

SECOND-DEGREE POLYNOMIAL FUNCTION

The equation of the basic quadratic function is:

$$f(x) = ax^2$$

The graph is a curve in the shape of a parabola.

Parameter a represents the opening of the parabola.

If a is:

- **positive**, the parabola will open **upwards**.
- **negative**, the parabola will open **downwards**.
- greater than 1, a **vertical stretch** of the parabola will occur.
- less than 1, a **vertical compression** of the parabola will occur.

In order to find the rule of this function you need one point from the graph or table of values.

Example 1:

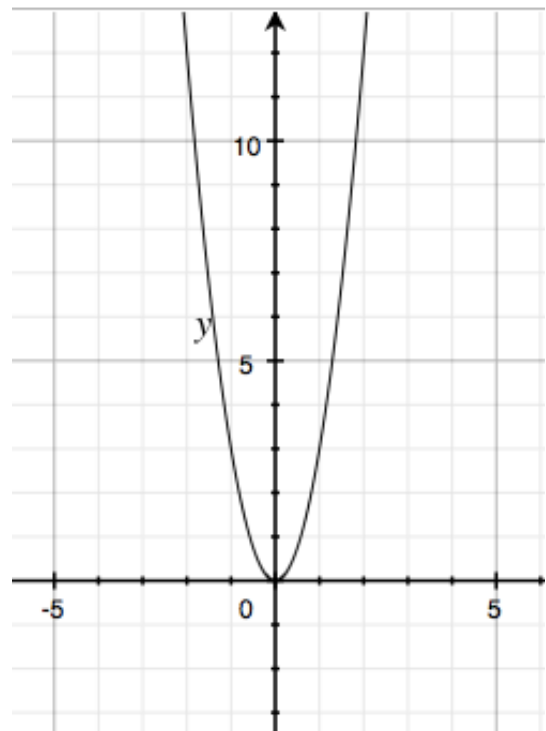
Point (1, 3)

$$x=1 \text{ and } y=3$$

$$f(x) = ax^2$$

$$3 = a(1)^2$$

$$3 = a$$



Example 2:

Point (2, 1)

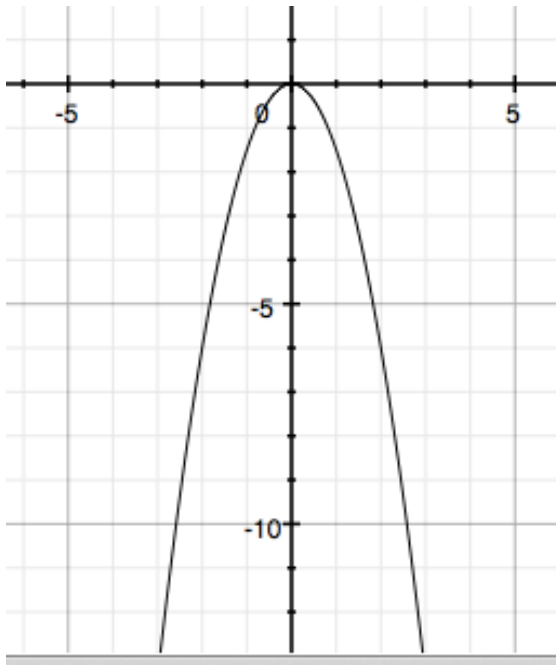
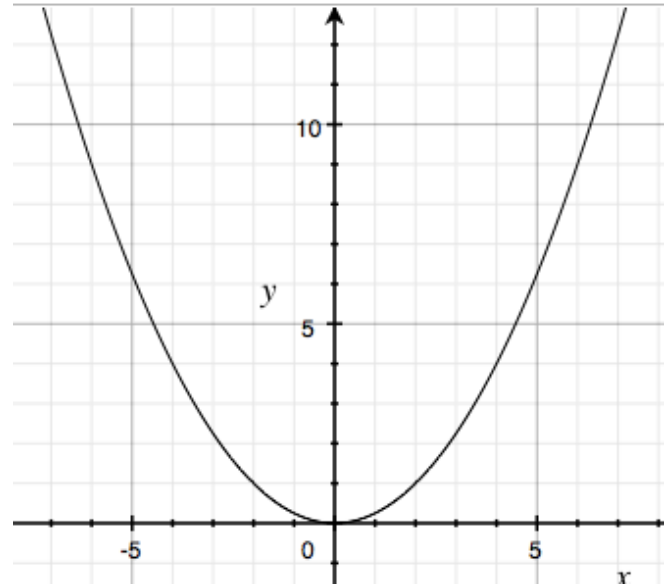
$x=2$ and $y=1$

$$f(x) = ax^2$$

$$1 = a(2)^2$$

$$1 = a(4)$$

$$\frac{1}{4} = a$$



Example 3:

Point (2, -6)

$x=2$ and $y=-6$

$$f(x) = ax^2$$

$$-6 = a(2)^2$$

$$-6 = a(4)$$

$$-\frac{3}{2} = a$$

In order to graph the second-degree polynomial function, prepare a table of values using the rule and graph the points that you obtain.