Graphing Quadratics

Standard Form

Quadratic:

Parabola:

Vertex:

Axis of symmetry:

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

- The axis of symmetry is x =______.
- The vertex has x-coordinate ______. Substitute x back in to find y.
- The parabola opens up when a__0 and opens down when a___0.
- The vertex is a _____________ when the parabola opens up and a _____________ when the parabola opens down.
- The y-intercept is located at (0, _____).
- The parabola is narrower than the parent graph $y=x^2$ if |a|___1 and wider if |a|____1.
- The slope ______ will find points on the parabola that are 1 unit to the right and left of the vertex.

Example 1 Graphing in the form $y = ax^2 + bx + c$

$y = 2x^2 - 8x + 6$

$a=$ $b=$ $c=$

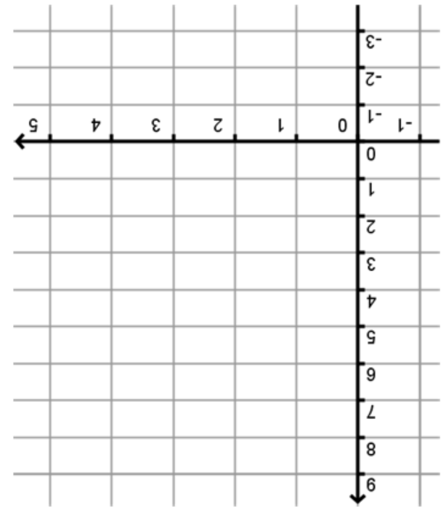
Opens up or down?

Axis of symmetry:

Vertex:

Is the vertex a max or min?

y-intercept:



Reflect the y-int over the axis of symmetry to find another point.
Use "a" to find points 1 unit to the right and left of the vertex.

Example 2 Graphing in the form $y = ax^2 + c$

$y = \frac{-1}{2}x^2 + 3$

$a=$ $b=$ $c=$

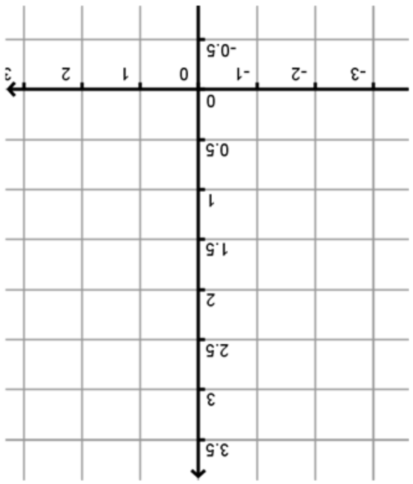
Opens up or down?

Axis of symmetry:

Vertex:

Is the vertex a max or min?

y-intercept:



Use "a" to find points 1 unit to the right and left of the vertex.
Since the vertex is also the y-intercept, you can't reflect it to find another guide point. Instead, use another value for x to find a point and then reflect it over the axis of symmetry.

Example 3 Application problem

A woodland jumping mouse hops along a parabolic path given by $y = -0.2x^2 + 1.3x$, where x is the mouse's horizontal position (in feet) and y is the corresponding height (in feet). Can the mouse jump over a fence that is 3 feet high?