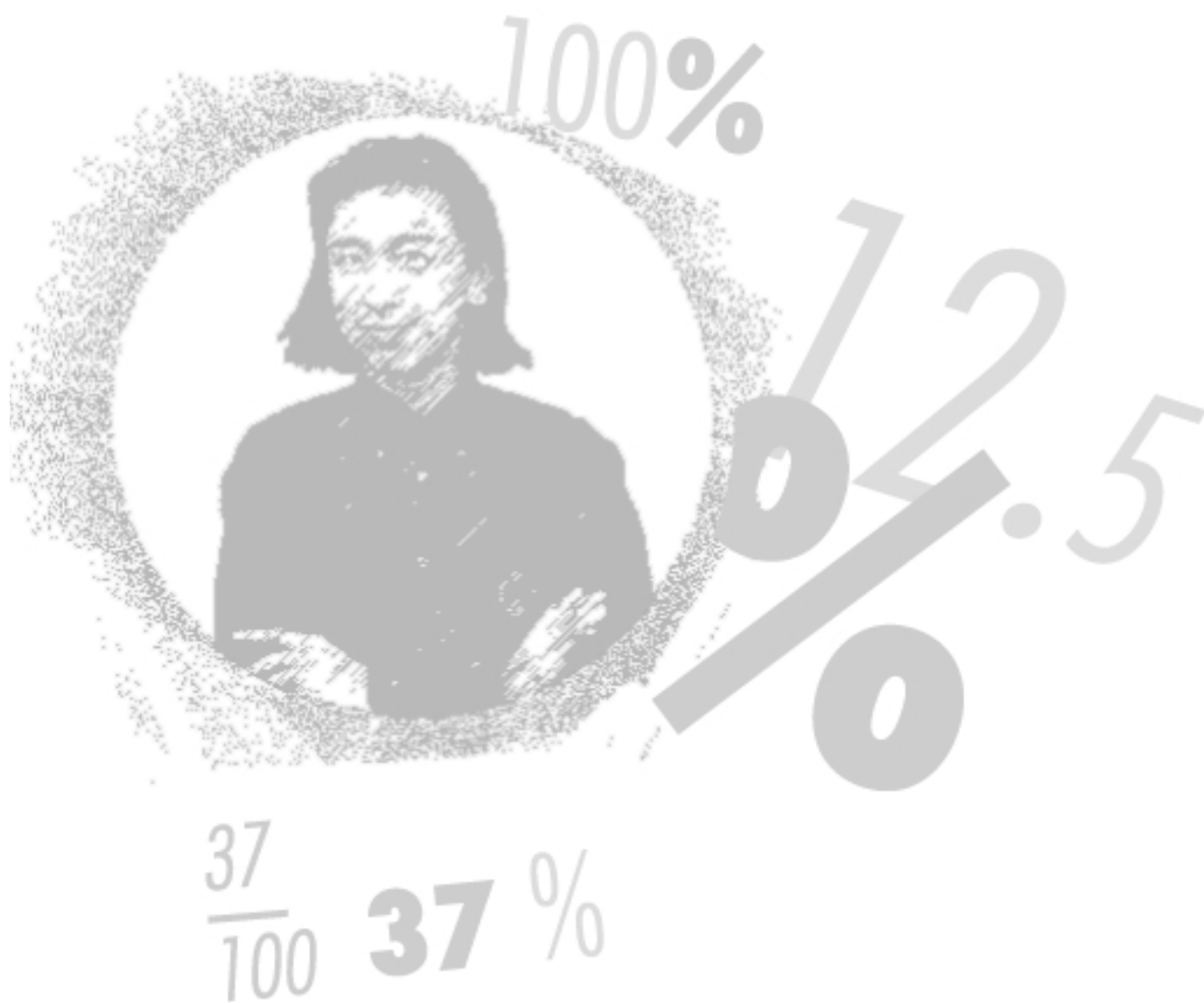


LESSON F3.2 - PERCENT





Overview

You have already studied fractions and decimals, and worked with ratios and proportions. Now you will use these concepts to study percent.

In this lesson, you will learn the definition of percent, and how to rewrite a percent as a decimal or a fraction. You will also learn how to use percent to solve some everyday problems.

Before you begin, you may find it helpful to review the following mathematical ideas which will be used in this lesson. To help you review, you may want to work out each example.

To see these Review problems worked out, go to the Overview module of this lesson on the computer.

Review 1

Simplifying a fraction with denominator 100

Write $33\frac{1}{3}$ as an improper fraction.

Answer: $\frac{1}{3}$

Review 2

Writing a decimal as a fraction

Write the decimal 0.063 as a fraction.

Answer: $\frac{63}{1000}$

Review 3

Writing a fraction as a decimal

Write the fraction $\frac{5}{8}$ as a decimal.

Answer: 0.625

Review 4

Finding a ratio

A student theater group sells 100 tickets for a Saturday matinee. They sell 57 tickets to children. The rest of the tickets are sold to adults. What is the ratio of the number of adult tickets sold to the total number of tickets sold?

Answer: $\frac{43}{100}$

Review 5

Solving a proportion

Find the value of x that makes this proportion true: $\frac{3}{8} = \frac{x}{100}$

Answer: $x = \frac{75}{2}$

Review 6

Using a shortcut to multiply or divide by powers of ten

In each of the following, determine whether you can find the answer by moving the decimal point two places to the right, or by moving the decimal point two places to the left.

a. 1.3×100

Answer: right

b. $1.3 \div 100$

Answer: left



Explain

In Concept 1: Percent Definition, you will find a section on the following:

▪ **The Definition of Percent**

CONCEPT 1: PERCENT DEFINITION

The Definition of Percent

Here are several equivalent meanings of 50 percent:

- 50 out of **100**
- 50 **hundredths**
- 50 divided by **100**
- $50 \times \frac{1}{100}$

Notice that the number **100** plays a major role when you talk about percent.

This symbol is used to mean percent: %

Sometimes you'll work with percents in decimal form. For example, here's how to write 50% as a decimal:

$$50\% = 50 \text{ hundredths} = 0.50$$

Other times you'll work with percents in fraction form. Here's how to write 50% as a fraction:

$$50\% = 50 \times \frac{1}{100} = \frac{50}{100} = \frac{1}{2}$$

You can also use a 100-square grid to represent percent. Figure 1 shows how to represent 50% on a 100-square grid.

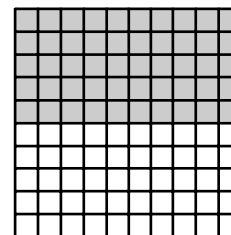


Figure 1

In addition, to solve some percent problems, sometimes it will be useful to picture percent using a number line. See Figure 2.

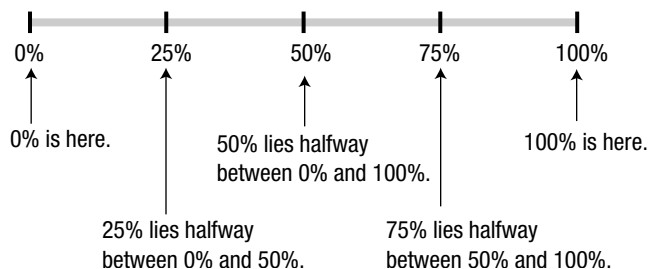


Figure 2

1. Use a 100-square grid to represent 60%. Then write 60% as a decimal and as a fraction.

Example 1

You may find these Examples useful while doing the homework for this section.

To represent 60% on a 100-square grid, shade 60 squares. See Figure 3.

