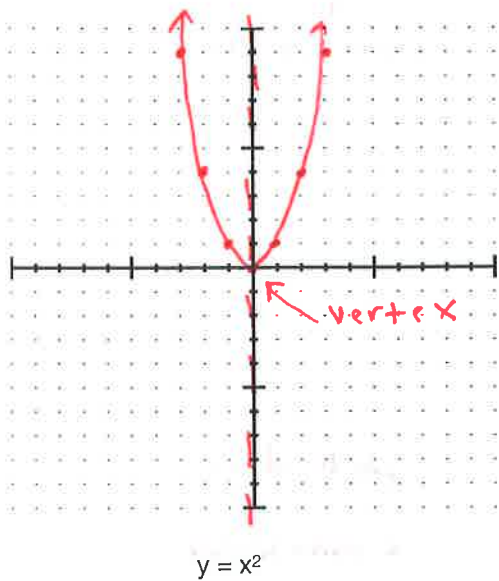


**Intro and Vocab**



- Quadratic *2<sup>nd</sup> degree polynomial*  $y = x^2 - 3$
- Parabola *Graph of Quadratic*
- Vertex *- where the u-starts*
- Maximum *- largest y*
- Minimum *- lowest y*
- Axis of Symmetry *- fold line (Ex:  $x = 0$ )*

x	-2	-1	0	1	2
y	$(-2)^2 = 4$	$(-1)^2 = 1$	$0^2 = 0$	$1^2 = 1$	$2^2 = 4$

Recall #1: When plugging in a negative value, always use parentheses!

Recall #2:  $(5)^2 = 25$        $(-5)^2 = 25$        $-(5)^2 = -25$        $-(-5)^2 = -25$

**Graphing by Table / Observations**

For each quadratic below:

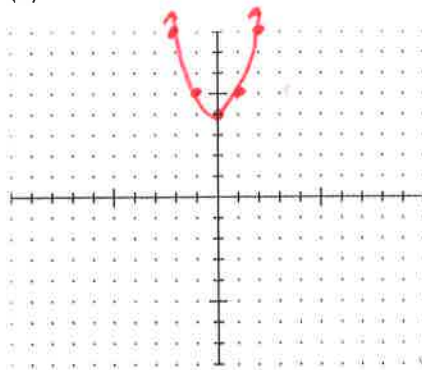
- (a) Make a table of values (at least 5 values)
- (b) Draw the parabola (at least 5 connected points with arrows!)
- (c) Describe how the graph compares to the parent function ( $y = x^2$ ). Pay special attention to the equation!

1)  $y = x^2 + 4$

(a)

x	y
-2	$(-2)^2 + 4 = 8$
-1	$(-1)^2 + 4 = 5$
0	$0^2 + 4 = 4$
1	$1^2 + 4 = 5$
2	$2^2 + 4 = 8$

(b)



(c)

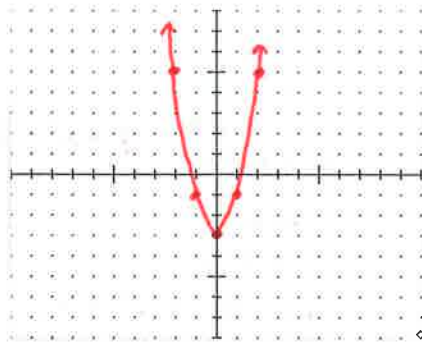
*Moved up 4*

2)  $y = 2x^2 - 3$

(a)

X	Y
-2	$2(-2)^2 - 3 = 5$
-1	$2(-1)^2 - 3 = -1$
0	$2(0)^2 - 3 = -3$
1	$2(1)^2 - 3 = -1$
2	$2(2)^2 - 3 = 5$

(b)



(c)

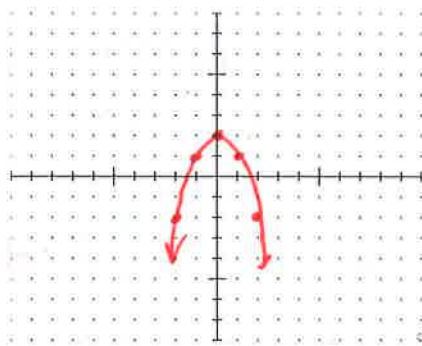
3 units lower  
+  
taller/skinnier

3)  $y = -x^2 + 2$  Hint: You should get (-1, 1) as a solution, not (-1, 3)

(a)

X	Y
-2	$-(-2)^2 + 2 = -2$
-1	$-(-1)^2 + 2 = 1$
0	$-(0)^2 + 2 = 2$
1	$-(1)^2 + 2 = 1$
2	$-(2)^2 + 2 = -2$

(b)



(c)

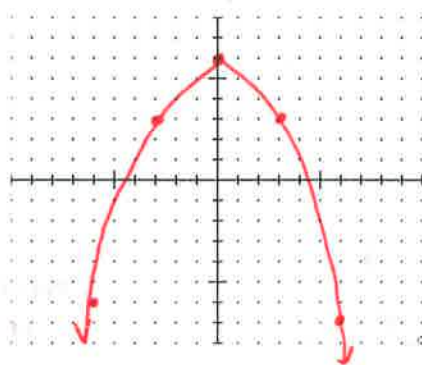
upside down  
2 units higher

4)  $y = -\frac{1}{3}x^2 + 6$  Hint: Because the denominator is 3, try x values that are multiples of 3

(a)

X	Y
-6	$-\frac{1}{3}(-6)^2 + 6 = -6$
-3	$-\frac{1}{3}(-3)^2 + 6 = 3$
0	$-\frac{1}{3}(0)^2 + 6 = 6$
3	$-\frac{1}{3}(3)^2 + 6 = 3$
6	$-\frac{1}{3}(6)^2 + 6 = -6$

(b)



(c)

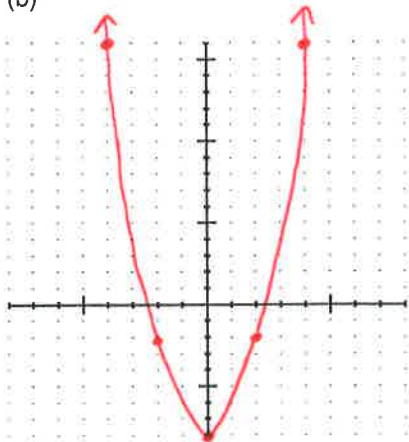
upside down  
6 units higher  
fatter/shorter

$$5) y = \frac{3}{2}x^2 - 8$$

(a)

x	y
-4	$\frac{3}{2}(-4)^2 - 8 = 16$
-2	$\frac{3}{2}(-2)^2 - 8 = -2$
0	$\frac{3}{2}(0)^2 - 8 = -8$
2	$\frac{3}{2}(2)^2 - 8 = -2$
4	$\frac{3}{2}(4)^2 - 8 = 16$

(b)



(c)

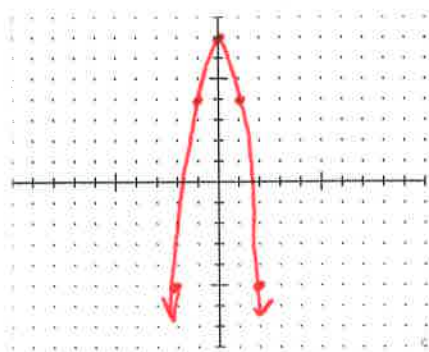
down 8  
slightly fatter/shorter

$$6) y = -3x^2 + 7$$

(a)

x	y
-2	$-3(-2)^2 + 7 = -5$
-1	$-3(-1)^2 + 7 = 4$
0	$-3(0)^2 + 7 = 7$
1	$-3(1)^2 + 7 = 4$
2	$-3(2)^2 + 7 = -5$

(b)



(c)

upside down  
up 7  
tall/skinny

## Summary

A) Describe how the values of a and c effect the graph of the parent function in the equation  $y = ax^2 + c$ ,

a: positive  $\rightarrow$

negative  $\rightarrow$

big  $\rightarrow$  tall/skinny

small  $\rightarrow$  short/fat

c: positive  $\rightarrow$

negative  $\rightarrow$

B) Describe the graphs of each of the following (use what you concluded in part A).

i)  $y = x^2 + 3$

facing up  
up 3

ii)  $y = -x^2 - 5$

facing down  
down 5

iii)  $y = \frac{5}{2}x^2$

tall/skinny