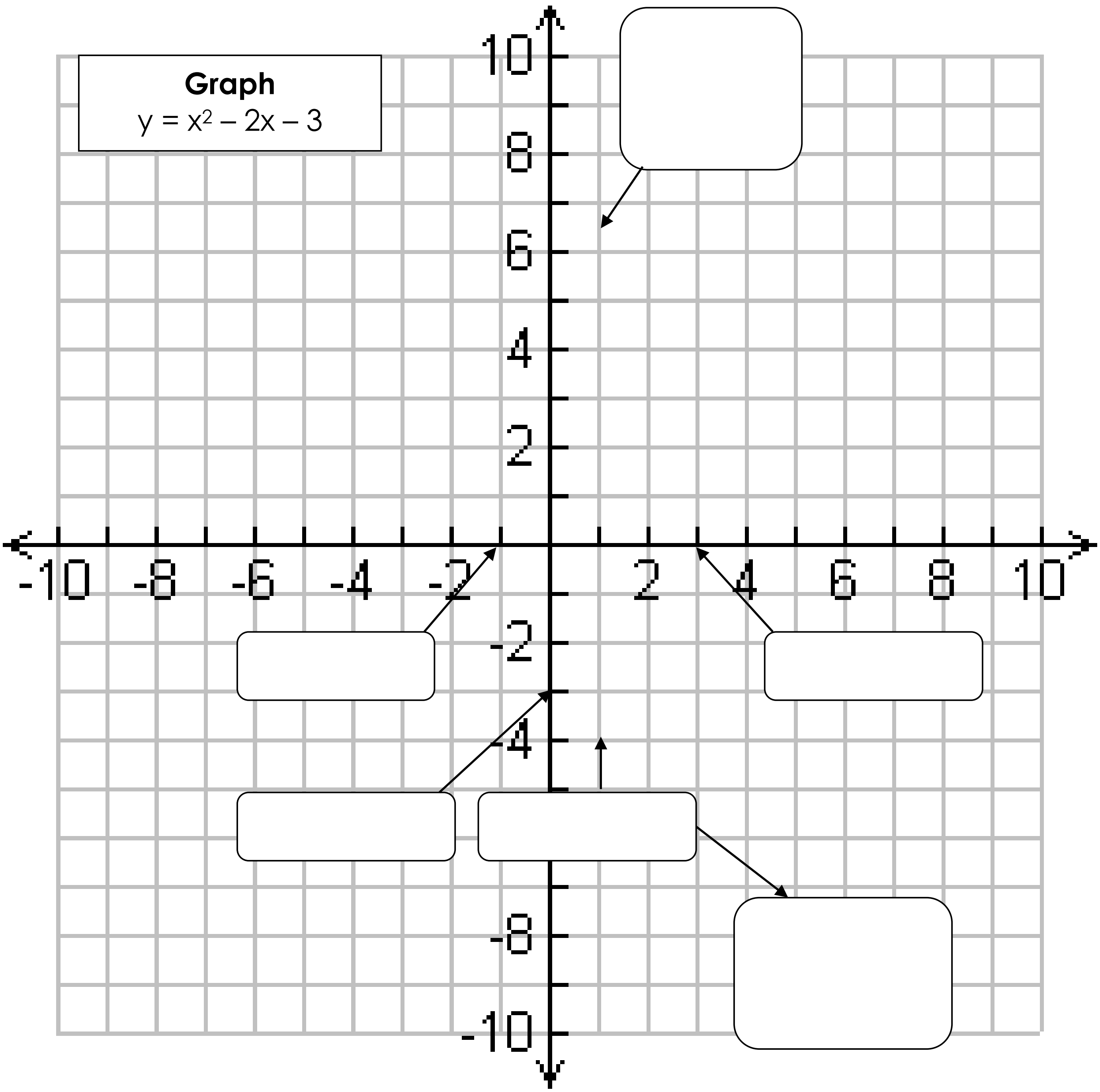
Graphing Standard Form of a Quadratic

Standard Form: y =



Important Vocabulary

Y-Intercept: ______________________________

X-Intercept (root, zero, solution): ______________________________

Vertex: ______________________________

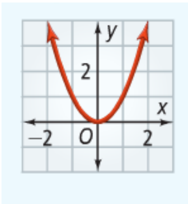
Axis of Symmetry: ______________________________

"a" Value: ______________________________

Parabola: ______________________________

AOS Formula

Essential Understanding: A quadratic function is a type of nonlinear function that models certain situations where the rate of change is____________. The graph of a quadratic function is a ______ _______________with the highest or lowest point corresponding to the ________ or _________ value.



The simplest quadratic function f(x) = x^2 or y = x^2. This is called the ___________________________.

