Name: _____ Period:_____ Date:_____

2.4 Transforming Graphs Investigation

1. Graph the function $f(x) = x^2$.

X							
$f(x)$							

2. Using your graphing calculator, graph the following parabolas and describe the transformations as compared to the standard graph of $f(x) = x^2$. In your comparison, make sure to include the changes in vertices, shape of the graph, and position on the coordinate plane.

a. $f(x) = x^2 + 4$ _____

b. $f(x) = x^2 - 4$ _____

c. $f(x) = (x+4)^2$ _____

d. $f(x) = (x-4)^2$ _____

e. $f(x) = 4x^2$ _____

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

g. $f(x) = -x^2$ _____

3. Predict the phase shifts that will occur for the graph of $f(x) = (x-3)^2 + 6$. Then, use the graphing calculator to check your prediction. _____

4. Graph the equation $f(x) = |x|$.

x							
$f(x)$							

5. Using your graphing calculator, graph the following functions and describe the transformations as compared to the standard graph of $f(x) = |x|$. In your comparison, make sure to include the changes in vertices, shape of the graph, and position on the coordinate plane.

a. $f(x) = |x| + 5$ _____

b. $f(x) = |x| - 5$ _____

c. $f(x) = |x+5|$ _____

d. $f(x) = |x-5|$ _____

e. $f(x) = 5|x|$ _____

f. $f(x) = \frac{1}{5}|x|$ _____

g. $f(x) = -|x|$ _____

6. Predict the phase shifts that will occur for the graph of $f(x) = |x+4|-3$. Then, use the graphing calculator to check your prediction. _____

7. a. Graph $y = x^2$ and $y = -x^2$.

   b. Graph $y = x^3 + 2x^2$ and $y = -\left(x^3 + 2x^2\right)$.

   c. What do you notice? What can you generalize about the graphs of $y = f(x)$ and $y = -f(x)$?

   _____

8. a. Graph $y = 2x - 1$ and $y = 2(-x) - 1$.

   b. Graph $y = \sqrt{x}$ and $y = \sqrt{-x}$

   c. What do you notice? What can you generalize about the graphs of $y = f(x)$ and $y = f(-x)$

   _____

9. Sketch a graph of each of the parent functions.

   f(x) = c f(x) = x f(x) = |x|

   f(x) = $\sqrt{x}$ f(x) = x^2 f(x) = x^3