READING James read 4 pages in a book in 6 minutes. How long would you expect him to take to read 6 pages?	4. COOKING A recipe that will make 3 pies calls for 7 cups of flour. Write a proportion and solve it to find how many pies can be made with 28 cups of flour.
5. TYPING Sara can type 80 words in 4 minutes. About how many words would you expect her to type in 10 minutes?	6. BASKETBALL The Lakewood Wildcats won 5 of their first 7 games this year. There are 28 games in the season. About how many games would you expect the Wildcats to win this season? Explain your reasoning.
7. FOOD Two slices of Dan's Famous Pizza have 230 Calories. How many Calories would you expect to be in 5 slices of the same pizza?	8. SHOPPING Andy paid \$1.40 for 4 grapefruits. Write a proportion and solve it to find how many grapefruits he can purchase for \$2.10.

Handwritten notes for problem 5:

$$\frac{90 \text{ words}}{4 \text{ min}} = \frac{W \text{ words}}{10 \text{ min}}$$

$$\frac{45 \times 5}{2 \text{ min}} = \frac{W \text{ words}}{10 \text{ min}}$$

$$225 \text{ words}$$

Handwritten notes for problem 4:

$$\frac{3 \text{ pies} \times 4}{7 \text{ c flour}} = \frac{P \text{ pie}}{28 \text{ c flour}}$$

$$P = 12 \text{ pies}$$

Handwritten notes for problem 7:

$$2 \cdot x = 5(230)$$

$$2x = 1150$$

$$x = \frac{1150}{2} = 575$$

Calories

There will be 575 Calories in 5 slices of pizza.

10-3 Study Guide and Intervention
Scale Drawings and Models

Scale drawings and scale models are used to represent objects that are too large or too small to be drawn or built at actual size. The scale gives the ratio that compares the measurements on the drawing or model to the measurements of the real object. The measurements on a drawing or model are proportional to the measurements of the actual object.

EXAMPLE 1 **RACE CARS** A model of a race car has a width of 3.5 inches. The scale is 1 inch = 2 feet. Find the actual width of the race car.

Let w represent the actual width.

Scale	Race Car
model width $\rightarrow \frac{1}{2} = \frac{3.5}{w}$	model width
actual width $\rightarrow \frac{1}{2} = \frac{3.5}{w}$	actual width

$1 \times w = 2 \times 3.5$ Find the cross products.
 $w = 7$ Multiply.

The actual width of the race car is 7 feet.

EXAMPLE 2 **HIKING** On a map, the distance between Round Lake and June Lake is 6 inches. The scale on the map is 3 inches = 5 miles. Find the actual distance between the two lakes.

Let d represent the actual distance.

Map Scale	Actual Distance
map distance $\rightarrow \frac{3}{5} = \frac{6}{d}$	map distance
actual distance $\rightarrow \frac{3}{5} = \frac{6}{d}$	actual distance

$3 \times d = 5 \times 6$ Find the cross products.
 $3d = 30$ Multiply.
 $\frac{3d}{3} = \frac{30}{3}$ Divide.
 $d = 10$

The distance between the two lakes is 10 miles.

EXERCISES

DRAFTING For Exercises 1–4, use the following information.
On a set of drawings, the scale is $\frac{2 \text{ inch}}{4 \text{ feet}} = 4 \text{ feet}$. Find the actual measurements.

Object	Drawing	Actual Size
1. door	4 inches	
2. wall	6 inches	
3. tree	12 inches	
4. computer	1 inch	

1) $\frac{2 \text{ in} \times 2}{4 \text{ ft} \times 2} = \frac{4 \text{ in}}{x \text{ ft}}$
 $x = 4 \times 2 = 8 \text{ ft}$

2) $\frac{2 \text{ in}}{4 \text{ ft}} = \frac{6 \text{ in}}{x \text{ ft}}$

3) $\frac{2 \text{ in}}{4 \text{ ft}} = \frac{12 \text{ in}}{x \text{ ft}}$

5. **MAPS** A map has a scale of $\frac{2 \text{ inches}}{7 \text{ miles}}$. The distance between Pirate's Cove and Midnight Lagoon on the map is 12 inches. What is the actual distance between the two places?