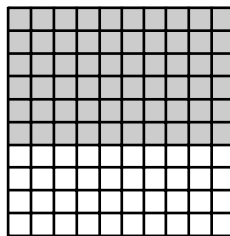


Figure 3

To write 60% as a decimal, think of 60% as “60 hundredths.”

So, $60\% = 0.60$.

To write 60% as a fraction, think of 60% as “ $60 \times \frac{1}{100}$.”

So, $60\% = 60 \times \frac{1}{100} = \frac{60}{100} = \frac{3}{5}$.

2. Represent each of the following percents on separate 100-square grids.

Example 2

- a. 3.5%
- b. 35%
- c. 350%

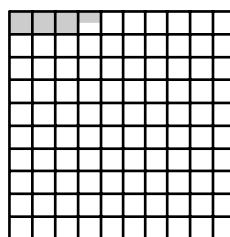


Figure 4

a. To represent 3.5% on a 100-square grid, shade 3.5 squares. See Figure 4.

b. To represent 35% on a 100-square grid, shade 35 squares. See Figure 5.

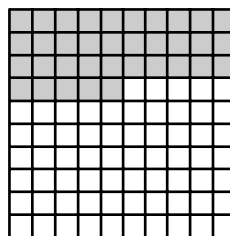


Figure 5

d. To represent 350% on a 100-square grid, shade 350 squares. That is, shade 3 100-square grids and 50 more squares. See Figure 6.

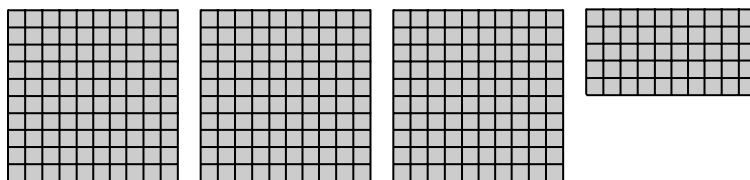


Figure 6

3. What number is 25% of 36?

Example 3

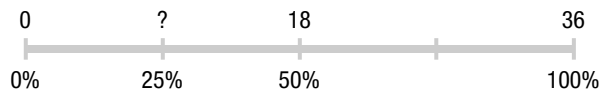


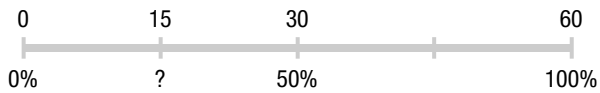
Figure 7

One way to find 25% of 36 is to draw a number line with two scales: 0 to 36 on the top and 0% to 100% on the bottom, as shown in Figure 7.

Since 25% lies halfway between 0% and 50%, the question mark (?) above 25% lies halfway between 0 and 18. But 9 lies halfway between 0 and 18. So 9 is 25% of 36.

Example 4

4. 15 is what percent of 60?

*Figure 8*

*One way to answer the question is to draw a number line with two scales:
0 to 60 on the top and 0% to 100% on the bottom, as shown in Figure 8.*

*Since 15 lies halfway between 0 and 30, the question mark (?) below 15 lies halfway
between 0% and 50%. But 25% lies halfway between 0% and 50%. So 15 is 25% of 60.*



Explain

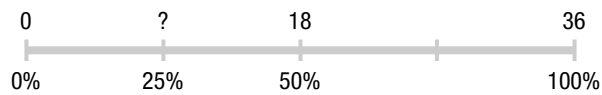
In Concept 2: Converting, you will find a section on each of the following:

- Writing a Percent as a Decimal
- Writing a Decimal as a Percent
- Writing a Percent as a Fraction
- Writing a Fraction as a Percent
- Finding Percent of Decrease
- Finding Percent of Increase

You may find these Examples useful while doing the homework for this section.

Example 5

4. What number is 25% of 36?

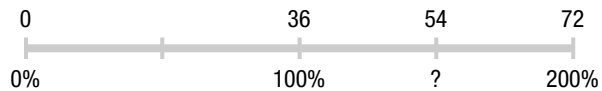


One way to find 25% of 36 is to draw a number line with two scales: 0 to 36 on the top and 0% to 100% on the bottom, as shown in Figure 8.

Since 25% lies halfway between 0% and 50%, the question mark (?) above 25% lies halfway between 0 and 18. But 9 lies halfway between 0 and 18. So 9 is 25% of 36.

Example 6

5. The number 54 is what percent of 36?



One way to answer the question “The number 54 is what percent of 36?” is to draw a number line with two scales: 0 to 72 on the top and 0% to 200% on the bottom, as shown in Figure 9.

Since 54 lies halfway between 36 and 72, the question mark (?) below 54 lies halfway between 100% and 200%. But 150% lies halfway between 100% and 200%. So 54 is 150% of 36.

Example 7

Example 8**CONCEPT 2: CONVERTING****Writing a Percent as a Decimal**

Here's a way to write a percent as a decimal:

- Drop the percent sign.
- Divide by 100 by moving the decimal point two places to the left.

Here, $0.33\dots$ means that the decimal number is a repeating decimal. The 3 repeats.

5. Write 7% as a decimal.

Here's a way to write 7% as a decimal:

- Drop the percent sign.
- Divide by 100 by moving the decimal point two places to the left.

$$0.07$$

So, 7% written as a decimal is 0.07.

6. Write 47.5% as a decimal.

Here's a way to write 47.5% as a decimal:

- Drop the percent sign.
- Divide by 100 by moving the decimal point two places to the left.

$$0.475$$

So, 47.5% written as a decimal is 0.475.

7. Write 105% as a decimal.

Here's a way to write 105% as a decimal:

- Drop the percent sign.
- Divide by 100 by moving the decimal point two places to the left.

$$1.05$$

So, 105% written as a decimal is 1.05.

Example 9

You may find these Examples useful while doing the homework for this section.

Example 10**Example 11**

Example 12

8. Write $33\frac{1}{3}\%$ as a decimal.

Here's a way to write $33\frac{1}{3}\%$ as a decimal:

- Rewrite $33\frac{1}{3}\%$ as a multiplication problem. $33\frac{1}{3} \times \frac{1}{100}$
- Write $33\frac{1}{3}$ as an improper fraction. $\frac{100}{3} \times \frac{1}{100}$
- Now multiply. $\frac{100}{3} \times \frac{1}{100} = \frac{100}{300}$

• Write $\frac{100}{300}$ as a decimal. $\frac{100}{300} = 100 \div 300 = 0.33\dots$

So, $33\frac{1}{3}\%$ written as a decimal is $0.33\dots$

Writing a Decimal as a Percent

Here's a way to write a decimal as a percent:

- Move the decimal point two places to the right.
- Write a percent sign.

Example 13

You may find these Examples useful while doing the homework for this section.

9. Write the decimal 0.8 as a percent.

Here's a way to write the decimal 0.8 as a percent:

- Move the decimal point two places to the right. 0.80
- Write a percent sign. 80%

So, 0.8 written as a percent is 80%.

10. Write the decimal 0.23 as a percent.

Example 14

Here's a way to write the decimal 0.23 as a percent:

- Move the decimal point two places to the right. 0.23
- Write a percent sign. 23%

So, 0.23 written as a percent is 23%.

11. Write the decimal 4.5 as a percent.

Here's a way to write the decimal 4.5 as a percent:

- Move the decimal point two places to the right. 4.50
- Write a percent sign. 450%

Example 15


So, 4.5 written as a percent is 450%.

Example 16

12. Write the decimal 0.025 as a percent

Here's a way to write the decimal 0.025 as a percent:

- Move the decimal point two places to the right.

0.025


- Write a percent sign.

