

## Quadratic Equations:

	<b>Standard Form:</b>	<b>Vertex Form:</b>	<b>Intercept Form:</b>
<b>Equation:</b>	$y = \textcolor{red}{a}x^2 + \textcolor{blue}{b}x + \textcolor{green}{c}$	$y = \textcolor{red}{a}(x - \textcolor{blue}{h})^2 + \textcolor{green}{k}$	$y = \textcolor{red}{a}(x - \textcolor{blue}{p})(x - \textcolor{green}{q})$
<b>Vertex:</b>	$\left[ \frac{-\textcolor{blue}{b}}{2\textcolor{red}{a}}, f\left(\frac{-\textcolor{blue}{b}}{2\textcolor{red}{a}}\right) \right]$	$(\textcolor{blue}{h}, \textcolor{green}{k})$	$\left[ \frac{\textcolor{blue}{p} + \textcolor{green}{q}}{2}, f\left(\frac{\textcolor{blue}{p} + \textcolor{green}{q}}{2}\right) \right]$
<b>Axis of Symmetry:</b>	$x = -\frac{\textcolor{blue}{b}}{2\textcolor{red}{a}}$	$x = \textcolor{blue}{h}$	$x = \frac{\textcolor{blue}{p} + \textcolor{green}{q}}{2}$
<b>Intercepts:</b>	<b>Y-intercept:</b> $(0, \textcolor{green}{c})$	<b>Y-int:</b> $(0, y)$ <b>X-Int:</b> $(x, 0)$	<b>X-intercepts:</b> $(\textcolor{blue}{p}, 0) (\textcolor{green}{q}, 0)$
<b>Sum of the Roots:</b>	$S = -\frac{\textcolor{blue}{b}}{\textcolor{red}{a}}$	$S = 2\textcolor{blue}{h}$	$S = \textcolor{blue}{p} + \textcolor{green}{q}$
<b>Product - Roots:</b>	$P = \frac{\textcolor{green}{c}}{\textcolor{red}{a}}$	$P = \textcolor{blue}{h}^2 + \frac{\textcolor{green}{k}}{\textcolor{red}{a}}$	$P = \textcolor{blue}{p} \cdot \textcolor{green}{q}$

**Maximum:** Equals the y-coordinate of the vertex when a is negative.

**Minimum:** Equals the y-coordinate of the vertex when a is positive.

### The Quadratic Formula:

$$x = \frac{-\textcolor{blue}{b} \pm \sqrt{\textcolor{blue}{b}^2 - 4\textcolor{red}{a}\textcolor{green}{c}}}{2\textcolor{red}{a}}$$

### The Discriminant:

$\textcolor{blue}{b}^2 - 4\textcolor{red}{a}\textcolor{green}{c} > 0$	2 Real Solutions
$\textcolor{blue}{b}^2 - 4\textcolor{red}{a}\textcolor{green}{c} = 0$	1 Real Solution
$\textcolor{blue}{b}^2 - 4\textcolor{red}{a}\textcolor{green}{c} < 0$	2 Imaginary Solutions