

## Lesson 3-1

### Example 1 Use the Distributive Property

Use the Distributive Property to write each expression as an equivalent expression. Then evaluate the expression.

a.  $3(5 + 2)$

$$\begin{aligned} 3(5 + 2) &= 3 \cdot 5 + 3 \cdot 2 \\ &= 15 + 6 && \text{Multiply.} \\ &= 21 && \text{Add.} \end{aligned}$$

b.  $(4 + 6)2$

$$\begin{aligned} (4 + 6)2 &= 4 \cdot 2 + 6 \cdot 2 \\ &= 8 + 12 && \text{Multiply.} \\ &= 20 && \text{Add.} \end{aligned}$$

### Example 2 Use the Distributive Property to Solve a Problem

**UNIFORMS** The uniform for a fast-food restaurant job consists of a \$18 shirt and a \$21 pair of pants. The restaurant needs uniforms for 7 new employees.

- a. Write two equivalent expressions to find the total cost of the uniforms for the 7 new employees.

**Method 1** Find the cost for 1 uniform, then multiply by 7.

$$\underbrace{7(\$18 + \$21)}_{\text{cost for 1 uniform}}$$

**Method 2** Find the cost of 7 shirts and 7 pairs of pants. Then add.

$$\underbrace{7(\$18)}_{\text{cost of 7 shirts}} + \underbrace{7(\$21)}_{\text{cost of 7 pairs of pants}}$$

- b. Find the total cost.

Evaluate either expression to find the total cost.

$$\begin{aligned} 7(\$18 + \$21) &= 7(\$18) + 7(\$21) && \text{Distributive Property} \\ &= \$126 + \$147 && \text{Multiply.} \\ &= \$273 && \text{Add.} \end{aligned}$$

The total cost is \$273.

**CHECK** You can check your result by evaluating  $7(\$39)$ .

**Example 3                      Simplify Algebraic Expressions**

Use the Distributive Property to write each expression as an equivalent algebraic expression.

a.  $4(3 + m)$

$$\begin{aligned} 4(3 + m) &= 4 \cdot 3 + 4m \\ &= 12 + 4m \end{aligned} \quad \text{Simplify.}$$

b.  $(p + 2)5$

$$\begin{aligned} (p + 2)5 &= p \cdot 5 + 2 \cdot 5 \\ &= 5p + 10 \end{aligned} \quad \text{Simplify.}$$

**Example 4                      Simplify Expressions with Subtraction**

Use the Distributive Property to write each expression as an equivalent algebraic expression.

a.  $3(w - 7)$

$$\begin{aligned} 3(w - 7) &= 3[w + (-7)] && \text{Rewrite } w - 7 \text{ as } w + (-7). \\ &= 3w + 3(-7) && \text{Distributive Property} \\ &= 3w + (-21) && \text{Simplify.} \\ &= 3w - 21 && \text{Definition of subtraction} \end{aligned}$$

b.  $-2(y - 4)$

$$\begin{aligned} -2(y - 4) &= -2[y + (-4)] && \text{Rewrite } y - 4 \text{ as } y + (-4). \\ &= -2y + (-2)(-4) && \text{Distributive Property} \\ &= -2y + 8 && \text{Simplify.} \end{aligned}$$