

PARENT FUNCTIONS AND TRANSFORMATIONS

Notecards from Parent Functions and Transformations: Transformations (Parent Functions)

Parent Functions

One of the things we do in calculus is study the behavior of functions. Some of the most basic functions you should be able to recognize and graph without the use of a calculator. You should be able to sketch an accurate graph (3 to 5 EXACT points) of the following parent functions: Check the [notecard checklist](#) if you aren't sure.

$$y = x$$

$$y = x^2$$

$$y = x^3$$

$$y = \sqrt{x}$$

$$y = \frac{1}{x}$$

$$y = \frac{1}{x^2}$$

$$y = |x|$$

$$y = [x]$$

$$y = ab^x, 0 < b < 1$$

$$y = ab^x, 1 < b$$

$$y = \log x$$

$$y = \sin x$$

$$y = \cos x$$

$$y = \tan x$$

Transformations

Not only should you be able to graph the parent functions above, but you should be able to graph the transformations of these graphs. Without knowing exact points on the parent function, it will be difficult to transform the parent function!

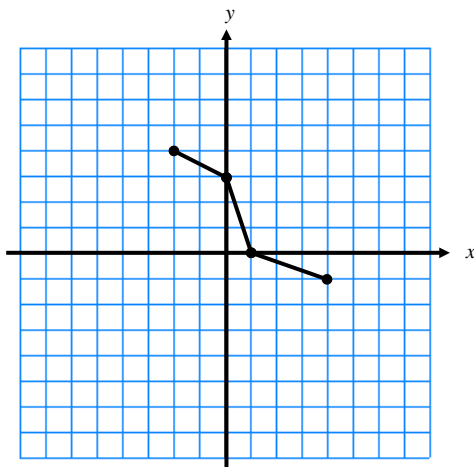
Example 1: Suppose you are given the function $f(x)$. What effect do a , b , c , and d have on original function if your new function is $a \cdot f(b(x+c)) + d$

Another way to look at this is with the following chart:

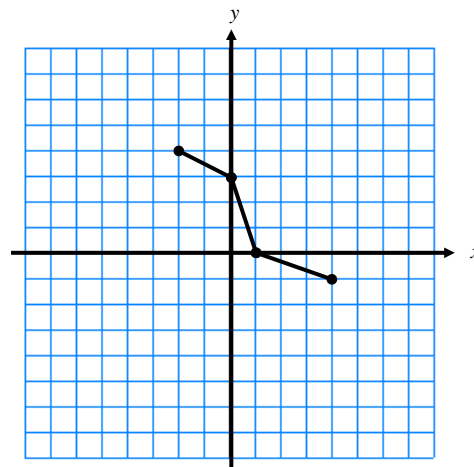
	Inside		Outside	
+/-	$f(x+c)$	$f(x-c)$	$f(x)+d$	$f(x)-d$
\times/\div	$f(bx)$	$f(-x)$	$a \cdot f(x)$	$-f(x)$

Example 2: Let f be the graph given in the picture below. Graph the following transformations of f .

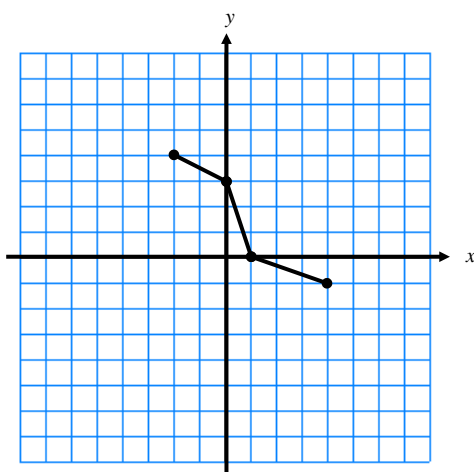
- a) $f(x)+2$
- b) $-f(x)$



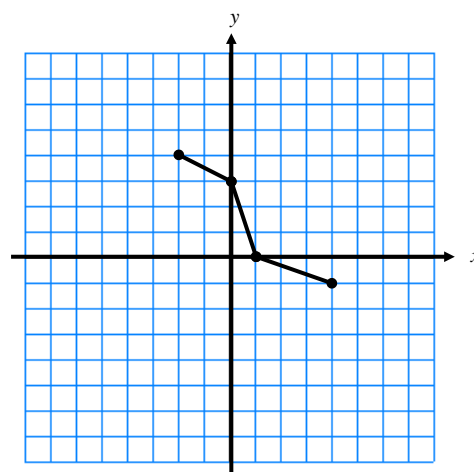
- c) $f(x-2)$
- d) $f(x+3)$



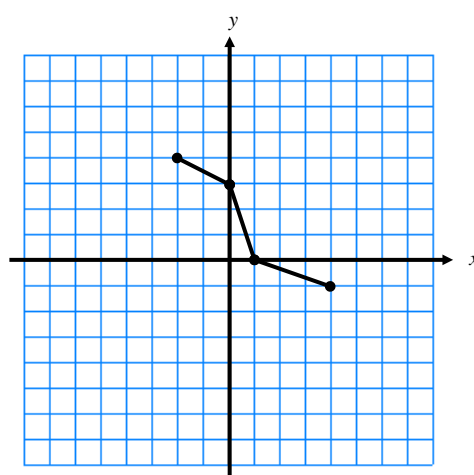
- e) $2f(x)$
- f) $f(-x)$



- g) $f(\frac{1}{2}x)$
- h) $f(2x-6)$



- i) $f(|x|)$
- j) $|f(x)|$



- k) $\frac{1}{2}f(3x-9)+1$

