

# Graphing Quadratics in Vertex Form

## Vocabulary:

Vertex Form:

Vertex:  $(h, k)$

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

Reflection: If  $a$  is negative the parabola will reflect over the x-axis

↕

Stretch: If  $a$  is greater than 1, the graph will stretch towards the y-values

↕

Horizontal shift:  $(h)$  Tells if the graph will move left or right from the origin

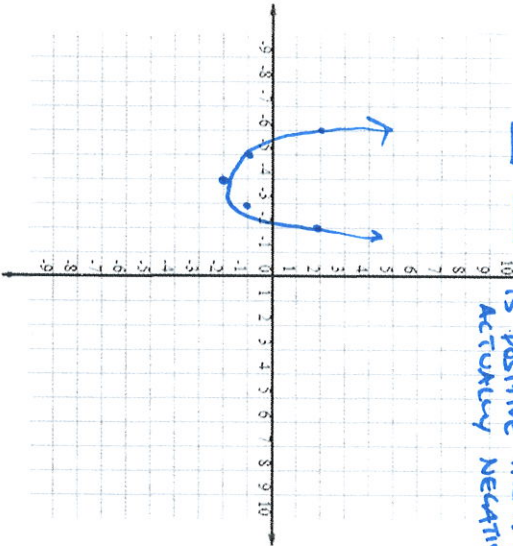
Vertical Shift:  $(k)$  Tells if the graph will move up or down from the origin

Graph the following quadratic function

$$f(x) = (x + 4)^2 - 2$$

Vertex is  $(h, k)$   
 solve the base function  
 is  $(x - h)$  with a negative  
 if the inside  $h$  value  
 is positive the  $h$  is  
 actually negative

x	y
-6	2
-5	-1
-4	-2) vertex
-3	-1
-2	2



What is the vertex?

$(-4, -2)$

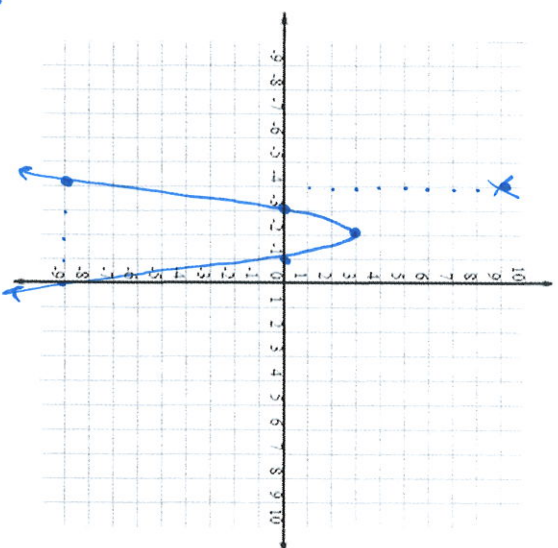
What is the Axis of Symmetry?

$x = -4$

Graph the following quadratic function

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

x	y
-4	-9
-3	0
-2	3
-1	0
0	-9



What are the zeros?

$(-3, 0)$   $(-1, 0)$

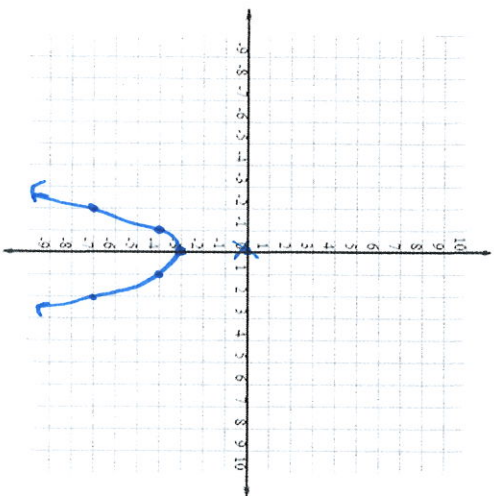
Does the graph over the x axis? How do you know?

YES BECAUSE  $a$  IS NEGATIVE

Graph the following quadratic function

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

x	y
-2	-7
-1	-4
0	-3
1	-4
2	-7



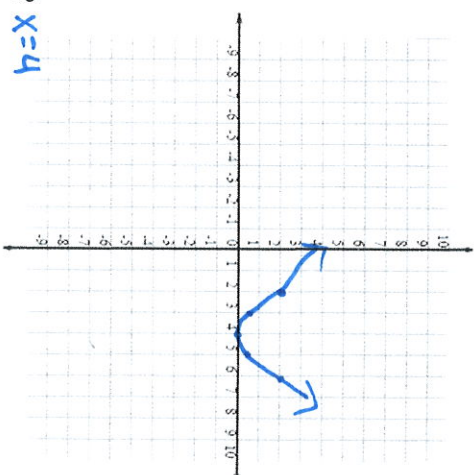
What is the vertex?  $(0, -3)$

What are the zeros?  
None!

Graph the following quadratic function

$$f(x) = \frac{1}{2}(x - 4)^2$$

x	y
2	2
3	.5
4	0
5	.5
6	2



What is the axis of symmetry?  $x = 4$

Does the graph over the x axis? How do you know?  
Zeros  $(4, 0)$   
No, because  $a$  is positive

- Graph the parent (original) quadratic function  $f(x) = x^2$
- Graph the quadratic function  $f(x) = (x - 2)^2 + 3$
- What is the vertex of the original graph?  $(0, 0)$
- What is the vertex of the original graph?  $(2, 3)$
- DESCRIBE how the new graph moved from the original graph  
It moved right 2 and up 3

f. How could you change the function  $f(x) = (x - 2)^2 + 3$  so it would reflect over the x-axis? Put a negative in front

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

g. Sketch the graph of the reflected function

