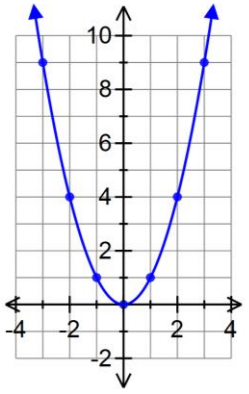
SM 2

Date: **Section:** 7.2

Objective: Graph quadratic formulas using the vertex and value of *a*.

The graph of $y = x^2$:



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

Vertex:

Axis of Symmetry:

Direction of Opening:

***y*-intercept:**

Pattern:

1. Find the vertex of the parabola.
2. Then use the pattern of the parent graph to find 4 more points, 2 on each side of the vertex. If *a* isn't 1, the pattern is a little different (see next page).

Examples: Fill in the requested information for each function. Then draw the graph.

a) $f(x) = x^2 + 4x + 3$ Form of the equation: _____ $a =$ _____ $b =$ _____

Vertex:

Axis of Symmetry:

Direction of Opening:

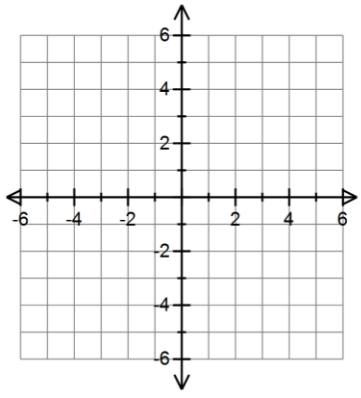
Is the vertex a maximum or minimum?

Maximum or minimum value:

y-intercept:

Domain:

Range:



	x	y
Vertex		

Vertical Stretch:

- a changes how wide the graph is.
  - If $|a|>1,$ the graph is **thinner** than the graph of $y=x^2$.
  - If $|a|<1,$ the graph is **wider** than the graph of $y=x^2$.

How *a* changes the pattern:
The normal pattern is find the vertex, then move over 1 up 1. To find the next two points go back to the vertex and move over 2 up 4.
When *a* is not 1 you multiply the y-value(the "up" number) by "*a*" to get the up value.
Example: $y = 3x^2$ Instead of over 1 up 1 it would be over 1 up 3 (one times 3) and instead of over 2 up 4 it would be over 2 up 12 (four times 3)

b) $f(x)=\frac{1}{2}(x-1)^2-4$ Form of the equation: _____ $a=$ _____ $h=$ _____ $k=$ _____

Vertex:

Axis of Symmetry:

Direction of Opening:

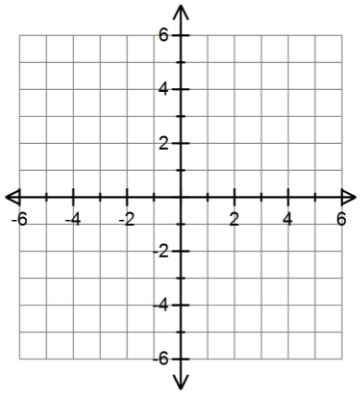
Is the vertex a maximum or minimum?

Maximum or minimum value:

y-intercept:

Domain:

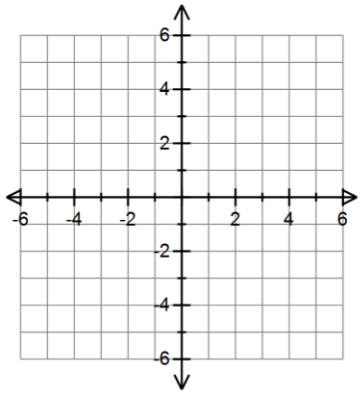
Range:



	x	*y*
Vertex		

c) $f(x) = -3x^2 - 6x + 2$ Form of the equation: _____ $a =$ _____ $b =$ _____

Vertex:



Axis of Symmetry:

Direction of Opening:

Is the vertex a maximum or minimum?

Maximum or minimum value:

y-intercept:

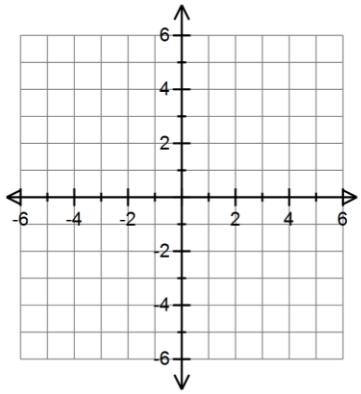
	x	*y*
Vertex		

Domain:

Range:

d) $f(x) = -(x+2)^2 - 1$ Form of the equation: _____ $a =$ _____ $h =$ _____ $k =$ _____

Vertex:



Axis of Symmetry:

Direction of Opening:

Is the vertex a maximum or minimum?

Maximum or minimum value:

y-intercept:

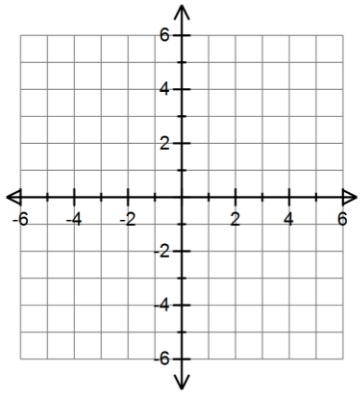
	x	*y*
Vertex		

Domain:

Range:

e) $f(x)=2(x-4)^2-3$ Form of the equation: _____ $a=$ _____ $h=$ _____ $k=$ _____

Vertex:



Axis of Symmetry:

Direction of Opening:

Is the vertex a maximum or minimum?

Maximum or minimum value:

y-intercept:

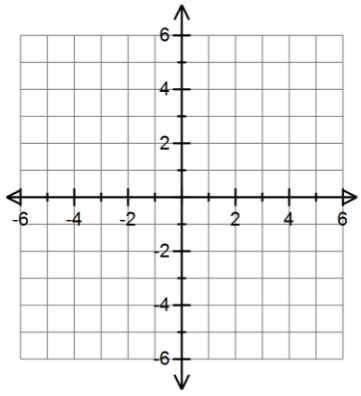
	x	*y*
Vertex		

Domain:

Range:

f) $f(x)=-\frac{1}{2}x^2-x+2$ Form of the equation: _____ $a=$ _____ $b=$ _____

Vertex:



Axis of Symmetry:

Direction of Opening:

Is the vertex a maximum or minimum?

Maximum or minimum value:

y-intercept:

	x	*y*
Vertex		

Domain:

Range: