

## EXAMPLE 2 Solve a quadratic equation having one solution

Solve  $-x^2 + 2x = 1$  by graphing.

### Solution

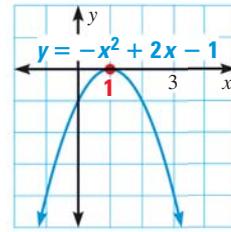
**STEP 1** Write the equation in standard form.

$$-x^2 + 2x = 1 \quad \text{Write original equation.}$$

$$-x^2 + 2x - 1 = 0 \quad \text{Subtract 1 from each side.}$$

**STEP 2** Graph the function  $y = -x^2 + 2x - 1$ .  
The  $x$ -intercept is 1.

▶ The solution of the equation  $-x^2 + 2x = 1$  is 1.



## EXAMPLE 3 Solve a quadratic equation having no solution

Solve  $x^2 + 7 = 4x$  by graphing.

### Solution

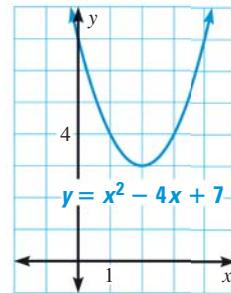
**STEP 1** Write the equation in standard form.

$$x^2 + 7 = 4x \quad \text{Write original equation.}$$

$$x^2 - 4x + 7 = 0 \quad \text{Subtract 4x from each side.}$$

**STEP 2** Graph the function  $y = x^2 - 4x + 7$ .  
The graph has no  $x$ -intercepts.

▶ The equation  $x^2 + 7 = 4x$  has no solution.



### AVOID ERRORS

Do not confuse  $y$ -intercepts and  $x$ -intercepts. Although the graph has a  $y$ -intercept, it does not have any  $x$ -intercepts.



### GUIDED PRACTICE for Examples 1, 2, and 3

Solve the equation by graphing.

1.  $x^2 - 6x + 8 = 0$

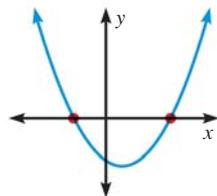
2.  $x^2 + x = -1$

3.  $-x^2 + 6x = 9$

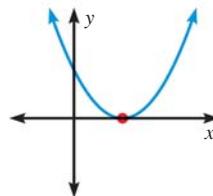
### KEY CONCEPT

### For Your Notebook

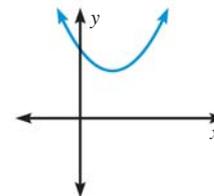
#### Number of Solutions of a Quadratic Equation



A quadratic equation has **two solutions** if the graph of its related function has **two  $x$ -intercepts**.



A quadratic equation has **one solution** if the graph of its related function has **one  $x$ -intercept**.



A quadratic equation has **no real solution** if the graph of its related function has **no  $x$ -intercepts**.