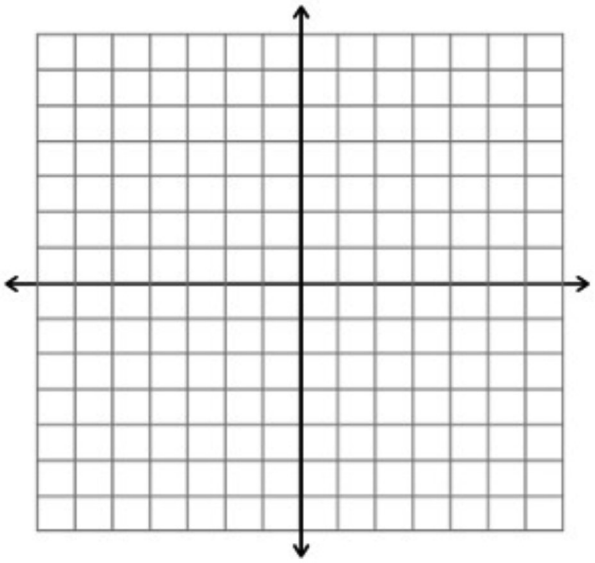
R.E.A.L. Math 1010 Supplemental Activity Name: _____
S21 Graphing Transformations of Functions

1. Use a table of values to graph all of the following functions on the coordinate plane to the right. Clearly label each graph. Also list the vertex of each function.



   a. $f(x) = x^2$
      Vertex:

   b. $g(x) = x^2 + 3$
      Vertex:

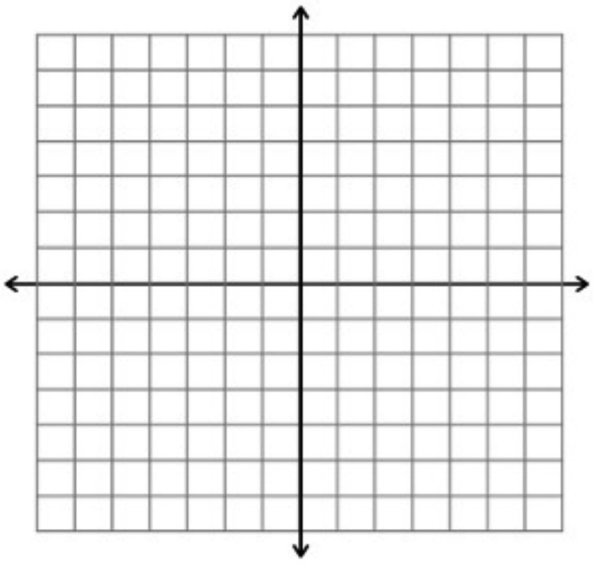
   c. $h(x) = x^2 - 3$
      Vertex:

2. How does the graph of $g(x)$ compare to the graph of $f(x)$? How do their vertices compare? Be specific.

   How does the graph of $h(x)$ compare to the graph of $f(x)$? How do their vertices compare? Be specific.

3. Make a generalization about the transformation of a function's graph when a constant is added to or subtracted from the x^2 term.

4. Graph all of the following functions on the coordinate plane to the right. Clearly label each graph. Also list the vertex of each function.



   a. $f(x) = x^2$
      Vertex:

   b. $g(x) = (x-3)^2$
      Vertex:

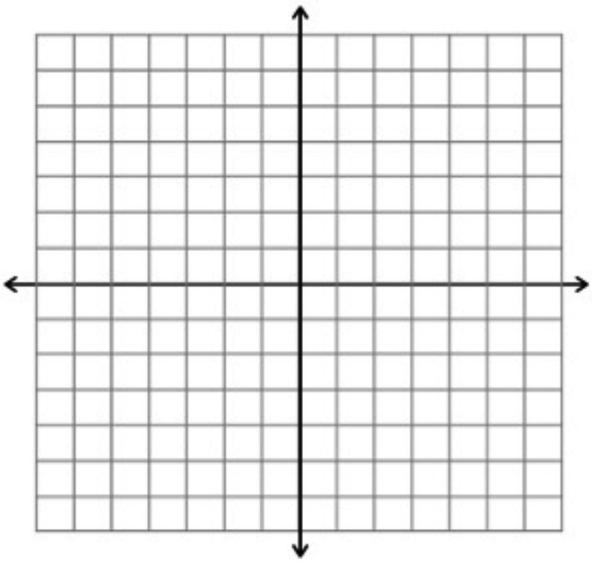
   c. $h(x) = (x+3)^2$
      Vertex:

5. How does the graph of $g(x)$ compare to the graph of $f(x)$? How do their vertices compare? Be specific.

   How does the graph of $h(x)$ compare to the graph of $f(x)$? How do their vertices compare? Be specific.