$$\frac{2 \text{ in} \times 6}{7 \text{ mi} \times 6} = \frac{12 \text{ in}}{x \text{ mi}}$$

$$x = 42 \text{ mi}$$

Lesson 10-3

10-3 Practice: Word Problems
Scale Drawings and Models

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<p>1. MAPS On a map with a scale of 1 inch = 9 miles, the distance between two towns is 3 inches. What is the actual distance between the two towns?</p>	<p>2. BLUEPRINTS On an architect's blueprint, the front of a building measures 27 inches. The scale of the blueprint is 1 inch = 2 feet. How wide will the front of the actual building be?</p> <p>$1 \text{ in} \times 27 \rightarrow 2 \times 27$ $2 \text{ ft} \times 27 \text{ ft} = x \text{ ft}$ $x = 54 \text{ ft}$ The front of the actual building measures 54 ft wide.</p>
<p>3. MODELS The model of an airplane has a wingspan of 20 inches. The model has a scale of 1 inch = 4 feet. What is the wingspan of the actual airplane?</p> <p>$1 \text{ in} \times 20 = 20 \text{ in}$ $4 \text{ ft} \times 20 = x \text{ ft}$ $x = 80 \text{ ft}$ The actual wingspan of the airplane is 80 ft.</p>	<p>4. ARCHITECTURE The drawing for a building has a scale of 1 inch = 3 feet. The building in the drawing has a height of 14 inches. How tall will the actual building be?</p>
<p>5. ROCKETS A model of the Saturn V rocket has a scale of 1 inch = 12 feet. If the model rocket is 30 inches tall, how tall was the actual Saturn V rocket?</p> <p>photo actual</p>	<p>6. CARS Ron took a photograph of his car and then measured the length of the car in the photograph. The length was $4\frac{1}{2}$ inches. If the scale of the photograph is 1 inch = 4 feet, how long is Ron's actual car?</p> <p>$1 \text{ in} \times 4\frac{1}{2} = 4\frac{1}{2} \text{ in}$ $4 \text{ ft} \times 4\frac{1}{2} = x \text{ ft}$ $x = 18 \text{ ft}$</p>
<p>7. MODELS A model of a 4-cylinder gasoline engine is built on a scale of 1 inch = 6 inches. If the length of the model engine is 9 inches, how long is the actual engine?</p> <p>actual reduced</p>	<p>8. PHOTOGRAPHY A photo lab technician is going to reduce a photograph that is 9 inches wide using a scale of 1 inch = $\frac{2}{3}$ inch. How wide will the reduced photo be?</p> <p>$1 \text{ in} \times 9 = 9 \text{ in}$ $\frac{2}{3} \text{ in} \times 9 = x \text{ in}$ $x = \frac{2}{3} \cdot 9 = \frac{6}{1} = 6 \text{ in}$ The reduced photo will be 6 inches.</p>

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10-4 Study Guide and Intervention
Modeling Percents

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$n\% = \frac{n}{100}$

Ratios like 41 out of 100, 25 out of 100, or 2 out of 100 can be written as percents. A percent (%) is a ratio that compares a number to 100. Since the word percent means out of one hundred, you can use a 10 × 10 grid to model percents.


EXAMPLES


1. Model 10%.
 10% means 10 out of 100.
 So, shade 10 of the 100 squares.

2. Model 78%.
 78% means 78 out of 100.
 So, shade 78 of the 100 squares.

You can use what you know about decimal models and percents to identify the percent of a model that is shaded.




EXAMPLES Identify each percent that is modeled.

3.  There are 30 out of 100 squares shaded. So, the model shows 30%.




4.  There are 43 out of 100 squares shaded. So, the model shows 43%.

EXERCISES

Model each percent.

1. 20%  2. 55%  3. 12% 

Identify each percent that is modeled.







