

Complete the table below for each equation.

Equation	a	h	k	Opens?	Min or Max?	Vertex (Ordered pair)	Axis of Symmetry (Equation: $x = ?$)
$y = x^2$				Up or Down	Min or Max		
$y = (x - 1)^2 + 4$				Up or Down	Min or Max		
$y = (x - 3)^2 + 2$				Up or Down	Min or Max		
$y = -(x + 1)^2 - 2$				Up or Down	Min or Max		
$y = (x + 3)^2$				Up or Down	Min or Max		
$y = -(x - 5)^2 + 4$				Up or Down	Min or Max		
$y = 2(x - 6)^2 - 3$				Up or Down	Min or Max		
$y = -2x^2 - 1$				Up or Down	Min or Max		
$y = \frac{1}{2}(x + 5)^2 - 2$				Up or Down	Min or Max		
$y = -3(x + 1)^2 - 5$				Up or Down	Min or Max		
$y = -x^2 + 4$				Up or Down	Min or Max		

Without graphing, find the vertex and axis of symmetry of the graph of each equation.

a. $y = 2(x - 5)^2 + 7$

b. $y = -2(x + 1)^2 + 3$

c. $y = -x^2 - 4$

d. $y = 0.5(x + 2)^2$

Exploring the Graph of $y = a(x - h)^2 + k$

(Vertex Form of a Quadratic Equation)

Consider the graph of $y = x^2$.

-Does the graph open UP or DOWN?

-Does the graph have a MINIMUM or a MAXIMUM?

-Where is the VERTEX of the graph?

-What is the equation for the AXIS OF SYMMETRY?

This equation can also be written in the form

$$y = a(x - h)^2 + k \quad \text{where } a = 1, \quad h = 0, \quad \text{and } k = 0.$$

Complete the table inside, then come back and summarize how **a**, **h**, and **k** affect the graph of

$$y = a(x - h)^2 + k$$

Summary: