LESSON

# 5-2 Percent Problems

## OVERVIEW

*Simple algebraic equations can be used to help solve different types of percent problems.*

## THE THREE TYPES OF PERCENT PROBLEMS

You can solve each of the three basic types of percent problems by writing and solving an equation.

- **Type 1:** Finding a percent of a given number.

**EXAMPLE:** What is 15% of 80?

$$n = 0.15 \times 80$$

$$= 12$$

15% of 80 is 12.

- **Type 2:** Finding a number when a percent of it is given.

**EXAMPLE:** 30% of what number is 12?

$$0.30 \times n = 12$$

$$0.30n = 12$$

$$10(0.3n) = 10(12)$$

$$3n = 120$$

$$n = \frac{120}{3}$$

$$= 40$$

30% of 40 is 12.

- **Type 3:** Finding what percent one number is of another.

**EXAMPLE:** What percent of 30 is 9?

$$\frac{p}{100} \times 30 = 9$$

$$\frac{p}{100} \times 30 = 9$$

$$\frac{\cancel{30}^{3}p}{\cancel{100}_{10}} = 9$$

$$p = \frac{10 \cdot 9}{3} = 30$$

9 is 30% of 30.

## LESSON 5-2 TUNE-UP EXERCISES

### Multiple Choice

**1** The sum of 25% of 32 and 40% of 15 is what percent of 35?

(A) 20%
(B) 25%
(C) 30%
(D) 40%
(E) 50%

**2** 30% of 150 equals 4.5% of

(A) 10
(B) 100
(C) 250
(D) 1000
(E) 10,000

**3** If $A$ is 125% of $B$, then $B$ is what percent of $A$?

(A) 60%
(B) 75%
(C) 80%
(D) 88%
(E) 90%

**4** By the end of the school year, Terry had passed 80% of his science tests. If Terry failed 4 science tests, how many science tests did Terry pass?

(A) 12
(B) 15
(C) 16
(D) 18
(E) 20

**5** If 30% of $x$ is 21, what is 80% of $x$?

(A) 28
(B) 35
(C) 42
(D) 48
(E) 56

**6** A soccer team has played 25 games and has won 60% of the games it has played. What is the minimum number of additional games the team must win in order to finish the season winning 80% of the games it has played?

(A) 28
(B) 25
(C) 21
(D) 18
(E) 15

**7** What percent of 800 is 5?

(A) $\frac{1}{160}\%$
(B) $\frac{5}{8}\%$
(C) 1.6%
(D) 62.5%
(E) $\frac{800}{5}\%$

**8** $\frac{1}{2}$ is what percent of $\frac{1}{5}$?

(A) 250%
(B) 210%
(C) 140%
(D) 40%
(E) 20%

**9** In an opinion poll of 50 men and 40 women, 70% of the men and 25% of the women said that they preferred fiction to nonfiction books. What percent of the number of people polled preferred to read fiction?

(A) 40%
(B) 45%
(C) 50%
(D) 60%
(E) 75%

**10** If 25% of $x$ is 12.5, what is 12.5% of $2x$?

(A) 6.25
(B) 12.5
(C) 25
(D) 37.5
(E) 50

**11** If $\frac{1}{8}$ of a number is 9, what is 75% of the same number?

(A) 36
(B) 48
(C) 54
(D) 72
(E) 81

**12** 300% of 6 is what percent of 24?

(A) 40%
(B) 50%
(C) 60%
(D) 75%
(E) 80%

**13** The regular price of software at a computer superstore is 12% off the retail price. During an annual sale, the same software is 25% off the regular price. If the retail price is $p$, which expression represents the sale price?

(A) $0.34p$
(B) $0.37p$
(C) $0.63p$
(D) $0.64p$
(E) $0.66p$

**14** The price of a stock falls 25%. By what percent of the new price must the stock price rise in order to reach its original value?

(A) 25%
(B) 30%
(C) $33\frac{1}{3}\%$
(D) 40%
(E) 75%

**15** If $a$ is 30% greater than $A$ and $b$ is 20% greater than $B$, then $ab$ is what percent greater than $AB$?

(A) 25%
(B) 50%
(C) 56%
(D) 60%
(E) 75%

**16** A number $a$ increased by 20% of $a$ results in a number $b$. When $b$ is decreased by $33\frac{1}{3}\%$ of $b$, the result is $c$. The number $c$ is what percent of $a$?

(A) 40%
(B) 60%
(C) 80%
(D) 120%
(E) 150%

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**VOTING POLL**

| | |
|---|---|
| Candidate A | 30% |
| Candidate B | 50% |
| Undecided | 20% |

The table above summarizes the results of an election poll in which 4000 voters participated. In the actual election, all 4000 of these people voted and those people who chose a candidate in the poll voted for that candidate. People who were undecided voted for candidate A in the same proportion as the people who cast votes for candidates in the poll. Of the people polled, how many voted for candidate A in the actual election?

(A) 1420
(B) 1500
(C) 1640
(D) 1680
(E) 1800

## Grid In

**1** A high school tennis team is scheduled to play 28 matches. If the team wins 60% of the first 15 matches, how many additional matches must the team win in order to finish the season winning 75% of its scheduled matches?

**2** In a club of 35 boys and 28 girls, 80% of the boys and 25% of the girls have been members for more than 2 years. If $n$ percent of the club have been members for more than 2 years, what is the value of $n$?