

Objective: To solve quadratic equations by the quadratic formula

when to use each of the 4 solving methods.

1.) Factoring Method: Can only be used if the quadratic equation is factorable and not prime.
 $(y = ax^2 + bx + c) \rightarrow (ax^2 + bx + c = 0)$

1st priority

2.) Square root Method: Can only be used if the quadratic equation is missing 'bx' term or middle term or is written in vertex form.

$$\begin{aligned} ax^2 + c &= 0 \\ a(x-h)^2 + k &= 0 \end{aligned}$$

3.) Completing the Square: Should be used when the quadratic equation cannot be factored and there are no fractions or decimals.

$$ax^2 + bx + c = 0$$

4.) Quadratic Formula: This method will always work, but takes more work and time with more room for error.

last priority

$$ax^2 + bx + c = 0$$

Quadratic Formula: $ax^2 + bx + c = 0$

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

Example 1:
$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$a = 2$
 $b = -7$
 $c = -3$

$$2m^2 - 7m - 3 = 0$$

$$x = \frac{-(-7) \pm \sqrt{(-7)^2 - 4(2)(-3)}}{2(2)}$$

$$x = \frac{7 \pm \sqrt{49 + 24}}{4}$$

$$x = \frac{7 \pm \sqrt{73}}{4}$$

$$x = \frac{7 + \sqrt{73}}{4}$$

$$x = \frac{7 - \sqrt{73}}{4}$$

~~$$2m^2 - 7m - 3 = 0$$

$2m$	-3
m	1

~~$$\frac{2m^2 - 7m - 3 = 0}{\frac{2}{2} \quad \frac{-7m}{2} \quad \frac{-3}{2}}$$~~

$$\frac{49}{24}$$

Example 2: $x^2 - 4x - 8 = 0$

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

$$= \frac{4 \pm \sqrt{16 + 32}}{2} = \frac{4 \pm \sqrt{48}}{2} = \frac{4 \pm \sqrt{16} \cdot \sqrt{3}}{2}$$

$$= \frac{4 \pm 4\sqrt{3}}{2} = \frac{4}{2} \pm \frac{4\sqrt{3}}{2} = 2 \pm 2\sqrt{3}$$

$$x = 2 + 2\sqrt{3}$$

$$x = 2 - 2\sqrt{3}$$