

### Lesson 10-7 (pp. 547-553)

### Using the Quadratic Formula

<b>Lesson Objectives</b> ▼ Use the quadratic formula when solving quadratic equations ▼ Choose an appropriate method when solving a quadratic equation	<b>NAEP 2005 Strand: Algebra</b> Topic: Equations and Inequalities Local Standards: _____
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#### Key Concepts

**Quadratic Formula**  
 If  $ax^2 + bx + c = 0$ , and  $a \neq 0$ , then  $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ .

#### Example

1 Using the Quadratic Formula Solve  $x^2 + 2 = -3x$  using the quadratic formula.

$$x^2 + 3x + 2 = 0$$

Add  $3x$  to each side and write in standard form.

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Use the quadratic formula.

$$x = \frac{-3 \pm \sqrt{(3)^2 - 4(1)(2)}}{2(1)}$$

Substitute 1 for a, 3 for b, and 2 for c.

$$x = \frac{-3 \pm \sqrt{1}}{2}$$

Simplify.

$$x = \frac{-3 + 1}{2} \text{ or } x = \frac{-3 - 1}{2}$$

Write two solutions.

$$x = -1 \text{ or } x = -2$$

Simplify.

Check for  $x = -1$

$$\begin{aligned} (-1)^2 + 3(-1) + 2 &\stackrel{?}{=} 0 \\ 1 - 3 + 2 &\stackrel{?}{=} 0 \\ 0 &= 0 \checkmark \end{aligned}$$

for  $x = -2$

$$\begin{aligned} (-2)^2 + 3(-2) + 2 &\stackrel{?}{=} 0 \\ 4 - 6 + 2 &\stackrel{?}{=} 0 \\ 0 &= 0 \checkmark \end{aligned}$$

#### Check Understanding

1. Use the quadratic formula to solve each equation.

a.  $x^2 - 2x - 8 = 0$

$$x = \frac{-(-2) \pm \sqrt{(-2)^2 - 4(1)(-8)}}{2(1)}$$

$$x = 4 \quad x = -2$$

b.  $x^2 - 4x = 117$

$$x^2 - 4x - 117 = 0$$

$$x = \frac{2 \pm \sqrt{4 + (-32)}}{2}$$

$$\frac{2 \pm \sqrt{-28}}{2}$$

$$\frac{2 + 6i}{2}$$

$$\frac{2 - 6i}{2}$$

$$x = 4$$

$$x = -2$$