

Name: _____ Date: _____

Graphing Quadratics – Standard Form

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

Most common way to see a quadratic written.

Axis of Symmetry: $x = \frac{-b}{2a}$

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

Plug your axis of symmetry in to the function to find the y-value

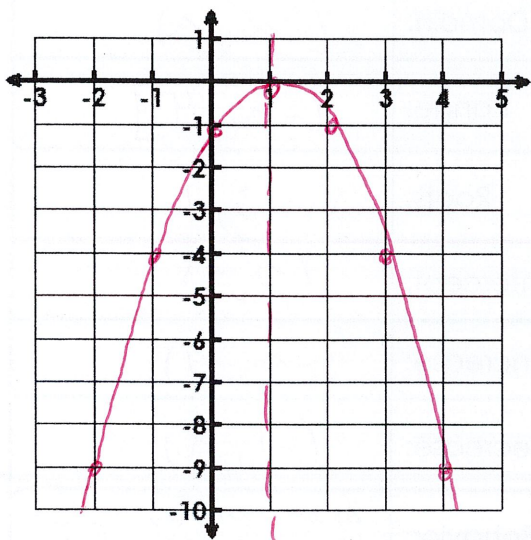
Steps to Graphing in STANDARD form:

1. Identify a, b, and c.
2. Find the axis of symmetry. $x = \frac{-b}{2a}$ Graph this lightly as a dashed vertical line.
3. Table, Edit Function, start = A.O.S. This is your vertex. Plot it.
4. Scroll up and down to get other ordered pairs.
5. Connect in a u-shape with arrows at each end.

Graph.

1. $f(x) = -x^2 + 2x - 1$

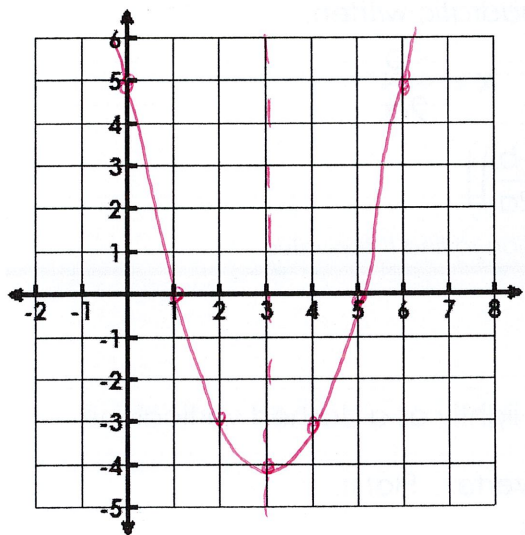
$\frac{-b}{2a} = \frac{-2}{2(-1)} = \frac{-2}{-2} = 1$



| Characteristics | |
|-----------------------|---|
| A.O.S. | $x = 1$ |
| Vertex: | $(1, 0)$ |
| Domain: | $(-\infty, \infty)$ |
| Range: | $(-\infty, 0]$ |
| x-intercept(s): | $(1, 0)$ |
| y-intercept: | $(0, -1)$ |
| Interval of Increase: | $(-\infty, 1)$ |
| Interval of Decrease: | $(1, \infty)$ |
| End Behavior: | $As x \rightarrow -\infty, f(x) \rightarrow -\infty$ $As x \rightarrow \infty, f(x) \rightarrow -\infty$ |

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

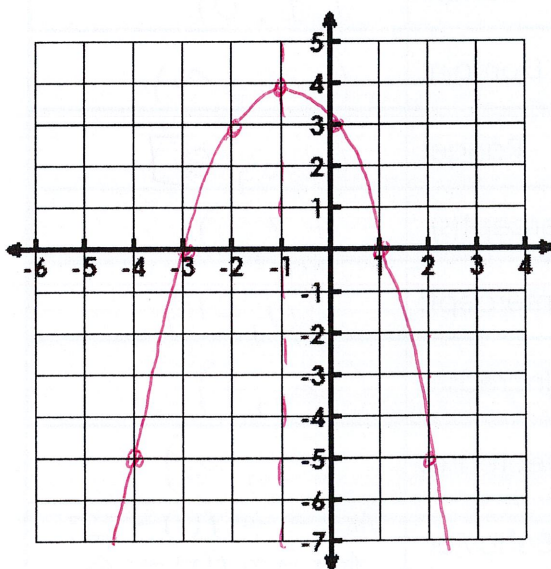
$$-\frac{b}{2a} = \frac{-(-6)}{2(1)} = \frac{6}{2} = 3$$



| Characteristics | |
|-----------------------|---|
| A.O.S. | $x = 3$ |
| Vertex: | $(3, -4)$ |
| Domain: | $(-\infty, \infty)$ |
| Range: | $[-4, \infty)$ |
| Zeros: | $x = 1, 5$ |
| y-intercept: | $(0, 5)$ |
| Interval of Increase: | $(3, \infty)$ |
| Interval of Decrease: | $(-\infty, 3)$ |
| End Behavior: | As $x \rightarrow -\infty, f(x) \rightarrow \infty$ As $x \rightarrow \infty, f(x) \rightarrow \infty$ |

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

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



| Characteristics | |
|-----------------------|---|
| A.O.S. | $x = -1$ |
| Vertex: | $(-1, 4)$ |
| Domain: | $(-\infty, \infty)$ |
| Range: | $(-\infty, 4]$ |
| Roots: | $x = -3, 1$ |
| y-intercept: | $(0, 3)$ |
| Interval of Increase: | $(-\infty, -1)$ |
| Interval of Decrease: | $(-1, \infty)$ |
| End Behavior: | As $x \rightarrow -\infty, f(x) \rightarrow -\infty$ As $x \rightarrow \infty, f(x) \rightarrow -\infty$ |