9-5 Percent

Objective: To write fractions and decimals as percents and to write percents as fractions and decimals.

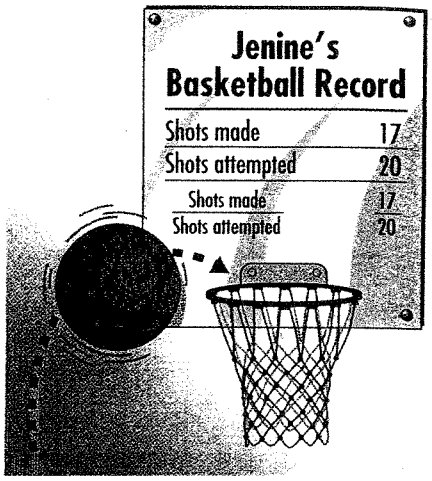
Terms to Know
- *percent*

DATA ANALYSIS

Jenine attempted twenty shots during the last basketball game. The school paper reported that she made 85% of her shots.

The symbol % is read "percent." A **percent** is a ratio that compares a number to 100. Percent means "per hundred," "hundredths," or "out of every hundred."

$$1\% = \frac{1}{100} = 0.01$$



Example 1

Write each fraction as a percent: **a.** $\frac{17}{20}$ **b.** $\frac{3}{8}$

Solution

a. Write $\frac{17}{20}$ as a fraction whose denominator is 100.

$$\frac{17}{20} = \frac{17 \cdot 5}{20 \cdot 5} = \frac{85}{100} = 85\%$$

b. The denominator of $\frac{3}{8}$ is not a factor of 100, so use division.

$\frac{3}{8} = 0.37\frac{1}{2}$ ← Divide $8\overline{)3.00}$ to the *hundredths* place.

$= 37\frac{1}{2}\%$ ← $0.37\frac{1}{2}$ means $37\frac{1}{2}$ *hundredths.*

Check Your Understanding

1. When changing $\frac{17}{20}$ to a percent in Example 1(a), why do you write the ratio as a fraction with a denominator of 100?
2. If you used a calculator in Example 1(b), what number would be displayed for $0.37\frac{1}{2}$?

Notice that to write a decimal as a percent, as in Example 1(b), you move the decimal point two places to the right and insert the symbol %.

$$0.37\frac{1}{2} = 37\frac{1}{2}\%$$

Example 2

Write each decimal as a percent: **a.** 0.43 **b.** 0.09 **c.** 2.4

Solution

a. $0.43 = 0.43\% = 43\%$

b. $0.09 = 0.09\% = 9\%$

c. $2.4 = 2.40\% = 240\%$

You can also write percents as decimals and as fractions. To write a percent as a decimal, you move the decimal point two places to the left and drop the % symbol.

Notice in Examples 3 and 4 that a percent may be less than 1 or greater than 100.

Example 3

Write each percent as a decimal.

a. 74% **b.** 0.25% **c.** 110% **d.** $8\frac{1}{2}\%$

Solution

a. $74\% = 74\% = 0.74$

b. $0.25\% = 00.25\% = 0.0025$

c. $110\% = 1.10\% = 1.1$

d. $8\frac{1}{2}\% = 08.5\% = 0.085$

Example 4

Write each percent as a fraction or a mixed number in lowest terms.

a. 125% **b.** 3.6% **c.** $\frac{2}{5}\%$

Solution

a. $125\% = \frac{125}{100} = \frac{5}{4} = 1\frac{1}{4}$

b. $3.6\% = \frac{3.6}{100} = \frac{(3.6)(10)}{(100)(10)} = \frac{36}{1000} = \frac{9}{250}$

c. $\frac{\frac{2}{5}}{100} = \frac{2}{5} \div 100 = \frac{2}{5} \cdot \frac{1}{100} = \frac{1}{250}$

Check Your Understanding

3. Describe how the position of the decimal point is changed in writing a percent as a decimal.
4. In Example 3(d), why is $8\frac{1}{2}$ rewritten as 8.5?
5. Why are the numerator and denominator in Example 4(b) multiplied by 10?

Guided Practice

COMMUNICATION «*Reading*

«**1.** What is a percent?

«**2.** Describe two methods for changing a fraction to a percent.

Write each ratio as a percent.

3. 18 out of 100 **4.** 2:100

5. 56 to 100 **6.** $\frac{100}{100}$

7. To write $1\frac{5}{8}$ as a percent, replace each ___?___ with the number that makes the statement true.

$1 = \frac{?}{100} = \_\_?\_\_\%$

$\frac{5}{8} = 0.625 = \_\_?\_\_\%$

$1\frac{5}{8} = 1 + \frac{5}{8} = \_\_?\_\_\% + \_\_?\_\_\% = \_\_?\_\_\%$

Write each fraction or decimal as a percent.

8. $\frac{11}{50}$ **9.** $\frac{3}{5}$ **10.** $\frac{7}{8}$ **11.** $\frac{1}{200}$

12. 0.45 **13.** 0.002 **14.** 1 **15.** 2.78

Write each percent as a decimal.

16. 65% **17.** 4% **18.** 9.2% **19.** $7\frac{1}{4}\%$

Write each percent as a fraction or a mixed number in lowest terms.

20. 36% **21.** 0.5% **22.** $\frac{1}{4}\%$ **23.** 375%