11/5 Solve Quadratic Equations Using the Quadratic Formula

The Quadratic Formula

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

$$x = \frac{-b + \sqrt{b^2 - 4ac}}{2a} \quad \text{or} \quad x = \frac{-b - \sqrt{b^2 - 4ac}}{2a}$$

$$y = \underline{a}x^2 + \underline{b}x + \underline{c}$$

Examples

$$3x^2 - 5x = -1$$
$$\quad\quad +1 \quad\quad +1$$
$$3x^2 - 5x + 1 = 0$$

$a = 3$
$b = -5$
$c = 1$

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

$$x = \frac{-(-5) \pm \sqrt{(-5)^2 - 4(3)(1)}}{2(3)}$$

$x \approx 1.43$ $\quad$ $x \approx 0.23$

$(1.43, 0)$ $\quad$ $(0.23, 0)$

$$4x^2 = 7x + 2$$
$$4x^2 - 7x - 2 = 0 \quad\quad -4x^2 + 7x + 2$$

Methods for Solving Quadratic Equations

1. Graphing – x-intercepts are integers
2. Use square roots – no "bx" term
3. Factoring – easy to factor
4. Quadratic Formula

Which method?

$x^2 - 10 = 0$ square roots

$x^2 + x - 6 = 0$ graphing/factoring

$(x+3)(x-2) = 0$ $b = 1$

$ac = -6$

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

Quadratic Formula

$a = 1$

$b = 6$

$c = (-5)$

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

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

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