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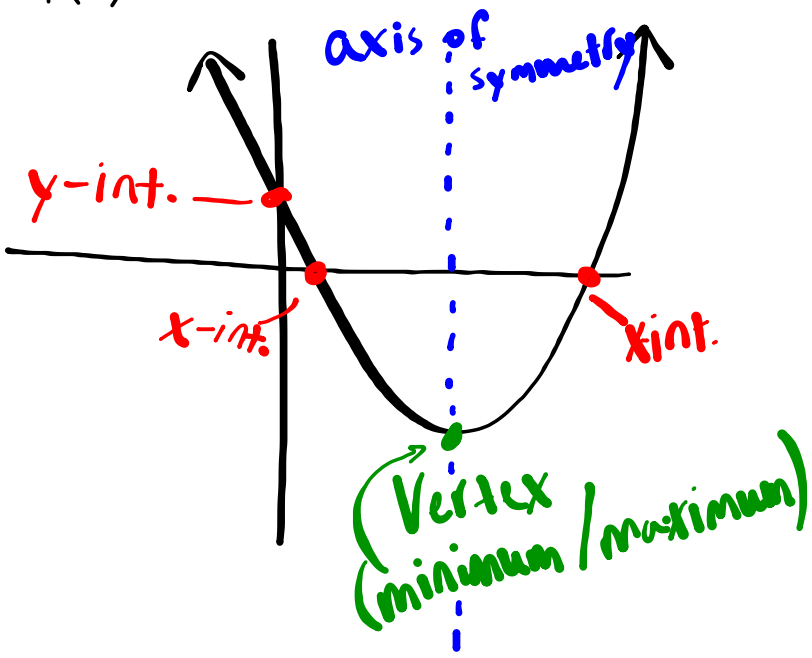
Graphing Quadratic Functions

Form $f(x) = ax^2 + bx + c$



- The y-intercept is c.
- The axis of symmetry is

$$x = \frac{-b}{2a}$$

- The vertex is

$$\left(\frac{-b}{2a}, f\left(\frac{-b}{2a}\right)\right)$$

↑ Plug x-value back into the equation.

Graphing:

1) Find the axis of symmetry.

2) Find the vertex.

3) Plot the y-intercept and its reflection.

Ex. Graph $f(x) = x^2 + 2x - 3$.

$a = 1$ $b = 2$ $c = -3$

1) $x = \frac{-b}{2a}$

$x = \frac{-2}{2(1)} = \frac{-2}{2} = -1$

2) $f(x) = x^2 + 2x - 3$

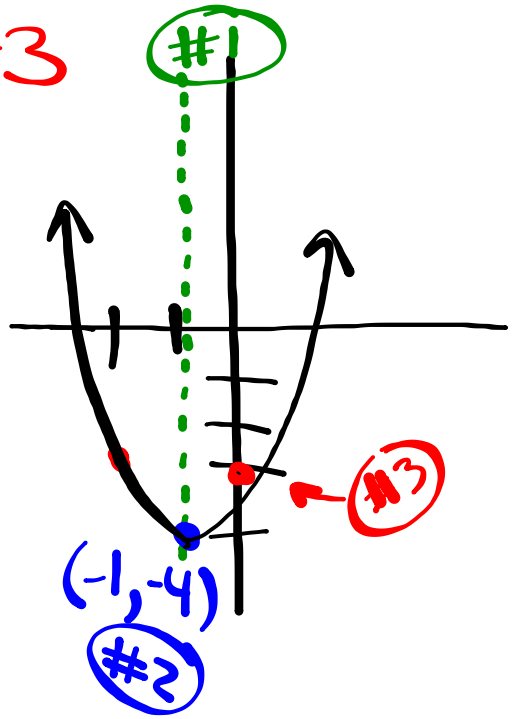
$f(-1) = (-1)^2 + 2(-1) - 3$

$= 1 - 2 - 3$

$f(-1) = -4$

$(-1, -4)$

3) $c = -3$



Ex. Graph $f(x) = x^2 + 5x + 6$

$a = 1 \quad b = 5 \quad c = 6$

Step 1) $x = \frac{-b}{2a}$

$= \frac{-5}{2(1)}$

$= -\frac{5}{2} = -2.5$

Step 2) $f(x) = x^2 + 5x + 6$

$f(-2.5) = (-2.5)^2 + 5(-2.5) + 6$

$f(-2.5) = 6.25 - 12.5 + 6$

$f(-2.5) = -0.25$

$(-2.5, -0.25)$

Step 3) $c = 6$