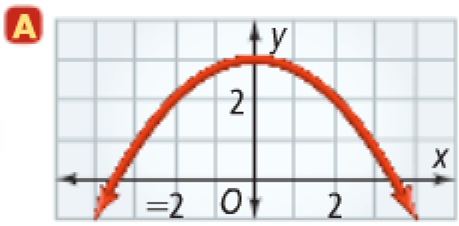
$ax^2 + bc + c$
Parabola opens ________

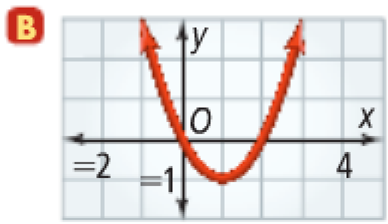
Vertex is the _________point
or the ______ point of the parabola

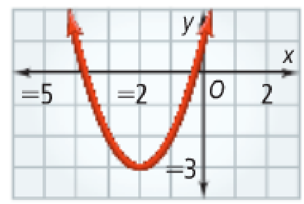
$-ax^2 + bx + c$
Parabola opens _____________

Vertex is the ___________ point
or the _______ point of the parabola

Example 1: Find the vertex for each function





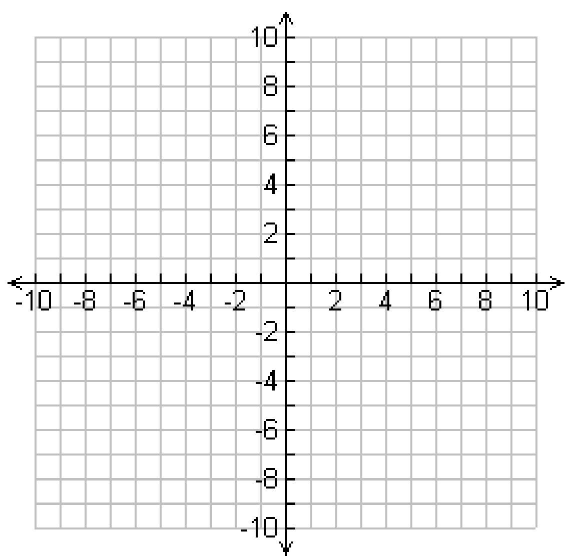


You can use the fact that a parabola is symmetric to graph it quickly.

- Find the _______________ of the vertex and several point on one side of the vertex
- _____________ the points across the axis of symmetry

Example 2: Graph y = ax^2 y = 1/3 x^2

x	Y = 1/3 x^2	x, y



The coefficient of the x^2 - term in a quadratic function affects the width of a parabola as well as the direction in which it opens.

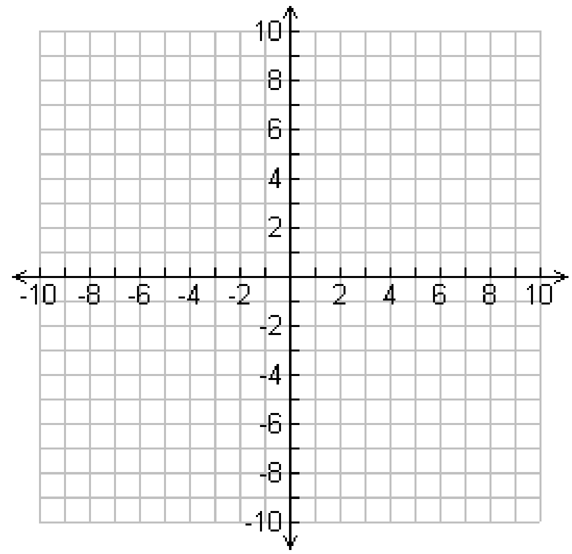
- Larger numbers _________ the graph so it gets closer together
- Fractions makes the graph ________.
- Negative sign ________ the graph.

Example 3: Comparing Widths of Parabolas

The y-axis is the axis of symmetry for graphs of functions $y = ax^2 + c$. The c translates the graph ____________.

Example 4: Graphing $y = ax^2 + c$

x	$Y = 2x^2$	$Y = 2x^2 + 3$



As an object falls, its speed continues to increase, so its height above the ground decreases at a faster and faster rate. Ignoring air resistance, you can model the object's height with the function $h = -16t^2 + c$. The height h is in feet, the time t is in seconds, and the object's initial height c is in feet.

Example 5: An acorn drops from a tree branch 20 ft above the ground. The function $h = -16t^2 + 20$ gives the height h of the acorn (in feet) after t seconds. What is the graph of this quadratic function? At about what time does the acorn hit the ground?

Practice: Using the information from above, suppose the acorn drops from a tree branch 70 ft. above the ground. The function $h = -16t^2 + 70$ gives the height h of the acorn. What is the graph of the function? About what time would the acorn hit the ground? What are reasonable domain and range for the original function?

Practice: For a physics experiment, the class drops a golf ball off a bridge toward the pavement below. The bridge is 75 feet high. The function $h = -16t^2 + 75$ gives the golf ball's height h above the pavement (in feet) after t seconds. Graph the function. How many seconds does it take for the golf ball to hit the pavement?