

EXAMPLE 2 Find the number of solutions

Tell whether the equation $3x^2 - 7 = 2x$ has *two solutions*, *one solution*, or *no solution*.

Solution

STEP 1 Write the equation in standard form.

$$3x^2 - 7 = 2x \quad \text{Write equation.}$$

$$3x^2 - 2x - 7 = 0 \quad \text{Subtract } 2x \text{ from each side.}$$

STEP 2 Find the value of the discriminant.

$$\begin{aligned} b^2 - 4ac &= (-2)^2 - 4(3)(-7) && \text{Substitute 3 for } a, -2 \text{ for } b, \text{ and } -7 \text{ for } c. \\ &= 88 && \text{Simplify.} \end{aligned}$$

► The discriminant is positive, so the equation has two solutions.

**GUIDED PRACTICE** for Examples 1 and 2

Tell whether the equation has *two solutions*, *one solution*, or *no solution*.

1. $x^2 + 4x + 3 = 0$

2. $2x^2 - 5x + 6 = 0$

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

EXAMPLE 3 Find the number of x -intercepts

Find the number of x -intercepts of the graph of $y = x^2 + 5x + 8$.

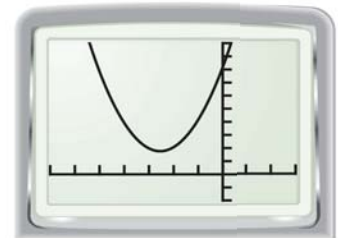
Solution

Find the number of solutions of the equation $0 = x^2 + 5x + 8$.

$$\begin{aligned} b^2 - 4ac &= (5)^2 - 4(1)(8) && \text{Substitute 1 for } a, 5 \text{ for } b, \text{ and } 8 \text{ for } c. \\ &= -7 && \text{Simplify.} \end{aligned}$$

► The discriminant is negative, so the equation has no solution. This means that the graph of $y = x^2 + 5x + 8$ has no x -intercepts.

CHECK You can use a graphing calculator to check the answer. Notice that the graph of $y = x^2 + 5x + 8$ has no x -intercepts.

**GUIDED PRACTICE** for Example 3

Find the number of x -intercepts of the graph of the function.

4. $y = x^2 + 10x + 25$

5. $y = x^2 - 9x$

6. $y = -x^2 + 2x - 4$