4.  60% 5.  70% 6.  70%

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10-4 Practice: Word Problems

Modeling Percents

<p>1. FOOTBALL In the 2001–2002 season, the Dallas Cowboys football team won 45% of their games. Make a model to show 45%.</p> 	<p>2. LANDSCAPING Jacob is making a 10 foot by 10 foot patio in his backyard using paving stones that are 1 foot square. The shaded area of the model indicates the finished part of the patio. What percent of the patio has Jacob finished?</p> 
<p>3. ART Lydia is making a collage using 100 photographs arranged in a square pattern. The shaded area in the model indicates the part of the collage already covered by photos. What percent of the collage is finished?</p> 	<p>4. ENERGY In the year 2000, nuclear energy accounted for 8% of the energy used in the U.S. Make a model to show 8%.</p> 
<p>5. GAMES The figure shows the starting position for a game played on a 10 by 10 board. The shaded squares contain same pieces. What percent of the squares on the board contain game pieces?</p>  <p style="margin-left: 20px;">shaded total</p> $\frac{20}{100} = 20\%$ $\frac{2}{10} = \frac{1}{5}$	<p>6. MUSIC In the school chorus, 52% of the girls sing soprano and 44% sing alto. Which of these two sections of the chorus has more girls? Explain using models.</p>  <p style="margin-left: 20px;">52% 44%</p>

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10-5 Study Guide and Intervention

Percents and Fractions

$n\% = \frac{n}{100}$

To write a percent as a fraction, write it as a fraction with a denominator of 100. Then simplify.

EXAMPLE 1 Write 15% as a fraction in simplest form.


15% means 15 out of 100.

$$15\% = \frac{15}{100}$$

Write the percent as a fraction with a denominator of 100.

$$= \frac{15}{100} \text{ or } \frac{3}{20}$$

Simplify. Divide the numerator and denominator by the GCF, 5.



EXAMPLE 2 Write 180% as a fraction in simplest form.


180% means 180 out of 100.

$$180\% = \frac{180}{100}$$

Write the percent as a fraction with a denominator of 100.

$$= \frac{180}{100} \text{ or } 1\frac{4}{5}$$

Simplify.



You can also write fractions as percents. To write a fraction as a percent, write a proportion and solve.

EXAMPLE 3 Write $\frac{2}{5}$ as a percent.

$$\frac{2}{5} = \frac{n}{100}$$

Set up a proportion.

$$2 \times 100 = 5 \times n$$

Write the cross products.

$$200 = 5n$$

Multiply.

$$\frac{200}{5} = \frac{5n}{5}$$

Divide each side by 5.

$$40 = n$$

So, $\frac{2}{5}$ is equivalent to 40%.

EXAMPLE 4 Write $\frac{9}{8}$ as a percent.

$$\frac{9}{8} = \frac{p}{100}$$

Set up a proportion.

$$9 \times 100 = 8 \times p$$

Write the cross products.

$$900 = 8p$$

Multiply.

$$\frac{900}{8} = \frac{8p}{8}$$

Divide each side by 8.

$$112.5 = p$$

So, $\frac{9}{8}$ is equivalent to 112.5%.

EXERCISES

Write each percent as a fraction in simplest form.

1. 20% = $\frac{20}{100} = \frac{1}{5}$ 2. 35% 3. 70% 4. 60% 5. 150%

6. $225\% = \frac{225}{100} = \frac{9}{4}$

Write each fraction as a percent.

7. $\frac{3}{10} = \frac{30}{100} = 30\%$ 8. $\frac{2}{100} = 2\%$ 9. $\frac{8}{4} = 2 = 200\%$

10. $\frac{1}{5} = \frac{20}{100} = 20\%$ 11. $\frac{10}{8} = 125\%$ 12. $\frac{13}{100} = 13\%$

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$\frac{10}{8} = \frac{n}{100}$

$$8 \cdot n = 10 \cdot 100$$

$$\frac{8n}{8} = \frac{1000}{8} \rightarrow n = 125\%$$

$$\begin{array}{r} 8 \overline{) 1000} \\ \underline{-8} \\ 20 \\ \underline{-16} \\ 40 \\ \underline{-40} \\ 0 \end{array}$$

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10-5 Practice: Word Problems
Percents and Fractions

