The Quadratic Formula

$ax^2 + bx + c = 0$

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Completing the Square

First, complete the square

- $ax^2 + bx + c = 0$
- $x^2 + \frac{b}{a}x + \frac{c}{a} = 0$
- $x^2 + \frac{b}{a}x + \left(\frac{b}{2a}\right)^2 = -\frac{c}{a} + \left(\frac{b}{2a}\right)^2$
- $\left(x + \frac{b}{2a}\right)^2 = -\frac{c}{a} + \left(\frac{b}{2a}\right)^2$

Solve for x

Now, solve for x

- $\left(x + \frac{b}{2a}\right)^2 = -\frac{c}{a} + \left(\frac{b}{2a}\right)^2$
- $x + \left(\frac{b}{2a}\right) = \pm\sqrt{-\frac{c}{a} + \left(\frac{b}{2a}\right)^2}$
- $x = -\left(\frac{b}{2a}\right) \pm \sqrt{-\frac{c}{a} + \left(\frac{b}{2a}\right)^2}$
- $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

The Quadratic Formula

The solution of the quadratic equation.

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

where a is non-zero, is given by the formula

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