

# Percents, Fractions, and Decimals

## KEY Concept

A fraction in simplest form has a numerator and denominator that do not have a common factor. Recall that to write fractions in simplest form, you have to divide the numerator and denominator by their greatest common factor (GCF).

Half of all percents, when written as a fraction with 100 in the denominator, can be reduced.

An even number and 100 have a common factor of at least 2.

$$34\% = \frac{34}{100} = \frac{34 \div 2}{100 \div 2} = \frac{17}{50} \quad 50\% = \frac{50}{100} = \frac{50 \div 50}{100 \div 50} = \frac{1}{2}$$

When you convert a fraction to a decimal and a percent, divide the numerator by the denominator.

$$\frac{4}{5}$$

$$\begin{array}{r} 0.8 \\ 5 \overline{)4.0} \\ \underline{-40} \\ 0 \end{array}$$

$$0.8 = 80\%$$

## VOCABULARY

### decimal

numbers that have digits in the tenths place and beyond

### equivalent fractions

fractions that name the same number

### percent

a ratio that compares a number to 100

For percents that are commonly used, you should become familiar with the equivalent decimals and fractions in simplest form.

### Example 1

Write 8% as a decimal and as a fraction in simplest form.

1. The % sign means *out of 100*. Write 8% as a fraction using this definition.

$$8\% = \frac{8}{100}$$

2.  $\frac{8}{100}$  is read as *8 hundredths*.

Write this as a decimal.

$$0.08$$

3. Simplify the fraction, if possible.

$$\frac{8 \div 4}{100 \div 4} = \frac{2}{25}$$

### YOUR TURN!

Write 115% as a decimal and as a fraction in simplest form.

1. Write 115% as a fraction.

$$115\% = \frac{\quad}{100} \text{ or } 1\frac{\quad}{100}$$

2.  $1\frac{15}{100}$  is read as *1 and 15 hundredths*.

Write this as a decimal. \_\_\_\_\_

3. Simplify the fraction, if possible.

$$1\frac{15}{100} = 1\frac{15 \div \boxed{\quad}}{100 \div \boxed{\quad}} = 1\frac{\quad}{\quad}$$

GO ON 

### Example 2

Write  $\frac{3}{5}$  as a percent and as a decimal.

1. Identify the denominator. 5
2. What number multiplied by 5 is 100? 20
3. Write a fraction with a denominator of 20 that is equivalent to 1.  $\frac{20}{20}$
4. Multiply  $\frac{3}{5}$  by  $\frac{20}{20}$  to obtain a fraction with a denominator of 100.

$$\frac{3}{5} \times \frac{20}{20} = \frac{3 \times 20}{5 \times 20} = \frac{60}{100}$$

5. Write the fraction as a percent and as a decimal.

$$\frac{3}{5} = \frac{60}{100} = 60\% \qquad \frac{3}{5} = \frac{60}{100} = 0.60$$

To write 0.60 as a percent, you can move the decimal point two places to the right and add a % symbol.  $0.60 = 60\%$

### YOUR TURN!

Write  $\frac{3}{4}$  as a percent and as a decimal.

1. Identify the denominator. \_\_\_\_\_
2. What number multiplied by \_\_\_\_\_ is 100? \_\_\_\_\_
3. Write a fraction with a denominator of \_\_\_\_\_ that is equivalent to 1. \_\_\_\_\_
4. Multiply  $\frac{3}{4}$  by \_\_\_\_\_ to obtain a fraction with a denominator of 100.

$$\frac{3}{4} \times \frac{\boxed{\phantom{00}}}{\boxed{\phantom{00}}} = \frac{3 \times \phantom{00}}{4 \times \phantom{00}} = \frac{\phantom{00}}{100}$$

5. Write the fraction as a percent and as a decimal.

$$\frac{3}{4} = \frac{\phantom{00}}{100} = \phantom{00}\% \qquad \frac{3}{4} = \frac{\phantom{00}}{100} = \phantom{00}$$

### Example 3

Write  $\frac{1}{8}$  as a decimal and as a percent.