2.5%

*So, 0.025 written as a percent is 2.5%.***Writing a Percent as a Fraction**

Here's a way to write a percent as a fraction:

- Put 100 in the denominator of the fraction.
- Put the number of the percent in the numerator of the fraction.
- Simplify the fraction to lowest terms.

13. Write 45% as a fraction.

Here's a way to write 45% as a fraction:

- Put 100 in the denominator of the fraction.

 $\frac{?}{100}$

- Put the number of the percent in the numerator of the fraction.

 $\frac{45}{100}$

- Simplify the fraction to lowest terms.

 $\frac{9}{20}$ *So, 45% written as a fraction is $\frac{9}{20}$.*

14. Write 320% as a fraction.

Here's a way to write 320% as a fraction:

- Put 100 in the denominator of the fraction.

 $\frac{?}{100}$

- Put the number of the percent in the numerator of the fraction.

 $\frac{320}{100}$

- Simplify the fraction to lowest terms.

 $\frac{16}{5}$ *So, 320% written as a fraction is $\frac{16}{5}$.***Example 17**15. Write $33\frac{1}{3}\%$ as a fraction.*Here's one way to write $33\frac{1}{3}\%$ as a fraction:*

- Rewrite $33\frac{1}{3}\%$ as a multiplication problem.

 $33\frac{1}{3} \times \frac{1}{100}$

- Write $33\frac{1}{3}$ as an improper fraction.

 $\frac{100}{3} \times \frac{1}{100}$

- Now multiply. Simplify the result to lowest terms.

 $\frac{100}{3} \times \frac{1}{100} = \frac{100}{300} = \frac{1}{3}$ *So, $33\frac{1}{3}\%$ written as a fraction is $\frac{1}{3}$.***Example 18**15. Write $33\frac{1}{3}\%$ as a fraction.*Here's one way to write $33\frac{1}{3}\%$ as a fraction:*

- Rewrite $33\frac{1}{3}\%$ as a multiplication problem.

 $33\frac{1}{3} \times \frac{1}{100}$

- Write $33\frac{1}{3}$ as an improper fraction.

 $\frac{100}{3} \times \frac{1}{100}$

- Now multiply. Simplify the result to lowest terms.

 $\frac{100}{3} \times \frac{1}{100} = \frac{100}{300} = \frac{1}{3}$ *So, $33\frac{1}{3}\%$ written as a fraction is $\frac{1}{3}$.*

You may find these Examples useful while doing the homework for this section.

Example 17**Example 18**

16. Write 7.3% as a fraction.

Here's a way to write 7.3% as a fraction:

- Recall that % means "divided by 100". $7.3 \div 100$
So rewrite 7.3% as a division problem.

- To divide by 100, move the decimal 2 places to the left. $0.07.3$

Example 19

- Write the decimal as a fraction. $\frac{73}{1000}$

So, 7.3% written as a fraction is $\frac{73}{1000}$.

Writing a Fraction as a Percent

Here's a way to write a fraction as a percent:

- Write the fraction as a decimal.
— Divide the numerator by the denominator.
- Write the decimal as a percent.
— First, move the decimal point two places to the right.
— Then write a percent sign.

Example 20

17. Write $\frac{5}{8}$ as a percent.

Here's a way to write $\frac{5}{8}$ as a percent:

- Write the fraction as a decimal.
— Divide the numerator by the denominator. 0.625
$$\begin{array}{r} 8 \overline{)5.000} \\ \underline{48} \\ 20 \\ \underline{16} \\ 40 \\ \underline{40} \\ 0 \end{array}$$

Here the decimal is a repeating decimal.
The 5 repeats.

- Write the decimal as a percent.
— First, move the decimal point two places to the right. $0.62.5$
— Then write a percent sign. 62.5%

So, $\frac{5}{8}$ written as a percent is 62.5%.

18. Write $2\frac{1}{2}$ as a percent.

Here's one way to do this:

Example 21

- Write $2\frac{1}{2}$ as an improper fraction. $2\frac{1}{2} = \frac{5}{2}$

- Write the fraction as a decimal.
— Divide the numerator by the denominator. 2.5
$$\begin{array}{r} 2 \overline{)5.0} \\ \underline{4} \\ 10 \\ \underline{10} \\ 0 \end{array}$$

- Write the decimal as a percent.
- First, move the decimal point two places to the right. 2.50
- Then write a percent sign. 250%

So, $2\frac{1}{2}$ written as a percent is 250%.

19. Write $\frac{7}{20}$ as a percent.

Example 22

Here's one way to write $\frac{7}{20}$ as a percent:

- Rewrite the fraction using a denominator of 100. $\frac{7}{20} = \frac{?}{100}$
 - The fraction $\frac{7}{20}$ is equivalent to the fraction $\frac{35}{100}$. $\frac{7}{20} = \frac{7 \times 5}{20 \times 5} = \frac{35}{100}$
 - $\frac{35}{100} = 35\%$. $\frac{35}{100} = 35\%$
- So, $\frac{7}{20}$ written as a percent is 35%.

20. Write $\frac{5}{9}$ as a percent.

Here's a way to write $\frac{5}{9}$ as a percent:

- Write the fraction as a decimal.
 - Divide the numerator by the denominator. $\frac{5}{9} = 5 \div 9 = 0.555\dots$
 - Write the decimal as a percent.
 - First, move the decimal point two places to the right. $0.555\dots$
 - Then write a percent sign. $55.5\dots\%$
- So, $\frac{5}{9}$ written as a percent is 55.5...%.

Finding Percent of Decrease

When a quantity or value decreases, you can calculate the percent of decrease.

Here's a way to find the percent of decrease:

- Find the amount of decrease. **old quantity – new quantity = amount of decrease**
- Write a fraction comparing the amount of decrease to the original (old) quantity. $\frac{\text{amount of decrease}}{\text{old quantity}}$
- Write that fraction as a percent.

You may find these Examples useful while doing the homework for this section.

Example 23

21. A local school district wants to decrease the size of each kindergarten class from 40 students to 25 students. Find what would be the percent of decrease in the classroom size.

Here's a way to find the percent of decrease in class size:

- Find the amount of decrease. **original size – new size = amount of decrease**
40 students – 25 students = 15 students
- Write a fraction comparing the amount of decrease to the original class size. $\frac{\text{amount of decrease}}{\text{original size}} = \frac{15 \text{ students}}{40 \text{ students}}$

Example 24



Explain

In Concept 3: Solving Percent Problems, you will find a section on the following:

■ Solving Some Percent Problems

- Write the fraction as a percent.

— Write the fraction as a decimal.

$$\frac{15}{40} = 15 \div 40 = 0.375$$

— Move the decimal point two places to the right.

$$0.375$$

— Write a percent sign.

$$37.5\%$$

So, the percent of decrease would be 37.5%.

22. Before a new highway was built, 3600 cars traveled on Elm Street from 8:00 a.m. to 9:00 a.m. After the highway was opened, only 720 cars used Elm Street from 8:00 a.m. to 9:00 a.m. Find the percent of decrease of the traffic.

Here's a way to find the percent of decrease of the traffic:

- Find the amount of decrease.

$$\begin{array}{r} \text{number of cars} \\ \text{before highway} \end{array} - \begin{array}{r} \text{number of cars} \\ \text{after highway} \end{array} = \begin{array}{r} \text{amount of} \\ \text{decrease} \\ \text{opened} \end{array}$$

Figure 10

$$3600 \text{ cars} - 720 \text{ cars} = 2880 \text{ cars}$$

- Write a fraction comparing the amount of decrease to the original amount.

$$\frac{\text{amount of decrease}}{\text{number of cars before highway}} = \frac{2880 \text{ cars}}{3600 \text{ cars}}$$

- Write the fraction as a percent.

