Algebra 2

Lesson 5-8: The Quadratic Formula

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So far, you have learned that a quadratic equation can be solved by graphing, factoring, and square rooting. You also can solve for x's that are complex. There is yet another method of factoring called **the Quadratic Formula.** I call it the "Queen Bee," because it is the Queen; it may be used to factor any quadratic equation.

Given a quadratic equation, $ax^2 + bx + c = 0$, the roots or zeros can be found by the formula

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

First off….

Simplify the square roots:

$\sqrt{12}$	$\sqrt{30}$	$\sqrt{72}$

Solve using the quadratic formula:

$x^2 + 4x + 3 = 0$	$x^2 = 6x - 1$
$2x^2 + 7x + 5 = 0$	$x^2 + 9x - 18 = 0$

The **discriminant** of a quadratic equation is $\boldsymbol{b^2 - 4ac}$. This expressions will help your to determine **how many** and **what kind of roots** a quadratic equation will have.

- If $b^2 - 4ac > 0$, then the quadratic equation will have **TWO** real roots.
- If $b^2 - 4ac = 0$, then the quadratic equation will have **ONE** real root.
- If $b^2 - 4ac < 0$, then the quadratic equation will have **NO** real roots.

How many and what kind of roots do the quadratic equations have?

$y = 2x^2 + x + 28$	$2x^2 + 7x - 15 = y$	$x^2 - 12x + 36 = y$