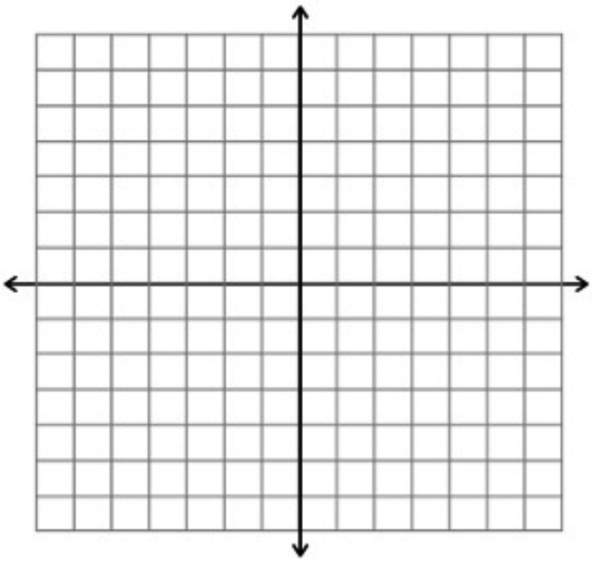
6. Make a generalization about the transformation of a function's graph when a constant is added to or subtracted from x before being squared.

7. Graph both of the following functions on the coordinate plane to the right. Clearly label each graph.
   a. $f(x) = x^2$
   b. $g(x) = (x-2)^2 - 4$



8. How does the graph of $g(x)$ compare to the graph of $f(x)$? Be specific.

9. Graph all of the following functions on the coordinate system to the right. Clearly label each graph.
   a. $f(x) = x$
   b. $g(x) = x + 2$
   c. $h(x) = x - 2$



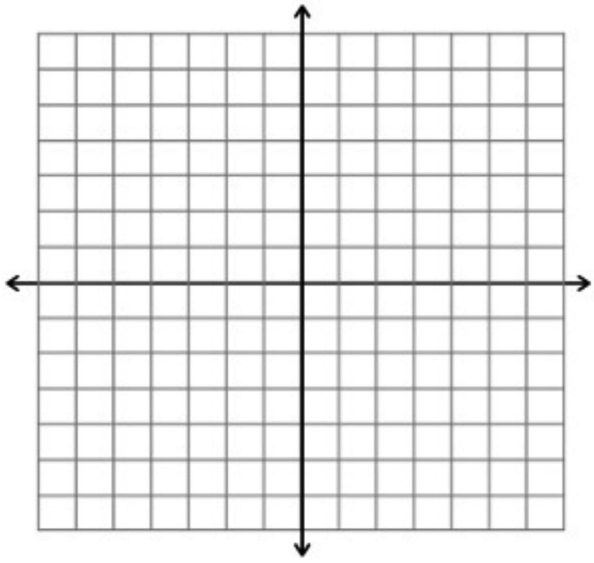
10. Are these quadratic, exponential, or linear functions?

11. How does the graph of $g(x)$ compare to the graph of $f(x)$? Be specific.

    How does the graph of $h(x)$ compare to the graph of $f(x)$? Be specific.

12. Do your generalizations made in #3 still hold true for these functions?

13. Graph all of the following functions on the coordinate plane.



a. $f(x) = 3^x$

b. $g(x) = 3^x + 2$

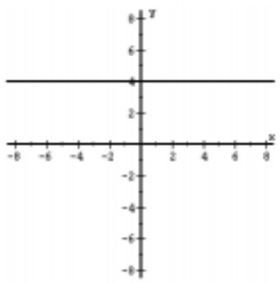
c. $h(x) = 3^{x+2}$

14. Are these quadratic, exponential, or linear functions?

15. Do your previous generalizations hold true for these functions?

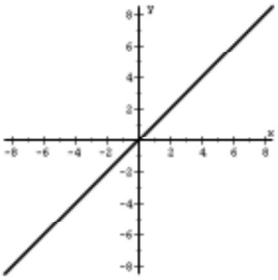
Parent Functions Graphs: Every function can be classified as a member of a "family." The "parent" of a function family is the most basic representation of the family. Below are graphs of some basic parent functions.

