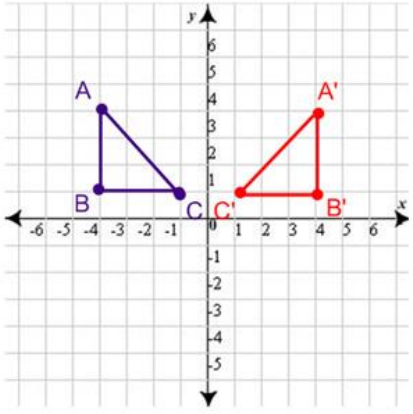
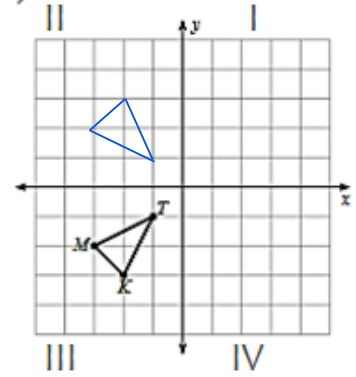
Welcome Back!!

Let's Begin the New Year by Reflecting Graphs



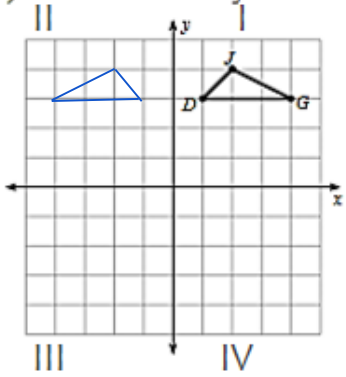
A. Identify the quadrant where each image will end up for the given reflection.

1) reflection across the x-axis



II

2) reflection across the y-axis



II

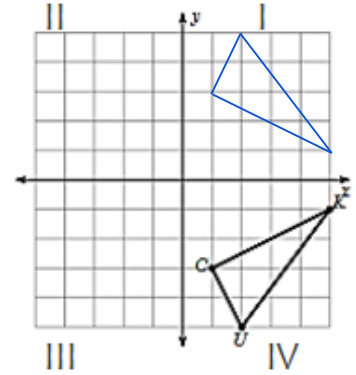
A. Which reflections are flipped up or down? These are vertical reflections.

1 and 3

A. Which reflections are flipped left or right? These are horizontal reflections.

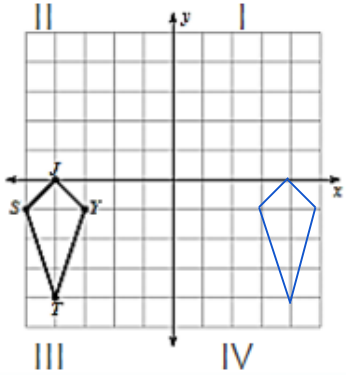
2 and 4

3) reflection across the x-axis



I

4) reflection across the y-axis



IV

A. Do the *x*- or *y*-values change with a vertical reflection? Which values change with a horizontal reflection?

Vertical Reflection: *y*-values change

Horizontal Reflection: *x*-values change

Algebra 1: 5.4 Guided Notes **Name** _____ **Period** ____
Reflections of Linear and Exponential Functions

Learning Goal

- Reflect a function horizontally and vertically.

Notes

A **reflection** Flips a graph across a line of reflection (like the x or y axis)

The reflection is a mirror image of the original graph.

	Horizontal Reflection	Vertical Reflection
Equation	$f(x) \rightarrow f(-x)$	$f(x) \rightarrow -f(x)$
Table	Only the x-values change signs (+/-)	Only the y-values change signs (+/-)
Graph	Graph reflects/flips over the y-axis (x=0)	Graph reflects/flips over the x-axis (y=0)

Let's Practice!

Write the equation for the horizontal and vertical reflection of each function.

