

The Discriminant

$$d = b^2 - 4ac$$

- Roots
- $d > 0$ 2 Real Solutions
 - $d = 0$ 1 Real Solution
 - $d < 0$ 2 Complex Solutions

Quadratic Formula

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

Solving Quadratic Equations

Factoring

- Greatest Common Factor

$$3x^2 + 18x = 3x(x+6)$$

$$x^2 - 5x - 6 = (x+1)(x-6)$$

- Difference of Two Squares

$$a^2 - b^2 = (a+b)(a-b)$$

- Perfect Square Trinomials

$$x^2 + bx + \left(\frac{b}{2}\right)^2 = \left(x + \frac{b}{2}\right)^2$$

Quadratic Functions

$$ax^2 + bx + c$$

$$(x-h)^2 + k$$

Completing the Square

Use Square Roots to find

- Real Solutions
- Complex Solutions

$$x = a \pm bi$$

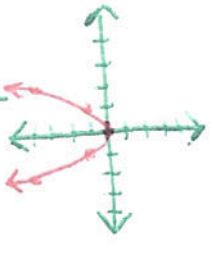
Real \rightarrow Imaginary

Plotting

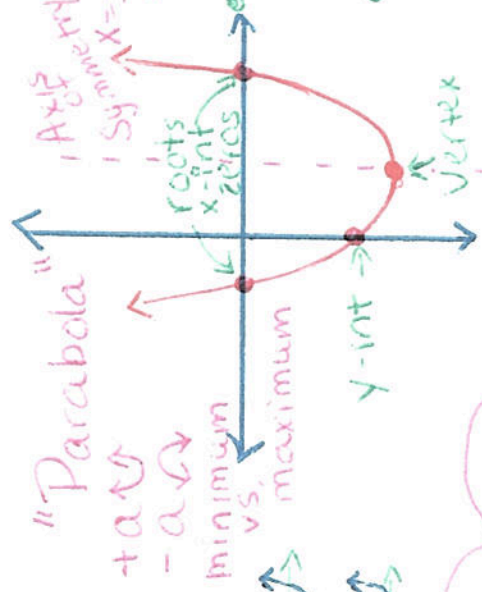
Equation \rightarrow Table \rightarrow Graph

x	y
-2	4
-1	0
1	0
2	4

Solution $y = 0$



Graphing & Interpreting



"Parabola" \rightarrow $+a \rightarrow$ minimum vs. $-a \rightarrow$ maximum

Vertex Form

$$y = a(x-h)^2 + k$$

- Standard Form
- Intercept Form

$$y = a(x-p)(x-q)$$

Translations & Transformations

- $f(x) = x^2$
- $g(x) = (x-h)^2$ \leftarrow vertical stretch
- $g(x) = x^2 + k$ \updownarrow horizontal stretch
- $g(x) = ax^2$ vertical stretch
- $g(x) = \left(\frac{x}{a}\right)^2$ horizontal stretch
- $g(x) = -x^2$ reflected across x-axis