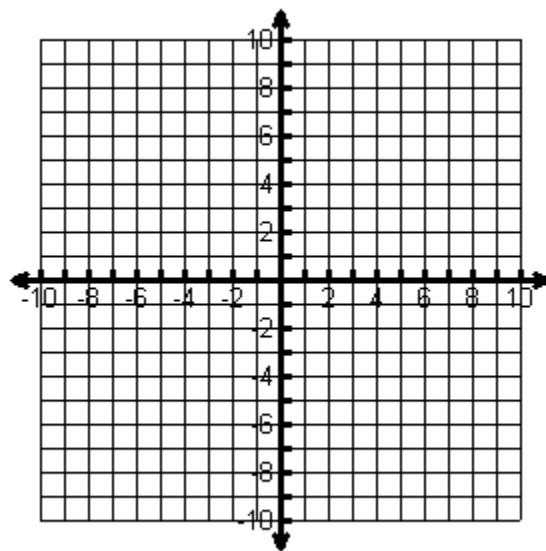


Name: \_\_\_\_\_ Date: \_\_\_\_\_

### Introduction to Quadratic Graphs

**Review what you already know:** Consider the linear function  $f(x) = 2x + 6$

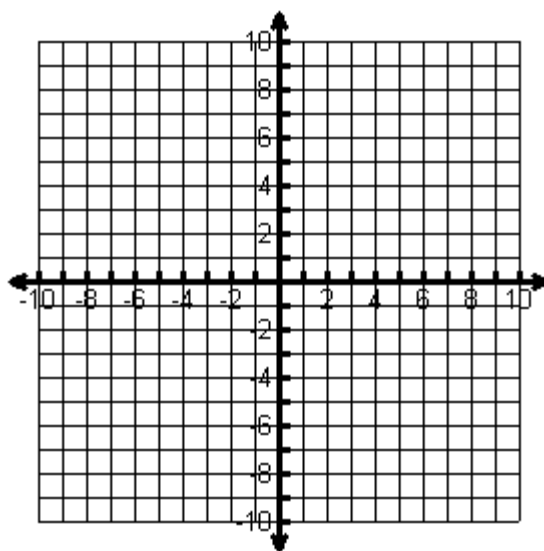
- A) What is the **slope** of the line? \_\_\_\_\_
- B) What is the **y-intercept**? \_\_\_\_\_
- C) What is  $f(2) =$  \_\_\_\_\_
- D) **Graph**  $f(x)$  to the right.
- E) What is the **x-intercept**? \_\_\_\_\_
- F) What is the **end behavior**?  $x \rightarrow$  \_\_\_\_\_  $f(x) \rightarrow$  \_\_\_\_\_  
 $x \rightarrow$  \_\_\_\_\_  $f(x) \rightarrow$  \_\_\_\_\_



**New Exploration:** Just as the line  $y = x$  is the *parent function* for all lines,  $y = x^2$  is the *parent function* for all **quadratic functions**. Consider the quadratic function  $g(x) = x^2$

- A) Complete the table for  $g(x) = x^2$

x	$x^2$
-3	
-2	
-1	
0	
1	
2	
3	



- B) Using these values, plot the **graph** for  $g(x)$
- C) What is the **end behavior**?  $x \rightarrow$  \_\_\_\_\_  $f(x) \rightarrow$  \_\_\_\_\_  
 $x \rightarrow$  \_\_\_\_\_  $f(x) \rightarrow$  \_\_\_\_\_
- D) What is the **line of symmetry** for  $g(x)$ ? \_\_\_\_\_
- E) The point  $(0, 0)$  is called the **vertex** of  $g(x)$ . Describes what happens at the vertex.

Just as the **slope** and **y-intercept** change the appearance of a line, **transformations** of a quadratic function change its shape, too. **Graph** each of the following on your graphing calculator. For each of them, state the **coordinates** of the **vertex** and the **equation** of the **axis of symmetry**.

<b>Equation:</b>	A) $y = x^2 + 3$	B) $y = x^2 - 2$	C) $y = x^2 - 4$
Vertex			
Axis of Symmetry			

<b>Equation:</b>	D) $y = (x - 2)^2$	E) $y = (x - 4)^2$	F) $y = (x + 3)^2$
Vertex			
Axis of Symmetry			

<b>Equation:</b>	G) $y = 3x^2$	H) $y = \frac{1}{4}x^2$	I) $y = -x^2$
Vertex			
Axis of Symmetry			

<b>Equation:</b>	J) $y = 2(x - 1)^2 + 4$	K) $y = -2(x + 3)^2 - 5$	L) $y = \frac{1}{2}(x - 2)^2 + 1$
Vertex			
Axis of Symmetry			

Consider the function  $f(x) = a \cdot (x - h)^2 + k$ . Based on your graphs and results from above, explain what effect each of the following variables has on the graph.

a – \_\_\_\_\_

h – \_\_\_\_\_

k – \_\_\_\_\_

**In conclusion:** Describe the transformation for  $y = -(x + 3)^2 - 5$ :

\_\_\_\_\_