

Name:

Date:

Period:

## 4.6 Quadratic Formula Notes

### The Quadratic Formula

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

To solve a quadratic equation using the **quadratic formula**:

1. Write the equation in **STANDARD FORM**.  $ax^2 + bx + c = 0$
2. Identify  $a$ ,  $b$ , and  $c$ . **SUBSTITUTE** into the formula.
3. **SIMPLIFY**.

**Directions:** Solve each quadratic equation below using the quadratic formula.

Ex1:  $6x^2 - 11x - 10 = 0$

$a = 6$     $b = -11$     $c = -10$

$$x = \frac{-(-11) \pm \sqrt{(-11)^2 - 4(6)(-10)}}{2(6)}$$

$$= \frac{11 \pm \sqrt{121 - (-240)}}{12}$$

$$= \frac{11 \pm \sqrt{361}}{12}$$

$$x = \frac{11 \pm 19}{12}$$

$$x = \frac{11 + 19}{12}$$

$$= \frac{30}{12} = \frac{5}{2}$$

$$x = \frac{11 - 19}{12}$$

$$= \frac{-8}{12} = -\frac{2}{3}$$

$$x = \left\{ -\frac{2}{3}, \frac{5}{2} \right\}$$

Ex2:  $-2x^2 + 17 = 8x - 1$

$$-2x^2 - 8x + 18 = 0$$

or  $2x^2 + 8x - 18 = 0$

$a = -2$     $b = -8$     $c = 18$

$$x = \frac{-(-8) \pm \sqrt{(-8)^2 - 4(-2)(18)}}{2(-2)}$$

$$x = \frac{8 \pm \sqrt{64 + 144}}{-4}$$

$$= \frac{8 \pm \sqrt{208}}{-4}$$

$$= \frac{8 \pm \sqrt{16} \sqrt{13}}{-4}$$

$$= \frac{8 \pm 4\sqrt{13}}{-4} = \frac{8}{-4} \pm \frac{4}{-4} \sqrt{13}$$

$$x = -2 \pm \sqrt{13}$$

$$x = \left\{ -2 + \sqrt{13}, -2 - \sqrt{13} \right\}$$

Ex3:  $9x^2 - 1 = 24$

$$9x^2 - 25 = 0$$

$$9x^2 + 0x - 25 = 0$$

$$a=9 \quad b=0 \quad c=-25$$

$$x = \frac{0 \pm \sqrt{(0)^2 - 4(9)(-25)}}{2(9)}$$

$$= \frac{\pm \sqrt{900}}{18}$$

$$= \frac{\pm 30}{18}$$

$$x = \pm \frac{5}{3}$$

$$x = \left\{ -\frac{5}{3}, \frac{5}{3} \right\}$$

Ex4:  $5x^2 + 9 = 4x + 5$

$$5x^2 - 4x + 4 = 0$$

$$a=5 \quad b=-4 \quad c=4$$

$$x = \frac{-(-4) \pm \sqrt{(-4)^2 - 4(5)(4)}}{2(5)}$$

$$= \frac{4 \pm \sqrt{16 - 80}}{10}$$

$$= \frac{4 \pm \sqrt{-64}}{10}$$

$$= \frac{4 \pm 8i}{10}$$

$$= \frac{2}{5} \pm \frac{4i}{5}$$

$$x = \frac{2}{5} \pm \frac{4i}{5}$$

$$x = \left\{ \frac{2}{5} + \frac{4i}{5}, \frac{2}{5} - \frac{4i}{5} \right\}$$