— Write the fraction as a decimal.

$$\frac{2880}{3600} = 2880 \div 3600 = 0.8$$

— Move the decimal point two places to the right.

$$0.80$$

— Write a percent sign.

$$80\%$$

So, the percent of decrease of traffic on Elm Street was 80%.

Finding Percent of Increase

When a quantity or value increases, you can calculate the percent of increase.

Example 25

Here's a way to find the percent of increase:

- Find the amount of increase.

$$\text{new quantity} - \text{old quantity} = \text{amount of increase}$$

- Write a fraction comparing the amount of increase to the original (old) quantity.

$$\frac{\text{amount of increase}}{\text{old quantity}}$$

- Write that fraction as a percent.

23. According to the 1980 census, the population of Los Angeles County was approximately 7.5 million. In 1990 the population was approximately 9 million. Find the percent of increase of the population.

Here's how to find the percent of increase:

You may find these Examples useful while doing the homework for this section.

- Find the amount of increase.

$$\begin{array}{r} \text{population in} \quad \text{population in} \quad \text{amount of} \\ \text{1990 census} \quad - \quad \text{1980 census} \quad = \quad \text{increase} \\ 9 \text{ million} \quad - \quad 7.5 \text{ million} \quad = \quad 1.5 \text{ million} \end{array}$$

- Write a fraction comparing the population increase to the 1980 population.

$$\frac{\text{amount of increase}}{\text{population in 1980 census}} = \frac{1.5 \text{ million}}{7.5 \text{ million}}$$

- Write the fraction as a percent.

— Write the fraction as a decimal.

$$\frac{1.5}{7.5} = 1.5 \div 7.5 = 0.20$$

— Move the decimal point two places to the right.

$$0.20 \rightarrow$$

— Write a percent sign.

$$20\%$$

Example 26

So, the percent of increase of the population was 20%.

24. Suppose the price of gasoline increases from \$1.28 to \$1.36. What is the percent of increase?

Here one way to find the percent of increase:

- Find the amount of increase.

$$\begin{array}{r} \text{new price} - \text{original price} = \text{amount of increase} \\ \$1.36 - \$1.28 = \$0.08 \end{array}$$

- Write a fraction comparing the amount of increase to the original amount.

$$\frac{\text{amount of increase}}{\text{original price}} = \frac{\$0.08}{\$1.28}$$

- Write the fraction as a percent.

— Write the fraction as a decimal.

$$\frac{0.08}{1.28} = 0.08 \div 1.28 = 0.0625$$

— Move the decimal point two places to the right.

$$0.0625 \rightarrow$$

— Write a percent sign.

$$6.25\%$$

Example 27

So, the percent of increase is 6.25%.

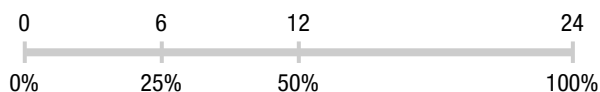
CONCEPT 3: SOLVING PERCENT PROBLEMS

Solving Some Percent Problems

To solve some percent problems it is often helpful to draw a number line to represent the problem.

For example, the number line in Figure 9 can be used to solve these three percent problems:

- What is 25% of 24?
- 6 is what percent of 24?
- 6 is 25% of what number?



Here are some general steps that outline one way to solve a percent problem:

- Draw a number line to represent the problem.
- Write a proportion corresponding to the picture.
- Solve the proportion.

Examples 25 and 28 show how to use these steps to solve specific problems.

Here are some general steps that outline another way to solve a percent problem.

- Identify the quantity that represents the “part” (of the whole).
- Identify the quantity that represents the “base” (that’s the whole quantity).
- Identify the “rate” (the percent).
- Use this formula to solve for the unknown quantity: $\text{Part} = \text{Base times Rate}$

See Example 26 for an example of how to use these steps to solve a percent problem.

See Example 27 for an example of a third way to solve a percent problem.

25. What is 7.65% of \$1600?

Here’s one way to answer the question:

- Draw a number line to represent the problem.
 - Use \$0 to \$1600 for the top scale.
 - Use 0% to 100% for the bottom scale.



- Write a proportion corresponding to the picture. $\frac{x}{7.65} = \frac{1600}{100}$
- Solve the proportion for x



Explore

This Explore contains three investigations.

- **A Survey**
- **Computing Tips**
- **A Percent Question**

You have been introduced to these investigations in the Explore module of this lesson on the computer. You can complete them using the information given here.

Investigation 1: A Survey

Survey at least 20 people about their ice-cream preference. Use the following table to record the information. (For each person, record their name in the first column and then place a check [✓] in one of the other four columns to indicate whether they don't like ice cream, or if they do, what is their favorite flavor.)

Ice Cream Survey				
Name	Doesn't like ice cream	Likes ice cream – favorite flavor		
		Chocolate	Vanilla	Other
Totals				

After you have completed your survey, complete the following exercises.

1. Report the survey results in the form of a fraction. Reduce each fraction if possible.

Doesn't like ice cream: $\frac{\text{number of people who don't like ice cream}}{\text{total number of people surveyed}}$ = _____

Vanilla: $\frac{\text{number of people whose favorite flavor is vanilla}}{\text{total number of people surveyed}}$ = _____

Chocolate: $\frac{\text{number of people whose favorite flavor is chocolate}}{\text{total number of people surveyed}}$ = _____

Other: $\frac{\text{number of people whose favorite flavor is other}}{\text{total number of people surveyed}}$ = _____

2. Report the survey results in question 1 as a decimal.

Doesn't like ice cream: _____

Vanilla: _____

Chocolate: _____

Other: _____

3. Report the survey results as a percent.

Doesn't like ice cream: _____

Vanilla: _____

Chocolate: _____

Other: _____

4. The line in Figure 12 is marked in 10 intervals. Each interval represents 10%. Illustrate the result of your survey by starting at the far left, counting the percent of people who don't like ice cream, and making a mark at that point. Now, start at this point, count the percent of people who like vanilla, and make a mark at that point. Continue this procedure for the other ice cream preferences. Your last mark should be at the far right.



Figure 13

5. Now, join the ends of the line in question 4 to make a circle. Connect the center of the circle with each mark you made on the line. Your picture should look like a pie. The whole pie represents 100%. Each piece of pie represents the percentage of people whose favorite flavor of ice cream corresponds to that piece.

Investigation 2: Computing Tips

One very common application of percent is to compute a 15% tip. Form a group with at most three other students in your class. Discuss the different ways the members of your group compute a 15% tip. Record your results below. You may be asked to present your findings in class, so keep this in mind when you record your results.

Method 1 for computing a 15% tip:

Method 2 for computing a 15% tip:

Method 3 for computing a 15% tip:

Method 4 for computing a 15% tip:

Now, discuss with your group different ways to compute a 20% tip. Are there methods that work for computing a 15% tip that don't work for a 20% tip and vice-versa?

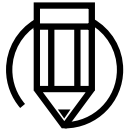
Investigation 3: A Percent Question

1. Ask 5 or 6 people the following questions and record their answers in the space provided. Before you ask others, record your own answers in the first row of the table.

Name	Is 15% of 20 equal to 20% of 15?	Is 60% of 75 equal to 75% of 60%?

2. In general, what can you say about $a\%$ of b and $b\%$ of a , regardless of the values of a or b ? Make up your own problems to investigate. Is the answer obvious to most people?