Lesson 10-5

<p>1. TOYS The Titanic Toy Company has a 4% return rate on its products. Write this percent as a fraction in simplest form.</p> <p>$4\% = \frac{4}{100} = \frac{1}{25}$</p> <p>The Titanic Toy Company has a return rate of $\frac{1}{25}$ one out of 25 toys is returned.</p>	<p>2. MUSIC There are 4 trombones out of 25 instruments in the Landers town band. What percent of the instruments are trombones?</p>
<p>3. SHOPPING Alicia's favorite clothing store is having a 30% off sale. What fraction represents the 30% off sale?</p> <p>$30\% = \frac{30}{100} = \frac{3}{10}$</p>	<p>4. FOOD At Ben's Burger Palace, 45% of the customers order large soft drinks. What fraction of the customers order large soft drinks?</p>
<p>5. BASKETBALL In the 2001-2002 NBA season, Shaquille O'Neal of the Los Angeles Lakers made 60% of his field goals. What fraction of his field goals did Shaquille make?</p> <p>$60\% = \frac{60}{100} = \frac{3}{5}$</p>	<p>6. SCHOOL In Janie's class, 7 out of 25 students have blue eyes. What percent of the class has blue eyes?</p> <p>$\frac{7}{25} \times 100 = 28\%$</p> <p>28% of Janie's class has blue eyes.</p>
<p>7. TESTS Michael answered $\frac{17}{20}$ questions correctly on his test. What percent of the questions did Michael answer correctly?</p>	<p>8. RESTAURANTS On Saturday afternoon, $\frac{41}{50}$ telephone calls taken at The Overlook restaurant were for dinner reservations. What percent of the telephone calls were for dinner reservations?</p> <p>$\frac{41}{50} \times 100 = 82\%$</p>

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10-6 Study Guide and Intervention
Percents and Decimals

$n\% = \frac{n}{100}$

To write a percent as a decimal, first rewrite the percent as a fraction with a denominator of 100. Then write the fraction as a decimal.

EXAMPLE 1 Write 23% as a decimal.

$23\% = \frac{23}{100} = 0.23$

Rewrite the percent as a fraction with a denominator of 100.
Write the fraction as a decimal.

%. to decimal LEFT places

EXAMPLE 2 Write 127% as a decimal.

$127\% = \frac{127}{100} = 1.27$

Rewrite the percent as a fraction with a denominator of 100.
Write the fraction as a decimal.

EXAMPLE 3 Write 0.8% as a decimal.

$0.8\% = \frac{0.8}{100}$

$= \frac{0.8}{100} \times \frac{10}{10} = \frac{8}{1,000} = 0.008$

Multiply by $\frac{10}{10}$ to eliminate the decimal in the numerator.
Write the fraction as a decimal.

To write a decimal as a percent, first write the decimal as a fraction with a denominator of 100. Then write the fraction as a percent.

EXAMPLE 4 Write 0.441 as a percent.

$0.441 = \frac{441}{1,000}$

$= \frac{441 \div 10}{1,000 \div 10} = \frac{44.1}{100} = 44.1\%$

Divide by 10 to get a denominator of 100.
Write the fraction as a percent.

decimal to % RIGHT 2 places

EXERCISES

- Write each percent as a decimal.
1. 39% $\rightarrow 0.39$ 2. 57% 3. 82%
4. 135% $\rightarrow 1.35$ 5. 112% 6. 0.4%
- Write each decimal as a percent.
7. 0.86 $\rightarrow 86\%$ 8. 0.36 9. 0.65
10. 0.2 11. 0.148 12. 0.217

$0.148 = 14.8\%$

NAME _____ DATE _____ PERIOD _____

10-6 Practice: Word Problems

Percents and Decimals

<p>1. COMMUTING According to the 2000 U.S. census, 76% of U.S. workers commute to work by driving alone. Write 76% as a decimal.</p>	<p>2. BASEBALL Barry Bonds's batting average for the 2002 season was 0.370. Write 0.370 as a percent.</p>
<p>3. ELECTIONS In the 2002 U.S. midterm elections, 39% of eligible adults voted. What is 39% written as a decimal?</p>	<p>4. BASKETBALL In the 2001-2002 season, Jason Kidd of the New Jersey Nets had a field goal average of 0.391. What is 0.391 written as a percent?</p>
<p>5. SPORTS When asked to choose their favorite sport, 27% of U.S. adults who follow sports selected professional football. What decimal is equivalent to 27%?</p> <p>27% $27 = 0.27$</p>	<p>6. AGE Lawrence is 18 years old and his brother Luther is 12 years old. This means that Lawrence is 1.5 times older than Luther. What percent is equivalent to 1.5?</p> <p>$w = 1.5 \times t$ $18 = 1.5 \times 12$ $150 = 150$</p> <p>1.5 $\times 20$ $\hline 30$ $\times 150$ $\hline 180$</p>
<p>7. WATER About 5% of the surface area of the U.S. is water. What decimal represents the amount of the U.S. surface area taken up by water?</p> <p>5% $0.05 = 0.05$</p>	<p>8. POPULATION China accounts for 0.207 of the world's population. What percent of the world's population lives in China?</p> <p>0.207 \rightarrow 20.7%</p>