1. $f(x) = 5^x$

   Horizontal reflection: 5^{-x}

   Vertical reflection: -5^x

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

   Horizontal reflection: $-2(-x)^2 = -2x^2$

   Vertical reflection: $-(-2x^2) = 2x^2$

3. $f(x) = \frac{5}{4}x^3$

   Horizontal reflection: $\frac{5}{4}(-x)^3$

   Vertical reflection: $-\frac{5}{4}x^3$

Let's Reflect an Exponential Function

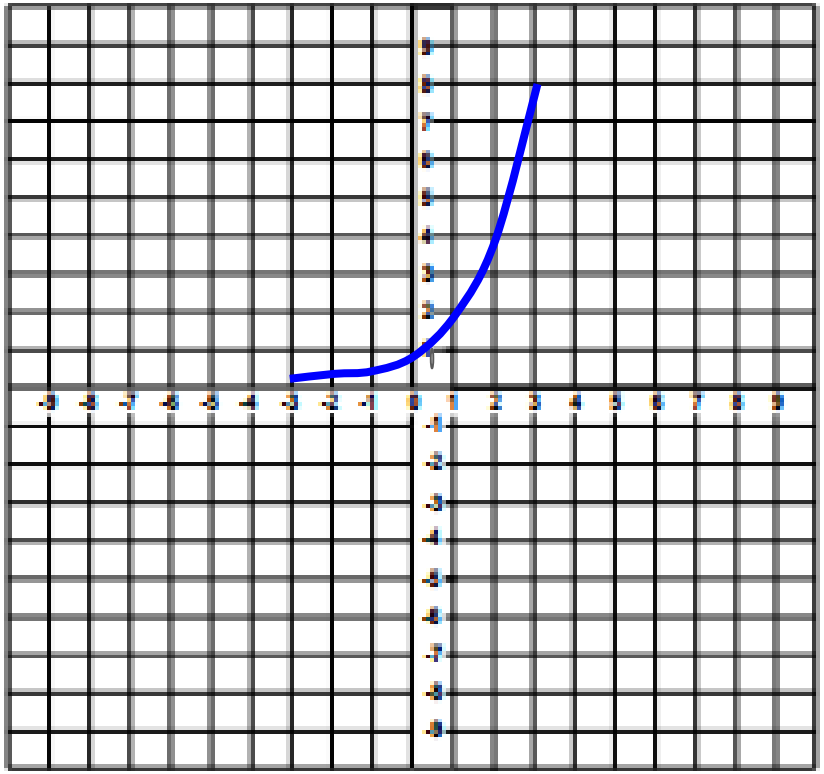
Equation

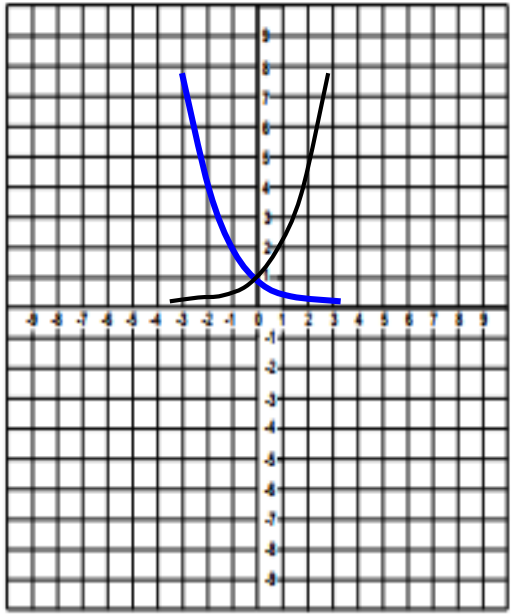
$f(x) = 2^x$

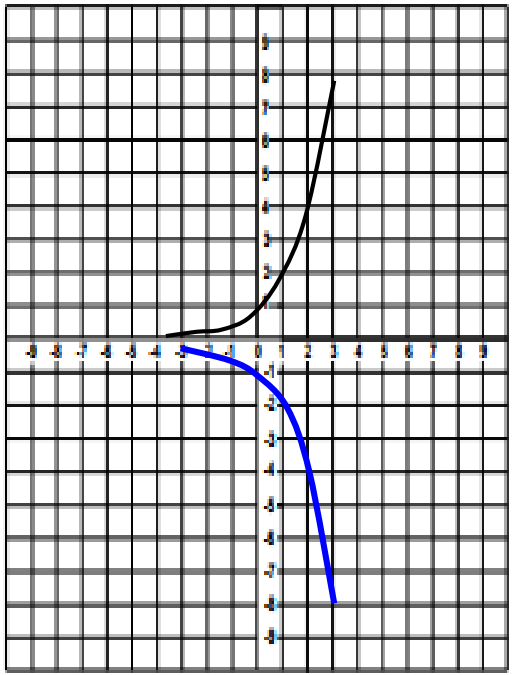
Table

x	$f(x) = 2^x$
-3	$2^{-3} = \frac{1}{8}$
-1	$2^{-1} = \frac{1}{2}$
0	$2^0 = 1$
1	$2^1 = 2$
3	$2^3 = 8$

Graph



	Equation	Table	Graph
Horizontal Reflection	$2^x \rightarrow 2^{-x}$	x | $f(x) = 2^{-x}$ 3 | $\frac{1}{8}$ 1 | $\frac{1}{2}$ 0 | 1 -1 | 2 -3 | 8	

Vertical Reflection	$2^x \rightarrow \underline{-2^x}$		

x	$f(x) = \underline{-2^x}$
-3	$-\frac{1}{8}$
-1	$-\frac{1}{2}$
0	-1
1	-2
3	-8

Homework: Worksheet