1. Divide to write the fraction as a decimal.

Read  $\frac{1}{8}$  as 1 divided by 8.  $\frac{1}{8} \Rightarrow$

$$\begin{array}{r} 0.125 \\ 8 \overline{)1.000} \\ \underline{-8} \phantom{00} \\ 20 \phantom{0} \\ \underline{-16} \phantom{0} \\ 40 \\ \underline{-40} \\ 0 \end{array}$$

2. Write the decimal as a percent by moving the decimal point two places to the right and adding a % sign.

$$\frac{1}{8} = 0.125 = 12.5\%$$

### YOUR TURN!

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

1. Divide to write the fraction as a decimal.

Read  $\frac{5}{8}$  as 5 divided by 8.  $\frac{5}{8} \Rightarrow$

$$\begin{array}{r} 0. \\ 8 \overline{)5.000} \end{array}$$

2. Write the decimal as a percent by moving the decimal point two places to the right and adding a % sign.

$$\frac{5}{8} = 0. \phantom{00} = \phantom{00}\% \phantom{00}$$

## Who is Correct?

Write  $\frac{1}{16}$  as a decimal.

**Sadie**

$$\begin{array}{r} 0.06225 \\ 16 \overline{)1.000} \\ \underline{-64} \phantom{00} \\ 360 \phantom{0} \\ \underline{-320} \phantom{0} \\ 400 \phantom{0} \\ \underline{-320} \phantom{0} \\ 80 \phantom{0} \\ \underline{-80} \\ 0 \end{array}$$

**Delmar**

$$\begin{array}{r} 0.0625 \\ 16 \overline{)1.000} \\ \underline{-96} \phantom{00} \\ 40 \phantom{0} \\ \underline{-32} \phantom{0} \\ 80 \phantom{0} \\ \underline{-80} \\ 0 \end{array}$$

**Ken**

$$\frac{1}{16} = \frac{1 \times 6.25}{16 \times 6.25} = \frac{6.25}{100} = 0.0625$$

Circle correct answer(s). Cross out incorrect answer(s).



## Guided Practice

Write each percent as a fraction or mixed number in simplest form and as a decimal.

1  $4\% = \frac{\boxed{\phantom{00}}}{100} = \underline{\hspace{2cm}}$

2  $16\% = \frac{\boxed{\phantom{00}}}{100} = \underline{\hspace{2cm}}$

$$\frac{4}{100} = \frac{4 \div \boxed{\phantom{00}}}{100 \div \boxed{\phantom{00}}} = \frac{\boxed{\phantom{00}}}{\boxed{\phantom{00}}}$$

$$\frac{16}{100} = \frac{16 \div \boxed{\phantom{00}}}{100 \div \boxed{\phantom{00}}} = \frac{\boxed{\phantom{00}}}{\boxed{\phantom{00}}}$$

## Step by Step Practice

3 Write  $\frac{5}{16}$  as a percent and as a decimal.

**Step 1** Divide 5 by 16.

$$16 \overline{)5.000}$$

**Step 2** To write as a percent, move the decimal point two places to the right and add the percent sign.

\_\_\_\_\_



Write each fraction as a decimal and as a percent.

4  $\frac{8}{25}$  \_\_\_\_\_

5  $\frac{2}{25}$  \_\_\_\_\_

6  $\frac{6}{32}$  \_\_\_\_\_

7  $\frac{7}{16}$  \_\_\_\_\_

### Step by Step Problem-Solving Practice

Solve.

- 8 **CHEMISTRY** During a chemistry experiment, Madela filled four beakers with different amounts of liquid. She must mark each beaker with the percent of liquid with which it was filled. How should she mark the beakers?

#### Problem-Solving Strategies

- Use a table.
- Look for a pattern.
- Guess and check.
- Use logical reasoning.
- Work backward.

**Understand** Read the problem. Write what you know.

The beakers must be marked with a \_\_\_\_\_.

**Plan** Pick a strategy. Two strategies are to look for a pattern and use logical reasoning.

**Solve** Look at the first beaker. How full is it? \_\_\_\_\_

How does the second beaker compare to the first one?

\_\_\_\_\_

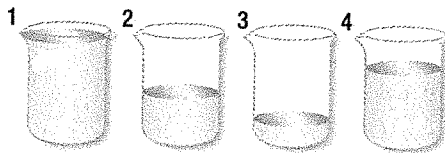
How does the third beaker compare with the second one?

\_\_\_\_\_

How does the fourth beaker compare with the other three beakers?

\_\_\_\_\_

Label each beaker with the correct percent, fraction, and decimal.



Percent: \_\_\_\_\_

Fraction: \_\_\_\_\_

Decimal: \_\_\_\_\_

**Check**

Is the greatest percent under the beaker with the greatest amount of liquid? Is the least percent under the beaker with the least amount of liquid?

- 9 **MOVIES** The table shows student responses to a survey about the students' favorite types of movies. There were 100 responses. What fraction of students chose action films as their favorite type of movie?

Favorite Types of Movies	% of Students
Animated	50%
Action	25%
Foreign	12.5%
Science Fiction	12.5%

Check off each step.