In this course we are studying Constant, Linear, Absolute Value, Quadratic, Exponential and Logarithmic. Each can be transformed.



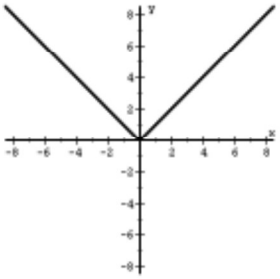
$f(x) = a$

Constant



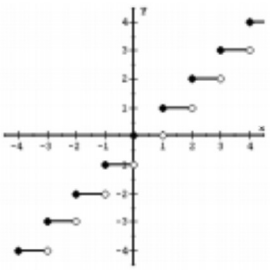
$f(x) = x$

Linear



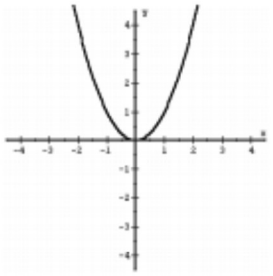
$f(x) = |x|$

Absolute Value



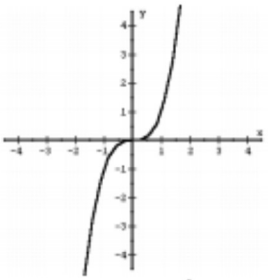
$f(x) = \text{int}(x) = [x]$

Greatest Integer



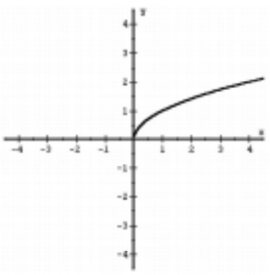
$f(x) = x^2$

Quadratic



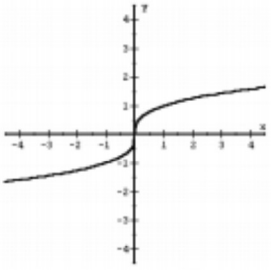
$f(x) = x^3$

Cubic



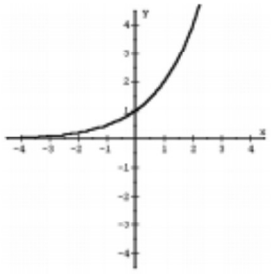
$f(x) = \sqrt{x}$

Square Root



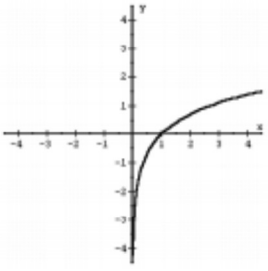
$f(x) = \sqrt[3]{x}$

Cube Root



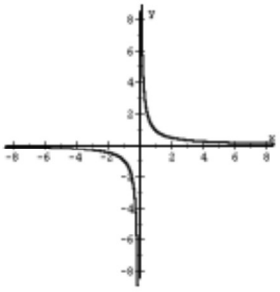
$f(x) = a^x$

Exponential



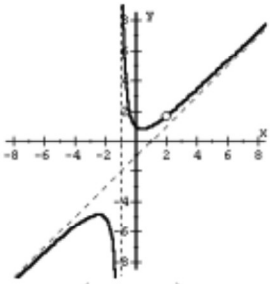
$f(x) = \log_a x$

Logarithmic



$f(x) = \frac{1}{x}$

Reciprocal



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

Rational

14. Describe each transformation of the following functions from their parent function.

Parent Function	Function	Description of transformation from parent function
$f(x) = x$	$f(x) = x - 2$	Vertical shift down two units
	$p(x) = (x - 10)^2 - 7$	
	$h(x) = \sqrt{x} + 5$	
	$g(x) = \lvert x - 2 \rvert + 7$	
	$f(x) = \sqrt{x + 23}$	
	$m(x) = x^3 - 18$	
	$q(x) = 2^x - 13$	
	$w(x) = log\ x + 1$	
	$k(x) = (x + 11)^3 + 2$	
	$z(x) = 2^{x-5}$	
	$r(x) = log\ (x + 22) -$	
	$d(x) = \lvert x \rvert - 18$	