Name: _____ Date: March 10 Hour: ____Alg 1____

Unit 7A Day 7: Reflecting Functions

Focus Question: How do I reflect a function?

A. Today we will continue to look at $kf(x)$ and $f(kx)$ where $f(x)$ is the function and k is some constant value. These transformations will also reflect a function. When we looked at them yesterday we focused only on positive values of k.

1. $kf(x)$ is a vertically stretch or compression because its outside the ( ) so its affecting the y

   If $k > 1$, it Stretched If $0 < k < 1$, should say if $|k| < 1$, it Compressed

2. $f(kx)$ is a horizontal stretch or compression because its inside the ( ) with x

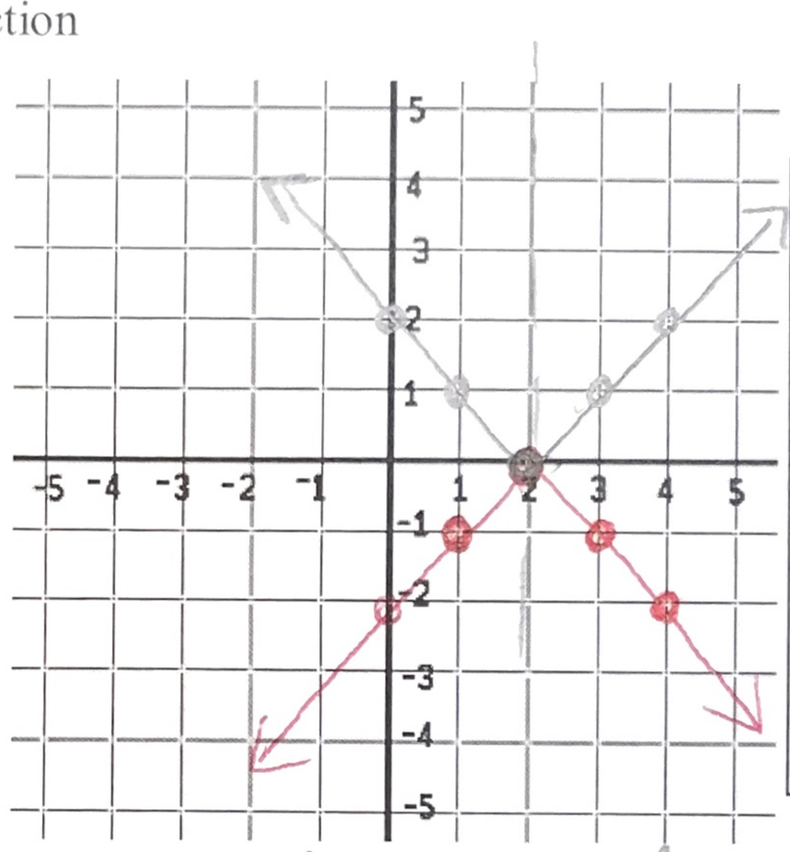
   If $k > 1$, it Compressed If $0 < k < 1$, should say if $|k| < 1$, it stretched

B. ***Transformation kf(x)*** *when k is negative*

Use two different colors to graph each function

1)

