

## LESSON 1.1

### GOAL

Evaluate algebraic expressions and use exponents.

### Vocabulary

A **variable** is a letter used to represent one or more numbers.

An **algebraic expression**, or variable expression, consists of numbers, variables, and operations.

To **evaluate an expression**, substitute a number for the variable, perform the operation(s), and simplify the result if necessary.

A **power** is an expression that represents repeated multiplication of the same factor.

A **power** can be written in a form using two numbers, a base and an exponent.

The **exponent** represents the number of times the base is used as a factor.

### EXAMPLE 1

#### Evaluate algebraic expressions

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Evaluate the expression when  $x = 5$

- a.  $7x$
- b.  $12 + x$

#### Solution

- |                      |                      |
|----------------------|----------------------|
| a. $7x = 7(5)$       | Substitute 5 for $x$ |
| $= 35$               | Multiply.            |
| b. $12 + x = 12 + 5$ | Substitute 5 for $x$ |
| $= 17$               | Add.                 |

#### Exercises for Example 1

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Evaluate the expression for the given value of the variable

- 1.  $15 - a$  when  $a = 3$
- 2.  $3b$  when  $b = 7$

### EXAMPLE 2

## Evaluate an expression

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The cost of filling a car's gas tank can be represented by the expression  $xy$  where  $x$  is the price per gallon of gasoline and  $y$  is the number of gallons purchased. You purchase 10 gallons of gasoline when the price per gallon is \$2.35. Find the total cost

### Solution

$$\text{Total Cost} = xy$$

$$= 2.35(10)$$

$$= 23.50$$

The total cost is \$23.50.

Write expression

Substitute 2.35 for  $x$  and 10 for  $y$ .

Multiply.

## Exercises for Example 2

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7. You purchase 5 gallons of gasoline when the price of gasoline is \$2.26 per gallon. Find the total cost.

## EXAMPLE 3

### Read and write powers

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Write the power in words and as a product.

a.  $8^3$

b.  $m^6$

### Solution

a. eight to the third power, or eight cubed;  $8 \cdot 8 \cdot 8$

b.  $m$  to the sixth power;  $m \cdot m \cdot m \cdot m \cdot m \cdot m$

## Exercises for Example 3

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Write the power in words and as a product.

9.  $4^8$

10.  $\frac{1}{3}^4$

11.  $x^2$

## *Answer Key*

### *Lesson 1.1*

#### **Study Guide**

1. 12
2. 21
3. 21
4. 7
5. 9
6. 3.2
7. \$11.30
8. \$17.60
9. four to the eighth power;  $4 \bullet 4 \bullet 4 \bullet 4 \bullet 4 \bullet 4 \bullet 4 \bullet 4$
10. one third to the fourth power;  $\frac{1}{3} \bullet \frac{1}{3} \bullet \frac{1}{3} \bullet \frac{1}{3}$
11.  $x$  to the second power, or  $x$  squared;  $x \bullet x$