3. Can you prove your conclusion in question 2? It may be helpful to use the fractional form of percent.



Homework

Concept 1: Percent Definition

The Definition of Percent

For help working these types of problems, go back to Examples 1–4 in the Explain section of this lesson.

1. Use a 100-square grid like the one in Figure 13 to represent 48%.
Then write 48% as a decimal and as a fraction.
2. Use a 100-square grid like the one in Figure 13 to represent 62%.
Then write 62% as a decimal and as a fraction.
3. Use a 100-square grid like the one in Figure 13 to represent 85.5%.
Then write 85.5% as a decimal and as a fraction.
4. Use a 100-square grid like the one in Figure 13 to represent 35.5%.
Then write 35.5% as a decimal and as a fraction.
5. Use a 100-square grid like the one in Figure 13 to represent 33%. Then write 33% as a decimal and as a fraction.
6. Use a 100-square grid like the one in Figure 13 to represent 66%. Then write 66% as a decimal and as a fraction.
7. Represent each of the following percents on separate 100-square grids like the one in Figure 13.
 - a. 4.5%
 - b. 45%
 - c. 450%
8. Represent each of the following percents on separate 100-square grids like the one in Figure 13.
 - a. 2.5%
 - b. 25%
 - c. 250%
9. Represent each of the following percents on separate 100-square grids like the one in Figure 13.
 - a. 3.25%
 - b. 32.5%
 - c. 325%
10. Represent each of the following percents on separate 100-square grids like the one in Figure 13.
 - a. 1.25%
 - b. 12.5%
 - c. 125%

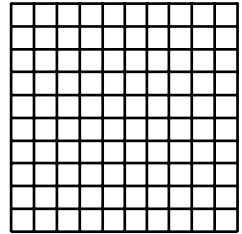
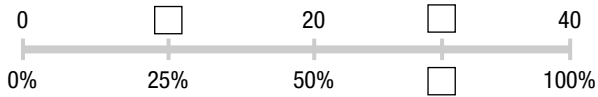


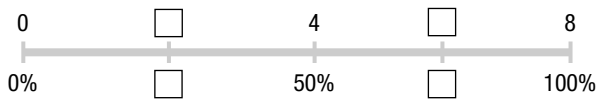
Figure 14

11. Fill in the missing information in the blank boxes on the number line below. Then answer the questions that follow.



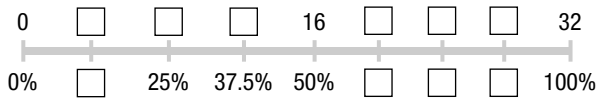
- a. 10 is what percent of 40?
- b. 25% of 40 is what number?
- c. 75% of what number is 30?
- d. 30 is what percent of 40?
- e. What percent of 40 is 20?
- f. 50% of what number is 20?

12. Fill in the missing information in the blank boxes on the number line below. Then answer the questions that follow.



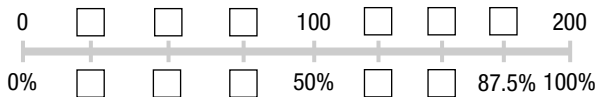
- a. 2 is what percent of 8?
- b. 25% of 8 is what number?
- c. 75% of what number is 6?
- d. 6 is what percent of 8?
- e. What percent of 8 is 4?
- f. 50% of what number is 4?

13. Fill in the missing information in the blank boxes on the number line below. Then answer the questions that follow.



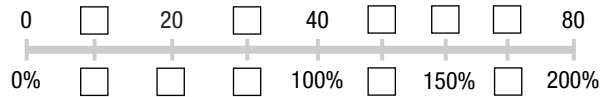
- a. 16 is what percent of 32?
- b. 25% of 32 is what number?
- c. 62.5% of what number is 20?
- d. 4 is what percent of 32?
- e. What percent of 32 is 12?
- f. 87.5% of what number is 28?

14. Fill in the missing information in the blank boxes on the number line below. Then answer the questions that follow.



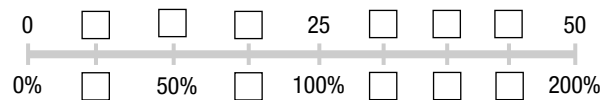
- a. 25 is what percent of 200?
- b. 25% of 200 is what number?
- c. 100% of what number is 200?
- d. 87.5% of what number is 175?
- e. 50 is what percent of 200?
- f. What percent of 200 is 100?

15. Fill in the missing information in the blank boxes on the number line below. Then answer the questions that follow.



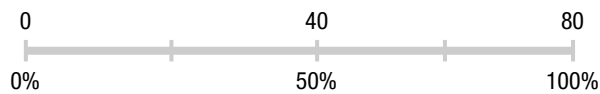
- a. 20 is what percent of 40?
- b. 150% of 40 is what number?
- c. 200% of what number is 80?
- d. 25% of what number is 10?
- e. 50 is what percent of 40?
- f. What percent of 40 is 70?

16. Fill in the missing information in the blank boxes on the number line below. Then answer the questions that follow.



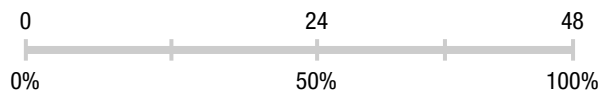
- a. 12.5 is what percent of 25?
- b. 200% of 25 is what number?
- c. 200% of what number is 50?
- d. 50% of what number is 12.5?
- e. 37.5 is what percent of 25?
- f. What percent of 25 is 25?

17. Use the number line below to find the number that is 75% of 80.



18. What number is 25% of 60?

19. The number 36 is what percent of 48? Use the number line below to help you find your answer?



20. The number 24 is what percent of 96?

21. The number 72 is what percent of 36?

22. The number 20 is what percent of 16?

23. The seating capacity of a classroom is 50. How many students are in the classroom if the room is 80% full?
To answer this question, find 80% of 50.

24. The seating capacity of a classroom is 80. How many students are in class if the room is 75% full?
To answer this question, find 75% of 80.

-
25. A sweatshirt regularly sells for \$20 and is now on sale for \$8. What percent of the original price is the sale price?
That is, \$8 is what percent of \$20?
26. A chair regularly sells for \$360 and is now on sale for \$90. What percent of the original price is the sale price?
That is, \$90 is what percent of \$360?
27. If \$500 is invested in an account earning 5% simple interest annually, how much interest will be earned in the first year of the investment? To answer this question, find 5% of \$500.
28. If \$800 is invested in an account earning 5% simple interest annually, how much interest will be earned in the first year of the investment? To answer this question, find 5% of \$800.
29. Of the 200 calories per serving of a certain yogurt, 25 calories come from fat. What percentage of the calories come from fat?
That is, 25 is what percent of 200?
30. Of the 200 calories in an energy bar, 75 calories come from fat. What percentage of the calories come from fat?
That is, 75 is what percent of 200?

Concept 2: Converting

Writing a Percent as a Decimal

For help working these types of problems, go back to Examples 5–8 in the Explain section of this lesson.

31. Write 26% as a decimal.
32. Write 72% as a decimal.
33. Write 3% as a decimal.
34. Write 2% as a decimal.
35. Write 36.7% as a decimal.
36. Write 43.9% as a decimal.
37. Write 25.85% as a decimal.
38. Write 58.34% as a decimal.
39. Write 215% as a decimal.
40. Write 137% as a decimal.
41. Write 125% as a decimal.
42. Write 465% as a decimal.
43. Write $16\frac{2}{3}\%$ as a decimal.
44. Write $11\frac{1}{9}\%$ as a decimal.
45. Write $83\frac{1}{3}\%$ as a decimal.
46. Write $77\frac{7}{9}\%$ as a decimal.
47. A store is having a sale and everything is 30% off. Write 30% as a decimal.
48. A store is having a sale and everything is 25% off. Write 25% as a decimal.

