Math 115E Activity 18

Chapter 6
Transformations

Transformation Rules

Function	Vertical Translation	Result	Point
$y = x^2$	**Upward** by k units	$y = x^2 + k$	$(x, y + k)$
$y = x^2$	**Downward** by k units	$y = x^2 - k$	$(x, y - k)$
$y = x^2$	**Right** by h units	$y = (x - h)^2$	$(x - h, y)$
$y = x^2$	**Left** by h units	$y = (x + h)^2$	$(x + h, y)$
$y = x^2$	**Stretch** for $\|c\| \geq 1$	$y = 2f(x)$	$(x, 2y)$
$y = x^2$	**Shrink** for $0 < \|c\| < 1$	$y = \frac{1}{2}f(x)$	$(x, \frac{1}{2}y)$
$y = x^2$	**Reflection** over the $x - axis$	$y = -x^2$	$(x, -y)$
$y = x^2$	**Reflection** over the $y - axis$	$y = (-x)^2$	$(-x, y)$

Quadratic Function Transformations

Convert each of the following transformations from function notation into descriptive words
Also pay attention to which transformations come first before others.

$y = \frac{1}{2}f(x - 1) + 2$	$y = 5f(x) + 3$	$y = -2f(x + 1) - 2$	$y = f(x - 3) + 4$

Transformation given a point

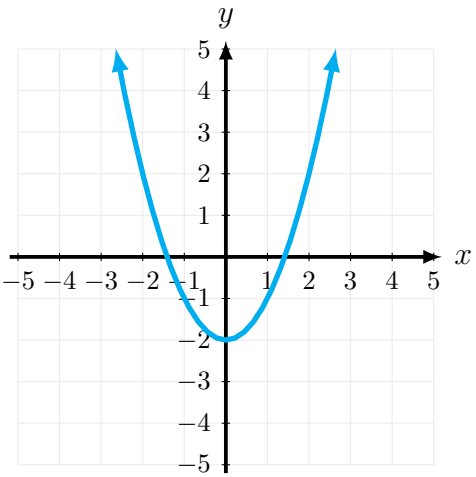
A Transformation in the form $y = af(x-h)+k$ with a point (x_0, y_0) from the original function $f(x)$ will have the following point as the result $(x-h, ay+k)$
Notice that only the x-value gets shifted and the y value remains the same then transformed

If $(3,4)$ is a point on the graph $f(x)$, using the same transformations as before, what ordered pair must also be on the graph of y? We do not know the original function, but what can we do?

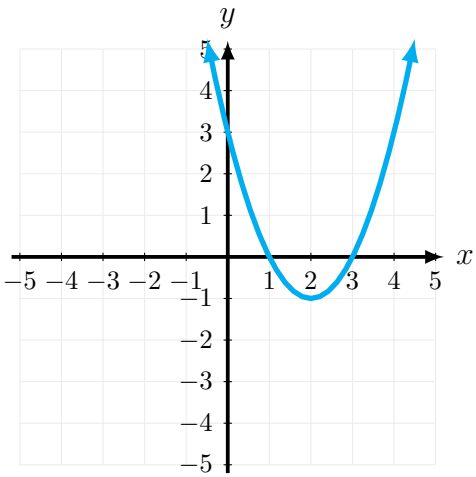
$y = \frac{1}{2}f(x-1)+2$	$y = 5f(x)+3$	$y = -2f(x+1)-2$	$y = f(x-3)+4$

Transformations From Graph

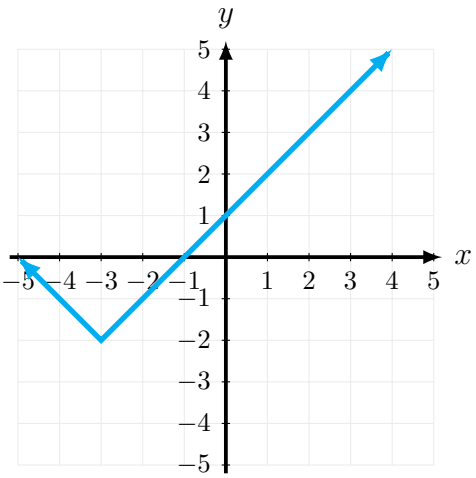
Adjust $y = f(x)$ below with transformation $y = 2f(x)$



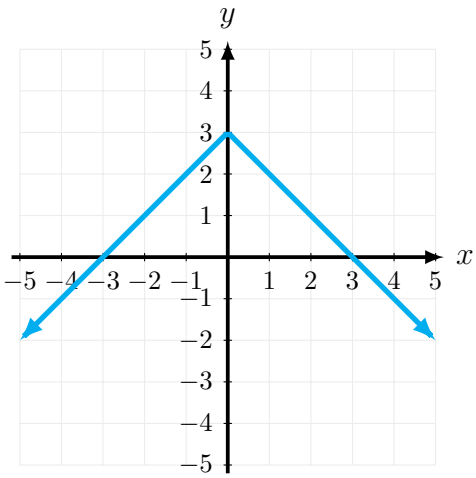
Adjust $y = g(x)$ below with transformation $y = -g(x)$



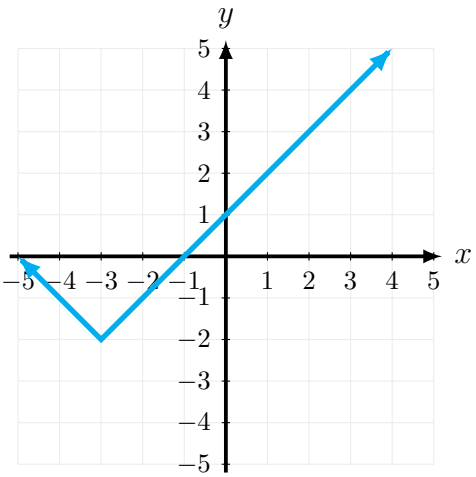
Adjust $y = h(x)$ below with transformation $y = h(x - 3)$



Adjust $y = k(x)$ below with transformation $y = -k(x) - 3$



Adjust $y = h(x)$ below with transformation $y = h(x - 3)$



Adjust $y = k(x)$ below with transformation $y = -k(x) - 3$