

**LESSON**  
**9.3****Study Guide**

For use with the lesson "Solve Quadratic Equations by Graphing"

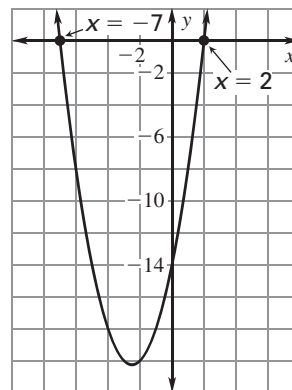
**GOAL** Solve quadratic equations by graphing.**Vocabulary**

A **quadratic equation** is an equation that can be written in the **standard form**  $ax^2 + bx + c = 0$  where  $a \neq 0$  and  $a$  is called the **leading coefficient**.

**EXAMPLE 1** Solve a quadratic equation having two solutionsSolve  $x^2 + 5x = 14$  by graphing.**Solution****STEP 1** Write the equation in standard form.

$$x^2 + 5x = 14 \quad \text{Write original equation.}$$

$$x^2 + 5x - 14 = 0 \quad \text{Subtract 14 from each side.}$$

**STEP 2** Graph the function  $y = x^2 + 5x - 14$ .The  $x$ -intercepts are  $-7$  and  $2$ .The solutions of the equation  $x^2 + 5x = 14$  are  $-7$  and  $2$ .**CHECK** You can check  $-7$  and  $2$  in the original equation.

$$x^2 + 5x = 14 \quad x^2 + 5x = 14 \quad \text{Write original equation.}$$

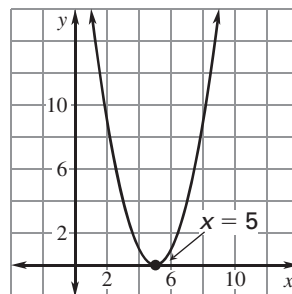
$$(-7)^2 + 5(-7) \stackrel{?}{=} 14 \quad (2)^2 + 5(2) \stackrel{?}{=} 14 \quad \text{Substitute for } x.$$

$$14 = 14 \checkmark \quad 14 = 14 \checkmark \quad \text{Simplify. Each solution checks.}$$

**EXAMPLE 2** Solve a quadratic equation having one solutionSolve  $x^2 + 25 = 10x$  by graphing.**Solution****STEP 1** Write the equation in standard form.

$$x^2 + 25 = 10x \quad \text{Write original equation.}$$

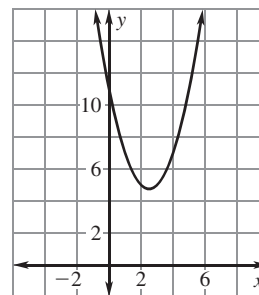
$$x^2 - 10x + 25 = 0 \quad \text{Subtract } 10x \text{ from each side.}$$

**STEP 2** Graph the function  $y = x^2 - 10x + 25$ .The  $x$ -intercept is  $5$ .The solution of the equation  $x^2 + 25 = 10x$  is  $5$ .

**LESSON**  
**9.3****Study Guide** *continued*  
*For use with the lesson "Solve Quadratic Equations by Graphing"***EXAMPLE 3** **Solve a quadratic equation having no solution****Solve**  $x^2 + 11 = 5x$  **by graphing.****Solution****STEP 1** Write the equation in standard form.

$$x^2 + 11 = 5x \quad \text{Write original equation.}$$

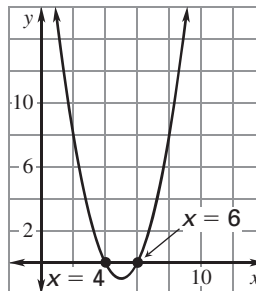
$$x^2 - 5x + 11 = 0 \quad \text{Subtract } 5x \text{ from each side.}$$

**STEP 2** Graph the function  $y = x^2 - 5x + 11$ .The graph has no  $x$ -intercepts.The equation  $x^2 + 11 = 5x$  has no solution.**Exercises for Examples 1, 2, and 3****Solve the equation by graphing.**

- $x^2 = 2x + 15$
- $x^2 + 4 = -4x$
- $x^2 + 6x = -4$

**EXAMPLE 4** **Find the zeros of a quadratic function****Find the zeros of**  $f(x) = x^2 - 10x + 24$ .**Solution**Graph the function  $f(x) = x^2 - 10x + 24$ .The  $x$ -intercepts are 4 and 6.

The zeros of the function are 4 and 6.

**Exercises for Example 4****Find the zeros of the function.**

- $f(x) = x^2 - 4$
- $f(x) = x^2 + 5x - 14$