-
49. A particular county in California has a sales tax of $7\frac{1}{4}\%$. Write $7\frac{1}{4}\%$ as a decimal.
 50. A particular county in Washington has a sales tax of $8\frac{1}{4}\%$. Write $8\frac{1}{4}\%$ as a decimal.
 51. A serving of a certain brand of yogurt provides 5% of the recommended daily value of fat. Write 5% as a decimal.
 52. An energy bar provides 11% of the recommended daily value of fat. Write 11% as a decimal.
 53. The interest rate on a certain credit card is 11.9%. Write 11.9% as a decimal.
 54. The interest rate on a certain credit card is 15.5%. Write 15.5% as a decimal.

Writing a Decimal as a Percent

For help working these types of problems, go back to Examples 9–12 in the Explain section of this lesson.

55. Write the decimal 0.9 as a percent.
56. Write the decimal 0.4 as a percent.
57. Write the decimal 0.1 as a percent.
58. Write the decimal 0.2 as a percent.
59. Write the decimal 0.29 as a percent.
60. Write the decimal 0.37 as a percent.
61. Write the decimal 0.61 as a percent.
62. Write the decimal 0.83 as a percent.
63. Write the decimal 2.0 as a percent.
64. Write the decimal 3.0 as a percent.
65. Write the decimal 4.7 as a percent.
66. Write the decimal 7.1 as a percent.
67. Write the decimal 0.095 as a percent.
68. Write the decimal 0.023 as a percent.
69. Write the decimal 0.062 as a percent.
70. Write the decimal 0.015 as a percent.
71. To find the amount of interest earned on a savings account in one year, a bank multiplies the amount in the account by 0.065. Write 0.065 as a percent to find the interest rate on the account.
72. To find the amount of interest earned on a checking account in one year, a bank multiplies the amount in the account by 0.0175. Write 0.0175 as a percent to find the interest rate on the account.
73. The pitch on a roof is 0.36. Write 0.36 as a percent.
74. The slope of a hill is 0.22. Write 0.22 as a percent.
75. The sale price of a coat is 0.9 times the original price. Write 0.9 as a percent.

-
76. The sale price of a sweater is 0.7 times the original price. Write 0.7 as a percent.
77. To get the selling price of a vehicle, a particular dealer multiplies the wholesale price by 1.05. Write 1.05 as a percent.
78. To get the selling price of a book, a particular salesperson multiplies the wholesale price by 1.2. Write 1.2 as a percent.

Writing a Percent as a Fraction

For help working these types of problems, go back to Examples 13–16 in the Explain section of this lesson.

79. Write 37% as a fraction.
80. Write 87% as a fraction.
81. Write 75% as a fraction.
82. Write 60% as a fraction.
83. Write 240% as a fraction.
84. Write 730% as a fraction.
85. Write 125% as a fraction.
86. Write 225% as a fraction.
87. Write $66\frac{2}{3}\%$ as a fraction.
88. Write $16\frac{2}{3}\%$ as a fraction.
89. Write $11\frac{1}{9}\%$ as a fraction.
90. Write $83\frac{1}{3}\%$ as a fraction.
91. Write 3.5% as a fraction.
92. Write 2.9% as a fraction.
93. Write 1.2% as a fraction.
94. Write 8.5% as a fraction.
95. A reservoir is filled to 80% of capacity. Write 80% as a fraction.
96. A gas tank is 60% full. Write 60% as a fraction.
97. A hill has a 7.5% grade. Write 7.5% as a fraction.
98. A roof has a pitch of 4.2%. Write 4.2% as a fraction.
99. The interest rate on a savings account is $3\frac{1}{4}\%$. Write $3\frac{1}{4}\%$ as a fraction.
100. The interest rate on an investment is $10\frac{2}{3}\%$. Write $10\frac{2}{3}\%$ as a fraction.
101. In a survey, 4.3% of the respondents were from a country other than the United States. Write 4.3% as a fraction.
102. Of the people enrolled in a college, 5% came from the same town. Write 5% as a fraction.

Writing a Fraction as a Percent

For help working these types of problems, go back to Examples 17–20 in the Explain section of this lesson.

103. Write $\frac{7}{16}$ as a percent.
104. Write $\frac{5}{16}$ as a percent.
105. Write $\frac{3}{8}$ as a percent.
106. Write $\frac{15}{24}$ as a percent.
107. Write $3\frac{3}{4}$ as a percent.
108. Write $6\frac{1}{4}$ as a percent.
109. Write $2\frac{3}{8}$ as a percent.
110. Write $\frac{13}{5}$ as a percent.
111. Write $\frac{17}{25}$ as a percent.
112. Write $\frac{24}{25}$ as a percent.
113. Write $\frac{19}{20}$ as a percent.
114. Write $\frac{4}{5}$ as a percent.
115. Write $\frac{11}{15}$ as a percent.
116. Write $\frac{13}{15}$ as a percent.
117. Write $\frac{5}{12}$ as a percent.
118. Write $\frac{5}{18}$ as a percent.
119. Sandy had $\frac{3}{25}$ of his paycheck deposited into a savings account. Write $\frac{3}{25}$ as a percent.
120. Mercedes spends $\frac{1}{5}$ of her paycheck on miscellaneous items. Write $\frac{1}{5}$ as a percent.
121. If $\frac{7}{16}$ of the books in a bookstore are fiction, what percent of the books are fiction? Write $\frac{7}{16}$ as a percent.
122. If $\frac{1}{16}$ of the movies on a movie club list are rated G, what percent of the movies are rated G? Write $\frac{1}{16}$ as a percent.
123. A reservoir is $\frac{17}{20}$ full. Write $\frac{17}{20}$ as a percent.
124. A pool is $\frac{3}{5}$ full. Write $\frac{3}{5}$ as a percent.
125. The retail price of a car is $1\frac{1}{20}$ times the wholesale price. What is the percent markup on the vehicle? Write $1\frac{1}{20}$ as a percent.
126. The retail price of a necklace is $1\frac{2}{5}$ times the wholesale price. What is the percent markup on the necklace? Write $1\frac{2}{5}$ as a percent.

127. Fill in the missing values in the table below.

Percent	Decimal	Fraction
1%	0.01	$\frac{1}{100}$
0.9%	_____	_____
_____	0.0099	_____
_____	_____	$\frac{1}{10}$
_____	0.11	_____
_____	_____	$\frac{1}{4}$
_____	0.42	_____
50%	_____	_____
_____	_____	$\frac{99}{100}$
125%	_____	_____
_____	1.33	_____
_____	_____	$1\frac{1}{2}$

128. Fill in the missing values in the table below.

Percent	Decimal	Fraction
10%	0.1	$\frac{1}{10}$
75%	_____	_____
_____	0.005	_____
_____	_____	$\frac{1}{8}$
_____	2.25	_____
_____	_____	$\frac{4}{5}$
_____	0.141	_____
150%	_____	_____
_____	_____	$\frac{27}{100}$
37.5%	_____	_____
_____	3.0	_____
_____	_____	$\frac{77}{1000}$

Finding Percent of Decrease

For help working these types of problems, go back to Examples 21–22 in the Explain section of this lesson.