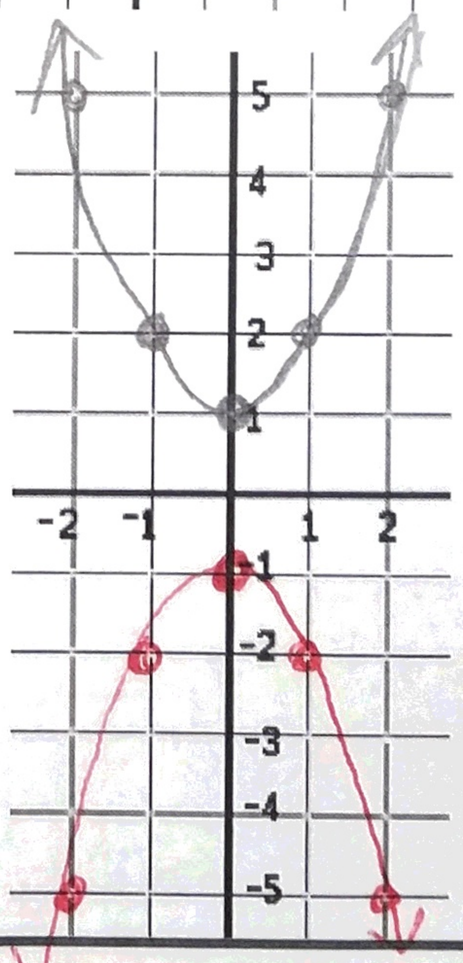
Original function	$g(x) = -f(x)$
$f(x) = \|x - 2\|$ (right 2)	$g(x) = -\|x-2\|$
x | y 3 | 1 4 | 2	x | y 4 | -2 3 | -1 2 | 0 1 | -1



The vertex (2,0) was originally a minimum but now it is a Maximum the flipped over the x-axis

2)

original function	$g(x) = -f(x)$ $-(x^2+1)$
$f(x) = x^2 + 1$ (parent, up 1)	$g(x) = -x^2 - 1$
x | y 1 | 2 2 | 5	x | y 0 | -1 1 | -2 2 | -5



The vertex (0,1) was originally a minimum but now it is at maximum and is at (0,-1) flipped over the x-axis

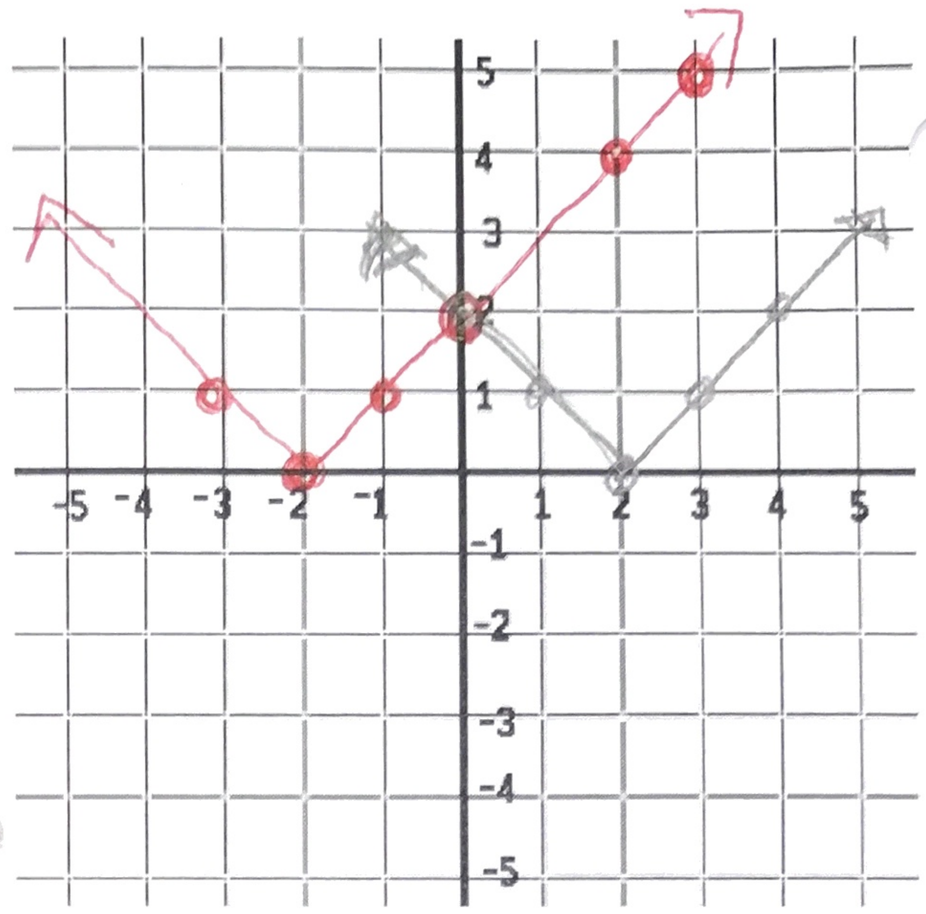
3) What does the transformation $kf(x)$ do to the function if k is negative?