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10-7 Study Guide and Intervention

Percent of a Number \rightarrow times (multiplication)

One way to find the percent of a number is to write the percent as a fraction and then multiply. Another way is to write the percent as a decimal and then multiply.

EXAMPLE 1 Find 70% of 40.

Method 1 Write the percent as a fraction.
 $70\% = \frac{70}{100}$ or $\frac{7}{10}$
 $\frac{7}{10}$ of 40 = $\frac{7}{10} \times 40$ or 28

Method 2 Write the percent as a decimal.
 $70\% = \frac{70}{100}$ or 0.7
 0.7 of 40 = 0.7×40 or 28

So, 70% of 40 is 28. Use a model to check the answer.

The model confirms that 70% of 40 is 28.

EXAMPLE 2 Find 120% of 25.

Method 1 Write the percent as a fraction.
 $120\% = \frac{120}{100}$ or $\frac{6}{5}$
 $\frac{6}{5}$ of 25 = $\frac{6}{5} \times 25$ or 30

Method 2 Write the percent as a decimal.
 $120\% = \frac{120}{100}$ or 1.2
 1.2 of 25 = 1.2×25 or 30

EXERCISES

Find the percent of each number.

- 10% of 120
- 60% of 25
- 75% of 24
- 90% of 40
- 120% of 20
- 150% of 2
- 15% of 40
- 30% of 70
- 150% of 6
- 165% of 20
- 8% of 15
- 6% of 6

Handwritten solutions for exercises 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12:

- 2. $0.6 \times 25 = 15$
- 3. $\frac{3}{4} \times 24 = 18$
- 4. $\frac{90}{100} \times 40 = 36$
- 5. $\frac{120}{100} \times 20 = 24$
- 6. $1.5 \times 2 = 3$
- 7. $\frac{15}{100} \times 40 = 6$
- 8. $\frac{30}{100} \times 70 = 21$
- 9. $1.5 \times 6 = 9$
- 10. $1.65 \times 20 = 33$
- 11. $0.08 \times 15 = 1.2$
- 12. $0.06 \times 6 = 0.36$

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10-7 Practice: Word Problems

Percent of a Number

1. **SCHOOL** There are 520 students at Northridge High School. 80% of these students take the bus. How many students take the bus?

2. **AGE** Theresa is 60% as old as her sister Mala, who is 20 years old. How old is Theresa?

3. **TIPPING** Charlie wants to leave a 15% tip for a meal that costs \$40. How much should Charlie leave for a tip?

4. **SALES TAX** Charmaine wants to buy a shirt for \$15. If the sales tax is 4% of \$15, how much will she pay in sales tax?

5. **FOOTBALL** In the 2001–2002 regular season, the Green Bay Packers won 75% of their games. There were 16 regular season games. How many games did Green Bay win?

$75\% \text{ of } 16$
 $\frac{3}{4} \times \frac{16}{1} = 12$

6. **BASEBALL** During the 2002 World Series, Rich Aurilia of the San Francisco Giants had a batting average of .250 or 25%. He was at bat 32 times. How many hits did he get?

$1 \times 8 = 8$
 $25 \div 100 = \frac{25}{100} = \frac{1}{4}$
 $32 \times \frac{1}{4} = 8$

7. **RUNNING** Thomas finished the race in 120 minutes. James took 95.5% as long as Thomas to finish the race. How long did it take James to finish the race?

$\frac{95.5}{100} \times 120$
 $100J = 95.5(120)$
 $J = 114.6$

8. **SHOPPING** A DVD player that normally costs \$160 is on sale for 70% of its normal price. What is the sale price of the DVD player?

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Lesson 10-7

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Study Guide and Intervention

Estimating with Percents

The table below shows some commonly used percents and their fraction equivalents.

