

## Lesson 2-4

## Example 1

Simplify.

a.  $4y + 3y$

b.  $-6p + 2p + q$

c.  $15mn + 7mp + (-16mn)$

## Solution

a.  $4y + 3y = (4 + 3)y$       Use the Distributive Property.  
 $= 7y$

Another way to solve this example is in expanded form.

$4y + 3y = y + y + y + y + y + y + y$   
 $= 7y$

b.  $-6p + 2p + q = (-6 + 2)p + q$       Use the Distributive Property.  
 $= -4p + q$

c.  $15mn + 7mp + (-16mn) = 15mn + (-16mn) + 7mp$       Rewrite using the Commutative  
 $= [15 + (-16)]mn + 7mp$       Property.  
 $= -mn + 7mp$

**Example 2****Simplify.**

a.  $\frac{1}{4}x - \frac{3}{4}x$

b.  $-4s + 9t - 7t$

c.  $3.2cd - (-8.5cf) - 5.7cd$

**Solution**

$$\begin{aligned} \text{a. } \frac{1}{4}x - \frac{3}{4}x &= \frac{1}{4}x + \left(-\frac{3}{4}x\right) \\ &= \left[\frac{1}{4} + \left(-\frac{3}{4}\right)\right]x \\ &= -\frac{2}{4}x \\ &= -\frac{1}{2}x \end{aligned}$$

Change subtraction to addition of the opposite.

Use the Distributive Property.

$$\begin{aligned} \text{b. } -4s + 9t - 7t &= -4s + 9t + (-7t) \\ &= -4s + [9 + (-7)]t \\ &= -4s + 2t \end{aligned}$$

Change subtraction to addition of the opposite.

Use the Distributive Property.

$$\begin{aligned} \text{c. } 3.2cd - (-8.5cf) - 5.7cd &= 3.2cd + 8.5cf + (-5.7cd) \\ &= 3.2cd + (-5.7cd) + 8.5cf \\ &= [3.2 + (-5.7)]cd + 8.5cf \\ &= -2.5cd + 8.5cf \end{aligned}$$

Rewrite using the Commutative Property.

Use the Distributive Property.

**Example 3**

Evaluate each expression when  $m = -5$  and  $n = 14$ .

a.  $m + 3m$

b.  $2m - n + 2n$

c.  $8m - 3m - n + 2n$

**Solution**

First, simplify each variable expression. Then substitute the appropriate value for each variable. Finally, simplify the expression using the order of operations.

$$\begin{aligned} \text{a. } m + 3m &= 4m \\ &= 4(-5) \\ &= -20 \end{aligned}$$

$$\begin{aligned} \text{b. } 2m - n + 2n &= 2m + n \\ &= 2(-5) + 14 \\ &= -10 + 14 \\ &= 4 \end{aligned}$$

$$\begin{aligned} \text{c. } 8m - 3m - n + 2n &= 5m + n \\ &= 5(-5) + 14 \\ &= -25 + 14 \\ &= -11 \end{aligned}$$

**Example 4**

**MODELING** Use Algeblocks to simplify each expression.

a.  $-4x + 6x$

b.  $3y - 5y + 3$

**Solution**

a.

$$-4x + 6x = 2x$$

b.

$$3y - 5y + 3 = -2y + 3$$