\_\_\_\_\_ Understand: I underlined the key words.

\_\_\_\_\_ Plan: To solve the problem, I will \_\_\_\_\_

\_\_\_\_\_ Solve: The answer is \_\_\_\_\_

\_\_\_\_\_ Check: I checked my answer by \_\_\_\_\_

- 10 **Reflect** When you change a percent to a decimal, you move the decimal point two place values to the left. Why is it always two places?

\_\_\_\_\_

\_\_\_\_\_

## Skills, Concepts, and Problem Solving

Write each percent as a fraction or mixed number in simplest form and as a decimal.

11 12% \_\_\_\_\_

12 6% \_\_\_\_\_

13 115% \_\_\_\_\_

14 130% \_\_\_\_\_

15 40% \_\_\_\_\_

16 75% \_\_\_\_\_

17 220% \_\_\_\_\_

18 3% \_\_\_\_\_

19 33% \_\_\_\_\_

20 125% \_\_\_\_\_

**GO ON** 

Write each fraction as a decimal and as a percent.

21  $\frac{1}{3}$  \_\_\_\_\_

22  $\frac{2}{3}$  \_\_\_\_\_

23  $\frac{3}{2}$  \_\_\_\_\_

24  $\frac{9}{4}$  \_\_\_\_\_

25  $\frac{3}{5}$  \_\_\_\_\_

26  $\frac{5}{8}$  \_\_\_\_\_

27  $\frac{23}{10}$  \_\_\_\_\_

28  $\frac{5}{6}$  \_\_\_\_\_

29  $\frac{3}{4}$  \_\_\_\_\_

30  $\frac{8}{5}$  \_\_\_\_\_

Write each percent as a fraction and decimal to complete this chart of common percents.

	Percent	Meaning	Fraction	Decimal
31	10%	10 out of 100		
32	20%	20 out of 100		
33	25%	25 out of 100		
34	50%	50 out of 100		
35	75%	75 out of 100		

Solve.

36 **PARTY** Harrison is making punch for a party that is  $\frac{2}{5}$  pineapple juice. What percent of the punch is pineapple juice?

\_\_\_\_\_

37 **SNACKS** Justin is making trail mix. The recipe says 2 parts crunchy cereal, 1 part peanuts, 1 part raisins, and 1 part pretzels. What fraction of the mix is peanuts? What percent of the mix is raisins?

\_\_\_\_\_

**Vocabulary Check** Write the vocabulary word that completes each sentence.

38 Numbers that have digits in the tenths place and beyond are called \_\_\_\_\_.

39 A percent is a(n) \_\_\_\_\_ that compares a number to 100.

40 **Writing in Math** Explain how to change a fraction to a percent.

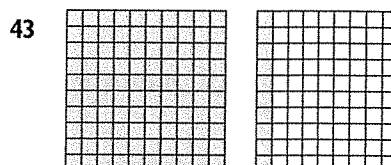
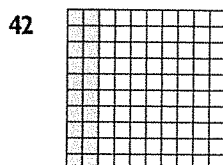
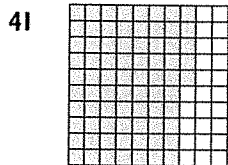
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 **Spiral Review**

**Identify the percent shown in each model.** (Lesson 3-1, p. 102)



\_\_\_\_\_

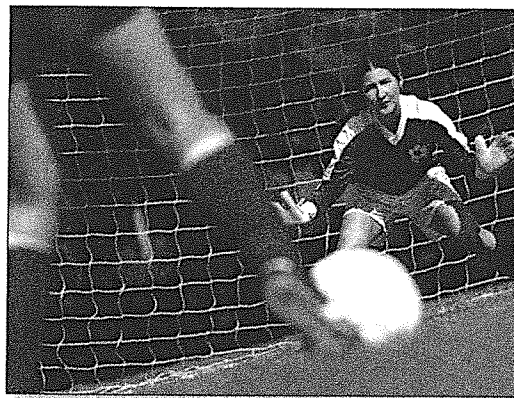
**Write the ratio as a percent. Then write the ratio as a fraction with 100 in the denominator and as a decimal.**

44 a soccer league with 100 players;  
34 are in the 7th grade

percent: \_\_\_\_\_

fraction: \_\_\_\_\_

decimal: \_\_\_\_\_



**Solve.**

45 **PIZZA** In Ava's class, 11 out of 20 students like pepperoni pizza and 9 out of 20 students like cheese pizza. Write these ratios as percents.

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