

**LESSON**  
**2.3****Study Guide**

For use with the lesson "Solve Two-Step Equations"

**GOAL** Solve two-step equations.**EXAMPLE 1** Solve a two-step equation**Solve**  $3x - 7 = 8$ .**Solution**

$$3x - 7 = 8$$

Write original equation.

$$3x - 7 + 7 = 8 + 7$$

Add 7 to each side.

$$3x = 15$$

Simplify.

$$\frac{3x}{3} = \frac{15}{3}$$

Divide each side by 3.

$$x = 5$$

Simplify.

The solution is 5. Check by substituting 5 for  $x$  in the original equation.

**CHECK**  $3x - 7 = 8$

Write original equation.

$$3(5) - 7 = 8$$

Substitute 5 for  $x$ .

$$15 - 7 = 8$$

Multiply 3 and 5.

$$8 = 8 \checkmark$$

Simplify. Solution checks.

**Exercises for Example 1****Solve the equation. Check your solution.**

1.  $\frac{x}{4} - 3 = 5$

2.  $9y + 2 = 29$

3.  $10 = -3z - 8$

4.  $-17 = \frac{m}{3} - 9$

**EXAMPLE 2** Solve a two-step equation by combining like terms**Solve**  $11x - 9x = 14$ .**Solution**

$$11x - 9x = 14$$

Write original equation.

$$2x = 14$$

Combine like terms.

$$\frac{2x}{2} = \frac{14}{2}$$

Divide each side by 2.

$$x = 7$$

Simplify.

**LESSON**  
**2.3****Study Guide** *continued*  
*For use with the lesson "Solve Two-Step Equations"***Exercises for Example 2****Solve the equation. Check your solution.**

5.  $3x + 11x = 28$

6.  $7y - 9y = 12$

7.  $-21 = 15w - 12w$

8.  $36 = 4p + 5p$

**EXAMPLE 3** **Find an input of a function****The output of a function is 7 more than twice the input. Find the input when the output is 13.****Solution****STEP 1** Write an equation for the function. Let  $x$  be the input and  $y$  be the output.

$$y = 2x + 7$$

 $y$  is 7 more than twice  $x$ .**STEP 2** Solve the equation for  $x$  when  $y = 13$ .

$$y = 2x + 7$$

Write original equation.

$$13 = 2x + 7$$

Substitute 13 for  $y$ .

$$13 - 7 = 2x + 7 - 7$$

Subtract 7 from each side.

$$6 = 2x$$

Simplify.

$$\frac{6}{2} = \frac{2x}{2}$$

Divide each side by 2.

$$3 = x$$

Simplify.

An input of 3 produces an output of 13.

**Exercises for Example 3**

9. The output of a function is 8 less than  $-3$  times the input. Find the input when the output is  $-23$ .
10. The output of a function is 12 more than 5 times the input. Find the input when the output is  $-8$ .
11. The output of a function is 7 more than  $-2$  times the input. Find the input when the output is 29.
12. The output of a function is 4 less than 9 times the input. Find the input when the output is 68.