$20\% = \frac{1}{5}$	$50\% = \frac{1}{2}$	$80\% = \frac{4}{5}$	$25\% = \frac{1}{4}$	$33\frac{1}{3}\% = \frac{1}{3}$
$30\% = \frac{3}{10}$	$60\% = \frac{3}{5}$	$90\% = \frac{9}{10}$	$75\% = \frac{3}{4}$	$66\frac{2}{3}\% = \frac{2}{3}$
$40\% = \frac{2}{5}$	$70\% = \frac{7}{10}$	$100\% = 1$		

EXAMPLES Estimate each percent.

1. 20% of 58
 20% is $\frac{1}{5}$.
 Round 58 to 60 since it is divisible by 5.
 $\frac{1}{5} \times 60 = \frac{1}{5} \times \frac{12}{1} = \frac{12}{1} = 12$
 So, 20% of 58 is about 12.

2. 76% of 25.
 76% is close to 75% or $\frac{3}{4}$.
 Round 25 to 24 since it is divisible by 4.
 $\frac{3}{4} \times 24 = \frac{3}{4} \times \frac{24}{1} = \frac{72}{1} = 18$
 So, 76% of 25 is about 18.

EXAMPLE 3 Estimate the percent of the figure that is shaded.

2 out of 9 circles are shaded.
 $\frac{2}{9}$ is about $\frac{3}{9}$ or $\frac{1}{3}$.
 $\frac{1}{3} = 33\frac{1}{3}\%$
 So, about $33\frac{1}{3}\%$ of the figure is shaded.

EXERCISES Estimate each percent.

1. 49% of 8
 $\frac{1}{2} \times 8 \approx 4$

2. 62% of 20
 $\frac{3}{5} \times 20 \approx 12$

3. 40% of 51
 $\frac{2}{5} \times 50 \approx 20$

4. 24% of 27
 $\frac{1}{4} \times 28 \approx 7$

5. 81% of 32
 $\frac{4}{5} \times 32 \approx 26$

6. 19% of 46
 $\frac{2}{10} \times 46 \approx 9$

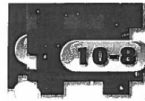
Estimate the percent that is shaded in each figure.

7.
 $\approx 25\%$

8.
 $\approx 75\%$
 $\approx 80\%$
 $\approx 85\%$

9.
 $\approx 60\%$
 $\approx 55\%$
 $\approx 50\%$

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Practice: Word Problems
Estimating with Percents

<p>1. SCHOOL At Westside High School, 24% of the 225 sixth grade students walk to school. About how many of the sixth grade students walk to school?</p>	<p>2. BASKETBALL In the 2002 regular season the WNBA Cleveland Rockers won 31.25% of their games. They had 32 games in their regular season. About how many games did they win?</p>
<p>3. SALES TAX The sales tax rate in Lacon is 9%. About how much tax would you pay on an item that costs \$61?</p>	<p>4. SPORTS The concession stand at a football game served 178 customers. Of those, about 52% bought a hot dog. About how many customers bought a hot dog?</p>
<p>5. READING Max has completed 39% of his reading assignment. If there are 303 pages in the assignment, about how many pages has Max read?</p>	<p>6. SHOPPING A store is having a 20% sale. That means the customer pays 80% of the regular price. About how much would you pay for an item that regularly sells for \$44.99?</p>
<p>7. SLEEP A recent study shows that people spend about 31% of their time asleep. About how much time will a person spend asleep during an average 78 year lifetime?</p>	<p>8. BIOLOGY The human body is 72% water, on average. About how much water will be in a person that weighs 138 pounds?</p>

$$\frac{33}{100} \times \frac{225}{1} \approx 74$$

$$31.25\% \text{ of } 32 = \frac{31.25}{100} \times 32 = \frac{1000}{100} \times \frac{32}{10} = 10 \times \frac{32}{10} = 32$$

$$80\% \text{ of } \$44.99 = \frac{80}{100} \times \$44.99 \approx \$36$$

$$72\% \text{ of } 138 = \frac{72}{100} \times 138 = \frac{72}{10} \times \frac{138}{1} = 7.2 \times 138 = 993.6$$

$$75\% \text{ of } 105 = \frac{75}{100} \times 105 = \frac{3}{4} \times 105 = 78.75$$

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