

## Master 5.1a      Activate Prior Learning: Using the Quadratic Formula to Solve Quadratic Equations

The quadratic formula is:

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

This formula can be used to solve any quadratic equation of the form  $ax^2 + bx + c = 0$ .

To solve the equation  $-4x^2 + 2x + 1 = 0$ :

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

Substitute:  $a = -4$ ,  $b = 2$ ,  $c = 1$

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

Simplify.

$$x = \frac{-2 \pm \sqrt{20}}{-8}$$

Write a mixed radical.

$$x = \frac{-2 \pm 2\sqrt{5}}{-8}$$

Factor.

$$x = \frac{-2(1 \pm \sqrt{5})}{-8}$$

Divide numerator and denominator by  $-2$ .

$$x = \frac{1 \pm \sqrt{5}}{4}$$

The solution is:  $x = \frac{1 + \sqrt{5}}{4}$  and  $x = \frac{1 - \sqrt{5}}{4}$       These roots are exact.

For an approximate root, evaluate the radical.

$$x = \frac{1 + \sqrt{5}}{4}$$

and

$$x = \frac{1 - \sqrt{5}}{4}$$

$$x = 0.8090\dots$$

$$x = -0.3090\dots$$

$$x \doteq 0.809$$

$$x \doteq -0.309$$

### Check Your Understanding

1. Use the quadratic formula to solve each quadratic equation. Write exact roots.

**a)**  $x^2 + 4x + 1 = 0$

**b)**  $2x^2 - 3x - 4 = 0$

**c)**  $3x^2 + 2x + 4 = 0$

2. Use the quadratic formula to solve each quadratic equation. Write the roots to the nearest thousandth.

**a)**  $-x^2 + 5x - 2 = 0$

**b)**  $5x^2 - 18x - 21 = 0$

**c)**  $16 - 7x + 3x^2 = 0$

#### Master 5.1a

Name: \_\_\_\_\_

Date: \_\_\_\_\_

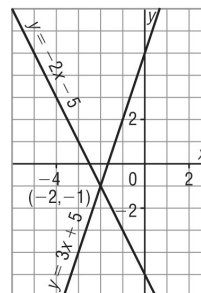
## Master 5.1b Activate Prior Learning: Solving Systems of Linear Equations

### Solving by Graphing

To solve this system:

$$y = -2x - 5 \quad \textcircled{1}$$

$$y = 3x + 5 \quad \textcircled{2}$$

The graph of equation  $\textcircled{1}$  has  $y$ -intercept  $-5$  and slope  $-2$ .The graph of equation  $\textcircled{2}$  has  $y$ -intercept  $5$  and slope  $3$ .The graphs intersect at  $(-2, -1)$ .So, the solution is:  $x = -2, y = -1$ 

### Solving by Substitution

To solve this system:

$$2x - y = 2 \quad \textcircled{1}$$

$$3x - 2y = 3 \quad \textcircled{2}$$

Solve equation  $\textcircled{1}$  for  $y$ .

$$2x - y = 2 \quad \textcircled{1}$$

$$y = 2x - 2$$

Substitute for  $y$  in equation  $\textcircled{2}$ .

$$3x - 2y = 3 \quad \textcircled{2}$$

$$3x - 2(2x - 2) = 3$$

$$3x - 4x + 4 = 3 \quad \text{Solve for } x.$$

$$x = 1$$

Substitute  $x = 1$  in equation  $\textcircled{1}$ .

$$2x - y = 2 \quad \textcircled{1}$$

$$2(1) - y = 2 \quad \text{Solve for } y.$$

$$y = 0$$

The solution is:  $x = 1, y = 0$ 

### Check Your Understanding

1. Solve each system of equations by graphing.

a)  $y = 2x - 5$

b)  $y = -3x + 5$

c)  $2x - 5y = 9$

$y = -3x + 10$

$y = -x + 3$

$3x + y = 5$

2. Solve each system of equations by substitution.

a)  $2x - y = 4$

b)  $x - 4y = 13$

c)  $3x + 4y + 12 = 0$

$2x + 4y = -11$

$2x + 2y = 1$

$2x - 8y - 10 = 0$

### Master 5.1b