

## Lesson 33      Using the Quadratic Formula to Solve Quadratic Equations

**Quadratic Formula:**      For  $ax^2 + bx + c = 0$ , where  $a \neq 0$

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

**Steps to Follow:**      for  $ax^2 + bx + c = 0$

1. List a, b, and c
2. Plug the respective values into the quadratic formula
3. Simplify the values under the radical
4. Write the expression as 2 values.

One expression with a positive radical, and one expression with a negative radical

5. Simplify each expression, if possible.

**Examples:** Solve the quadratic equations using the quadratic formula.

$$\begin{array}{r} 1. x^2 + 6 = 5x \\ -5x \quad -5x \\ \hline x^2 - 5x + 6 = 0 \end{array}$$

$$\begin{array}{l} a = 1 \\ b = -5 \\ c = 6 \end{array}$$

$$x = \frac{5 \pm \sqrt{(-5)^2 - 4(1)(6)}}{2(1)}$$

$$= \frac{5 \pm \sqrt{25 - 24}}{2}$$

$$= \frac{5 \pm 1}{2} =$$

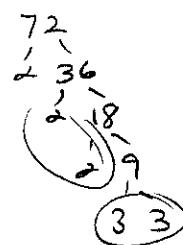
$$\begin{array}{l} 2. x^2 - 2x - 8 = 0 \\ a = 1 \quad x = \frac{4 + 32 = 36}{2(-2)} \\ b = -2 \\ c = -8 \quad = \frac{2 \pm \sqrt{36}}{2} \end{array}$$

$$\begin{array}{l} \frac{5+1}{2} = 3 \quad \frac{5-1}{2} = 2 \quad = \frac{2+6}{2} = \frac{8}{2} = 4 \quad \text{or} \quad \frac{2-6}{2} = \frac{-4}{2} = -2 \end{array}$$

$$3. 2x^2 + 4x - 7 = 0 \quad 16 + 56 = 72$$

$$\begin{array}{l} a = 2 \\ b = 4 \\ c = -7 \end{array} \quad x = \frac{-4 \pm \sqrt{(4)^2 - 4(2)(-7)}}{2(2)}$$

$$\begin{aligned} &= \frac{-4 \pm \sqrt{72}}{4} \\ &= \frac{-4 \pm 6\sqrt{2}}{4} \\ &= \frac{-2 + 3\sqrt{2}}{2} \quad \text{or} \quad \frac{-2 - 3\sqrt{2}}{2} \end{aligned}$$



$$6\sqrt{2}$$