

LESSON
1.1**Study Guide**

For use with the lesson "Evaluate Expressions"

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

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

Evaluate the expression for the given value of the variable.

1. $15 - a$ when $a = 3$

2. $3b$ when $b = 7$

3. $11 + c$ when $c = 10$

4. $\frac{28}{d}$ when $d = 4$

5. $\frac{1}{2}n$ when $n = 18$

6. $0.4f$ when $f = 8$

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EXAMPLE 2 Evaluate an expression

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

$$\begin{aligned} \text{Total Cost} &= xy && \text{Write expression.} \\ &= 2.35(10) && \text{Substitute 2.35 for } x \text{ and 10 for } y. \\ &= 23.50 && \text{Multiply.} \end{aligned}$$

The total cost is \$23.50.

Exercises for Example 2

7. You purchase 5 gallons of gasoline when the price of gasoline is \$2.26 per gallon. Find the total cost.
8. You purchase 8 gallons of gasoline when the price of gasoline is \$2.20 per gallon. Find the total cost.

EXAMPLE 3 Read and write powers
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
Write the power in words and as a product.

9. 4^8
10. $\left(\frac{1}{3}\right)^4$
11. x^2