129. The temperature at noon was 75° and at midnight was 60° .
What was the percent decrease in temperature over the 12-hour time period?
130. The temperature at noon was 100° and at midnight was 75° .
What was the percent decrease in temperature over the 12-hour time period?
131. A college class started out with 48 students. After the first drop date, there were 36 students.
What was the percent of decrease in the class size?
132. A college class started out with 56 students. After the first drop date, there were 35 students.
What was the percent of decrease in the class size?
133. Carly just changed jobs. Her commute to her old job took 45 minutes while the commute to her new job only takes 15 minutes.
What is the percent decrease in her commute time?
134. Riley just bought a new airplane. With the new plane it takes only 30 minutes to make a trip that used to take 45 minutes.
Find the percent decrease in the trip time.
135. If a car sold for \$16,000 and its value after one year is \$13,500, what is the percent decrease in the value of the car?

-
136. Kay bought a house for \$180,000. Unfortunately, the housing market took a turn for the worse and when Kay tried to sell the house it was appraised at \$150,000. Find the percent decrease in the price of the house.
137. The stock for a certain company was selling for \$200 per share until the President of the company resigned. After her resignation, the price of the stock dropped to \$75 per share. Find the percent decrease in the price per share.
138. Ralph has taken a new job that pays less but is more satisfying. If he was making an annual salary of \$32,000 in his old job and is now making \$26,000, what is the percent decrease in his annual salary?
139. A patient's systolic blood pressure reading dropped from 120 to 110. What is the percent decrease in the systolic reading?
140. A patient's diastolic blood pressure reading dropped from 80 to 70. What is the percent decrease in the diastolic reading?
141. Jody has been dieting and has lost 24 pounds. If his beginning weight was 200 pounds, find the percent decrease in Jody's weight.
142. Lane has been dieting and has lost 35 pounds. If his initial weight was 210 pounds, find the percent decrease in Lane's weight.
143. On a freeway, traffic was moving at 75 mph. At the sighting of a police car, the flow of traffic slowed to 60 mph. What was the percent decrease in the speed of the flow of traffic?
144. The speed limit on California State Highway 99 ranges from 70 mph to 55 mph. What is the percent decrease if you are traveling on a section of the highway where the speed limit decreases from 70 mph to 55 mph? Round your answer to the nearest percent.
145. Before a heat wave, a pool had 1800 gallons of water. After the heat wave, the pool had only 1200 gallons of water. Find the percent of decrease in the amount of water in the pool.
146. At the start of a trip, a car's gas tank had 15 gallons of fuel. At the end of the trip, the gas tank had only 9 gallons of fuel. Find the percent of decrease in the amount of fuel in the gas tank.
147. A commercial jetliner is experiencing turbulence so the pilot decreases its altitude from 35,000 feet to 28,000 feet. Find the percent decrease in altitude.
148. A mountain climber is experiencing dizziness at 12,000 feet so he descends to 9000 feet. What is the percent decrease in the altitude of the climber?
149. Beth suffers from Carpel Tunnel Syndrome. Before the onset of the syndrome her typing speed was 75 words per minute. After the onset her typing speed dropped to 45 words per minute. Find the percent decrease in Beth's typing speed.
150. Alicia suffers from migraine headaches. Before the onset of a headache her reading speed is 30 pages per hour. During a headache her reading rate drops to 12 pages per hour. Find the percent decrease in Alicia's reading speed.
151. During a diet, Herschel changed from drinking whole milk which has 8 grams of fat per serving to drinking low fat milk which has 2.5 grams of fat per serving. Find the percent decrease in grams of fat per serving.
152. During a diet, Lyle changed from drinking whole milk which has 8 grams of fat per serving to drinking low fat milk which has 5 grams of fat per serving. Find the percent decrease in grams of fat per serving.

Finding Percent of Increase

For help working these types of problems, go back to Examples 23–24 in the Explain section of this lesson.

153. During pregnancy a woman should gain 20 to 30 pounds. If Sonia weighed 157 pounds at the beginning of her pregnancy and was 179.5 pounds the day before her baby was delivered, find the percent of increase, to the nearest tenth of a percent, in Sonia's weight during the pregnancy.
154. During pregnancy a woman should gain 20 to 30 pounds. If Anna weighed 144 pounds at the beginning of her pregnancy and was 168 pounds the day before her baby was delivered, find the percent of increase in Anna's weight during the pregnancy.

155. Due to an untimely hailstorm, the price of apricots rose from \$0.64 per pound to \$1.20 per pound.
What was the percent of increase in the price per pound?
156. Due to an untimely freeze, the price of oranges increased from \$0.48 per pound to \$0.78 per pound.
What was the percent of increase in the price per pound?
157. To get out of the jet stream, the pilot of a commercial jet changed the altitude of the jet from 25,000 feet to 35,000 feet.
Find the percent of increase in the altitude of the jet.
158. A mountain climber climbed from 8,000 feet to 11,600 feet. Find the percent of increase in the altitude of the climber.
159. The retail price of a new vehicle is \$15,750. If the wholesale price is \$15,000, what is the percent of increase, from wholesale to retail, in the price of the vehicle?
160. The retail price of a face lotion is \$1.50. If the wholesale price is \$1.00, what is the percent of increase, from wholesale to retail, in the price of the lotion?
161. In order to pass a semi truck quickly, a motorist increases his speed from 60 mph to 75 mph.
Find the percent increase in the motorist's speed.
162. In order to pass another vehicle before his exit, a motorist increases his speed from 55 mph to 66 mph.
Find the percent increase in the motorist's speed.
163. A barrel has 10 gallons of water in it before a rain storm. After the rainstorm the barrel contains 25 gallons of water.
Find the percent of increase in the amount of water in the barrel.
164. A pool initially contains 2700 gallons of water. Then more water is added so it contains 3915 gallons of water. Find the percent of increase in the amount of water in the pool.
165. A population of bacteria doubles every hour. If you start with 10 such bacteria and two hours later have 40, what is the percent of increase in the population of the bacteria?
166. A population of bacteria triples every hour. If you start with 20 such bacteria and two hours later have 180, what is the percent of increase in the population of the bacteria?
167. A baby at birth weighed 8.5 pounds. At her first birthday she weighed 20.4 pounds. Find the percent of increase in the baby's weight.
168. A baby at birth weighed 8 pounds. At his first birthday he weighed 20 pounds. Find the percent of increase in the baby's weight.
169. A fish tank had 14 fish in it when one of the fish had 7 babies. Find the percent of increase in the number of fish in the tank.
170. A fish tank had 16 fish when one of the fish had 10 babies. Find the percent of increase in the number of fish in the tank.
171. A company's stock rose from \$8 per share to \$15 per share. Find the percent of increase in the price of the stock per share.
172. A company's stock rose from \$12 per share to \$21 per share. Find the percent of increase in the price of the stock per share.
173. At the beginning of a semester, 25 students were enrolled in Elementary Algebra. The instructor added another 15 students to the class at the first class meeting. Find the percent of increase in the number of students enrolled in the class.
174. At the beginning of a semester, 30 students were enrolled in Elementary Algebra. The instructor added another 12 students to the class at the first class meeting. Find the percent of increase in the number of students enrolled in the class.
175. The price of a text book increased from \$31.50 to \$37.80. Find the percent increase in the price of the book.
176. The price of a text book increased from \$45.00 to \$58.50. Find the percent increase in the price of the book.

Concept 3: Solving Percent Problems

Solving Some Percent Problems

For help working these types of problems, go back to Examples 25–28 in the Explain section of this lesson.