flips it over the x-axis

C. *Transformation f(kx)* *when k is negative*

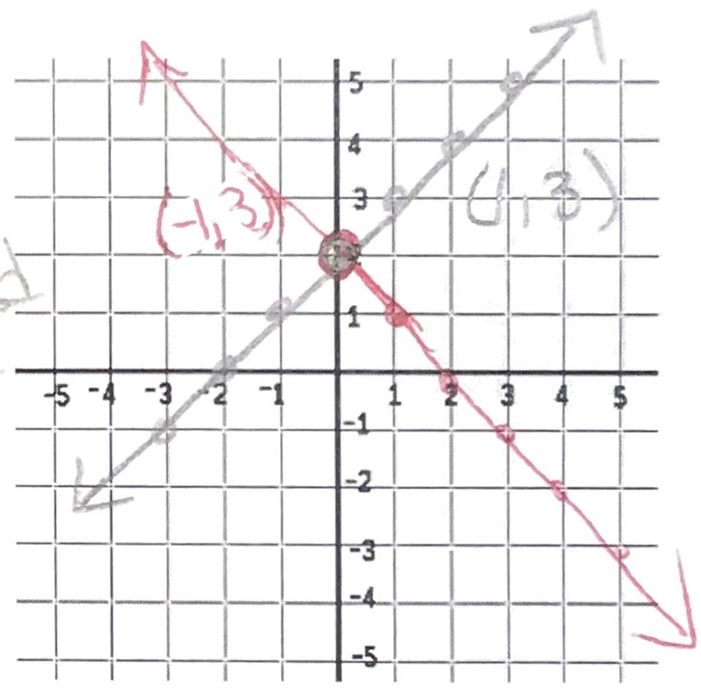
Use two different colors to graph each function

Original function	$g(x) = f(-x)$
$f(x) = \lvert x - 2 \rvert$	$g(x) =$ $\lvert -x - 2 \rvert$
x | y	x | y 3 | 5 2 | 4 0 | 2 -1 | 1 -2 | 0 -3 | 1



it flipped over the y-axis

Original function	$g(x) = f(-x)$
$f(x) = x + 2$	g(x) = $-x + 2$



it reflected over the y-axis

3) What does the transformation *f(kx)* do to the function if k is negative?

it reflects over the y-axis

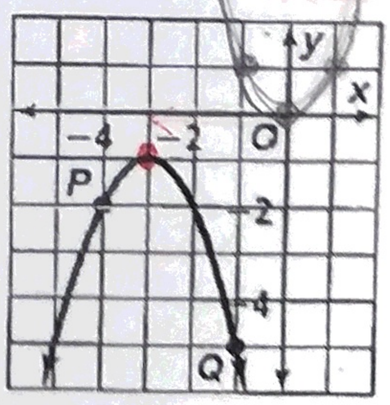
D. Practice

1. Describe what transformations happened to the parent quadratic if $g(x) = -2(x + 3)^2$

reflects over x — vertical stretch — left 3

2. Write the equation if the quadratic parent has been vertically compressed by ¼ and then translated 4 left units and 7 units down. $g(x) = \frac{1}{4}(x+4) - 7$

3. Describe the transformation of x^2 at right. Then write its equation.



reflect over x axis
left 3 & down 1

$h(x) = -(x+3)^2 - 1$

Again, these two transformations can be tricky if you don't know the original function. For instance, the graph of $f(x) = |x + 2|$ is identical to the graph above for $g(x) = |-x - 2|$. **After this test, we will always assume the transformation that has occurred is *kf(x)*.** This means we will describe all transformations as either a

vertical stretch or compression and a reflection over the X axis.