177. What is 40% of 3600?
178. What is 80% of 4800?
179. What is 37.5% of 248?
180. What is 62.5% of 656?
181. What is $16\frac{2}{3}\%$ of 348? Round your answer to the nearest whole number.
182. What is $33\frac{1}{3}\%$ of 612? Round your answer to the nearest whole number.
183. 425 is what percent of 1700?
184. 32 is what percent of 256?
185. 526 is what percent of 600?
186. 900 is what percent of 600?
187. 150 is what percent of 60?
188. 33 is what percent of 60?
189. 322 is 35% of what number?
190. 774 is 15% of what number?
191. 23 is 79.2% of what number? Round your answer to the nearest whole number.
192. 47 is 29.6% of what number? Round your answer to the nearest whole number.
193. To find the selling price of a vehicle, a dealer multiplies the wholesale price by 120%. If the selling price of the vehicle is \$5230, what is the wholesale price?
194. Kinna has part of a sales receipt. She needs to know what the purchase price was on her merchandise but can only read the amount of tax she paid. If the tax rate is $7\frac{3}{4}\%$ and the amount of tax she paid was \$1.77, find the purchase price on the merchandise.
195. If the sales tax is $6\frac{1}{4}\%$, how much tax will you have to pay on a purchase of \$71.49?
196. If the annual interest rate on a savings account is $3\frac{1}{4}\%$, how much interest will there be in one year on a deposit of \$750?
197. Shelly spends \$350 per month on rent. If her take-home pay is \$1129 per month, what percentage of her take-home pay does she spend on rent?
198. Kelly spends \$430 per month on rent. If her take-home pay is \$1720 per month, what percentage of her take-home pay does she spend on rent?
199. A student buys a used book for \$19.50. This is 85% of the original price of the book. How much did the book originally cost?
200. Kyle spends \$210 per month on food and miscellaneous supplies. If this is 15% of monthly take-home pay, how much money does Kyle take home monthly?



Evaluate

Take this Practice Test to prepare for the final quiz in the Evaluate module of this lesson on the computer.

Practice Test

- Write each percent as a decimal number.
 - 26%
 - 192%
- For the 100-square grids in Figures 14 and 15, find the percent that is shaded.

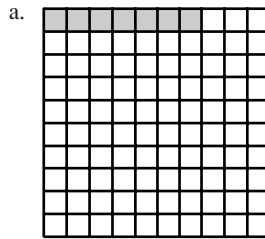


Figure 15

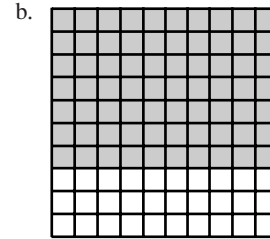


Figure 16

- The number line in Figure 16 is divided into four parts of equal length. Use the number line to answer this question: 27 is what percent of 36?

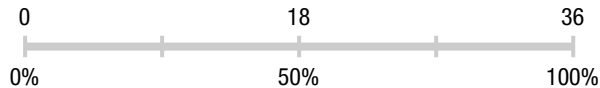


Figure 16

- Use the number line in Figure 17 to find 37.5% of 560.

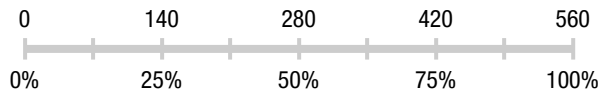


Figure 17

- Write 243.7% as a decimal number.
- Write the decimal number 5.132 as a percent.
- Circle the expression(s) below that are equal to 72%.
7.2 0.72 $\frac{72}{100}$ $\frac{72}{1000}$ $\frac{18}{25}$
- Last year, the original price of a popular sweater was \$40. This year, the price is \$54. Find the percent increase in price.

-
9. On an algebra test, Mario answered 30% of the questions correctly. The test contained a total of 80 questions. How many questions did Mario answer correctly? That is, what is 30% of 80?
 10. 16 is what percent of 25?
 11. A new company has hired 13 employees. This is 20% of the number of employees it expects to have at the end of next year. How many employees does it expect to have next year? That is, 13 is 20% of what number?
 12. When Cindy and Tony arrived at the airport, they found that their luggage weighed 45 pounds. This is 25% more than the accepted weight limit. What is the weight limit for luggage? That is, 45 is 125% of what number?



Topic F3 Cumulative Review

These problems cover the material from this and previous topics. You may wish to do these problems to check your understanding of the material before you move on to the next topic, or to review for a test.

1. Do this subtraction: $11.48 - 9.67$
2. Do this division: $\frac{24}{18} \div \frac{16}{9}$
3. Write $\frac{5}{8}$ as a percent.
4. What are the factors of 36?
5. Do this division: $57.66 \div 12.4$
6. Write a fraction which represents the ratio of 7 mangoes to 3 peaches.
7. True or false? The fractions $\frac{7}{12}$ and $\frac{21}{36}$ are equivalent fractions.
8. What is the reciprocal of $\frac{4}{5}$?
9. Write 138% as a decimal.
10. Find the least common denominator of $\frac{2}{9}$ and $\frac{8}{15}$.
11. Zach bought a pair of shoes for \$38.71 and a pair of socks for \$2.40. Estimate whether the total amount he spent was closer to \$41 or to \$42.
12. Find the missing number in this proportion: $\frac{x}{9} = \frac{12}{27}$
13. Round this number to the nearest thousand: 235,482
14. Add these fractions: $\frac{11}{17} + \frac{6}{13}$
15. A blouse that normally sells for \$36 is discounted to a price of \$27. Find the percent decrease in the price of the blouse.
16. Find the value of z which makes this statement true: $8z = 28$
17. Write this decimal number as a fraction in lowest terms: 0.84
18. What number is 30% of 70?
19. Write as a decimal number: two hundred twelve and fifteen thousandths
20. A pancake recipe calls for $\frac{3}{4}$ cup of buttermilk. Colleen is making a double batch of pancakes. How many cups of buttermilk does she need?
21. Jennie's car travels 390 miles on 12.5 gallons of gasoline. Find the gas mileage in miles per gallon.
22. True or false: $231.02 > 231.020$

23. Niki recorded the number of passes dropped and the number of receptions made by each receiver on her football team in yesterday's game.

Receiver	Number of Passes Dropped	Number of Receptions Made
Kristi	2	5
Jeff	3	9
Wanda	1	6

For each receiver, make a fraction with the number of passes dropped in the numerator and the number of receptions made in the denominator. Put these fractions in order from least to greatest.

24. Write 56% as a fraction in lowest terms.
25. Combine the terms with an "x" and combine the terms with a "y":
 $\frac{1}{6}x + \frac{3}{4}y + \frac{1}{2}x + \frac{2}{9}y$
26. Do this multiplication: 4.9×0.7
27. The ratio of men to women on a bus is 3 to 4. There are 28 people on the bus. How many men and how many women are on the bus?
28. Round this number to the nearest hundredth: 351.2754
29. Find the value of x that makes this statement true: $4.2 + x = 11.5$
30. True or false? $30\% = 3.0$
31. What is $\frac{3}{5}$ of 11?
32. Choose the fraction below that is equivalent to $\frac{2}{3}$:
 $\frac{12}{13}$ $\frac{3}{5}$ $\frac{10}{15}$ $\frac{14}{25}$
33. The price of a movie ticket increased from \$6.50 to \$7.50. Find the percent increase in the price of a movie ticket. Round your answer to the nearest hundredth.
34. Find the GCF of 40 and 28.
35. Which is greater, 4^2 or 4×2 ?
36. What is the value of the 9 in 2983.41?
37. Write a ratio to compare 4 feet to 18 inches. (Hint: 12 inches = 1 foot.)
38. Find: $8 \times 3 + (4 \times 6) \div 3$.
39. True or false? $\frac{4}{5} < \frac{12}{15}$
40. Write $\frac{9}{12}$ as a decimal number.