Math 1050 ~ College Algebra

3 Transformations of Functions

Transformations of Functions

Types of transformations from y = f(x) to y = Af(Bx - C) + D

Shifts

Vertical: h(x) = f(x) + D Example: $y = x^2 + 2$

Horizontal: g(x) = f(x-C) Example: $y = (x - 1)^3$

Reflect

Vertical: h(x) = -(f(x)) Example: $y = -x^2$

Horizontal: g(x) = f(-x) Example: $y = \sqrt{-x}$

Stretch/shrink

Vertical: h(x) = A(f(x)) Example: $y = 5x^3$

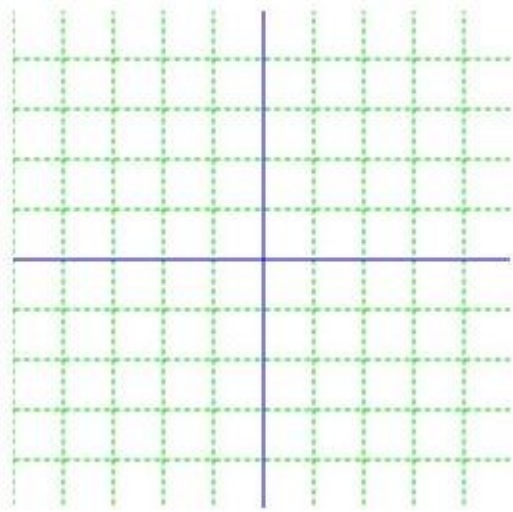
Horizontal: g(x) = f(Bx) Example: $y = \sqrt{(1/2)x}$

EX 1

Graph these functions.

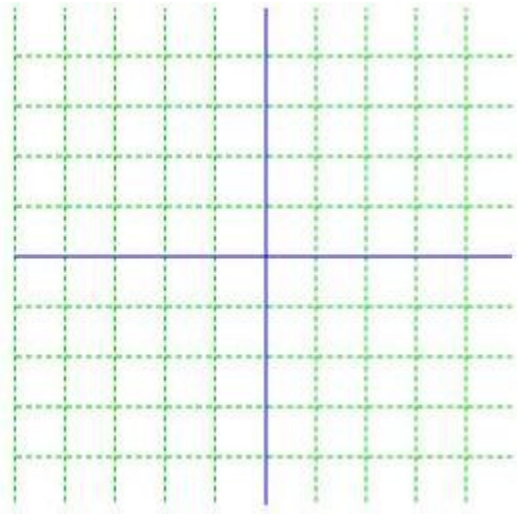
1a)

$$y = -\sqrt{(-x)}$$



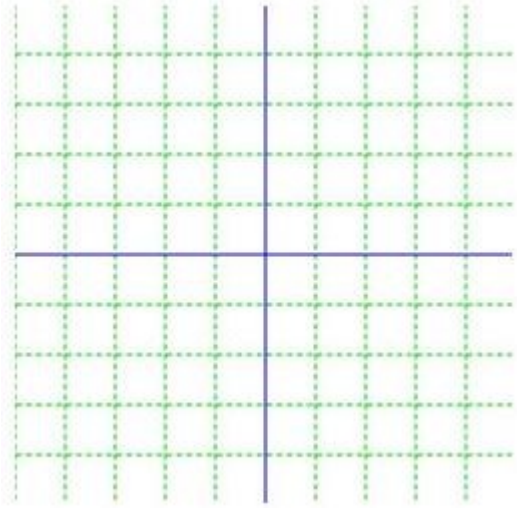
1b)

$$y = |x - 2| + 1$$



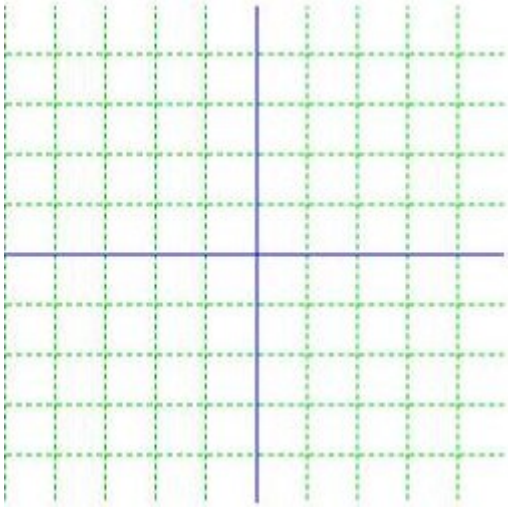
1c)

$$y = -x^2 + 3$$



1d)

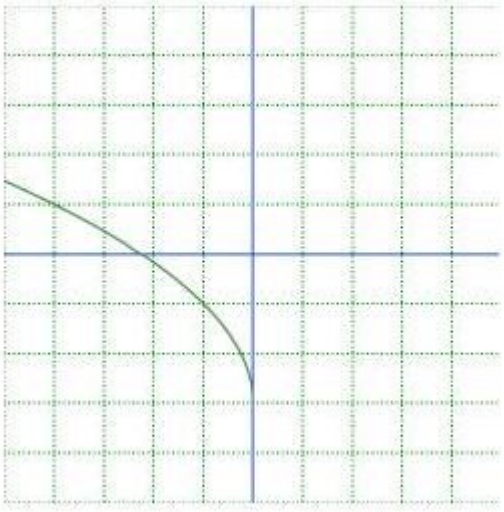
$$y = \frac{1}{2}(x+1)^3 - 3$$



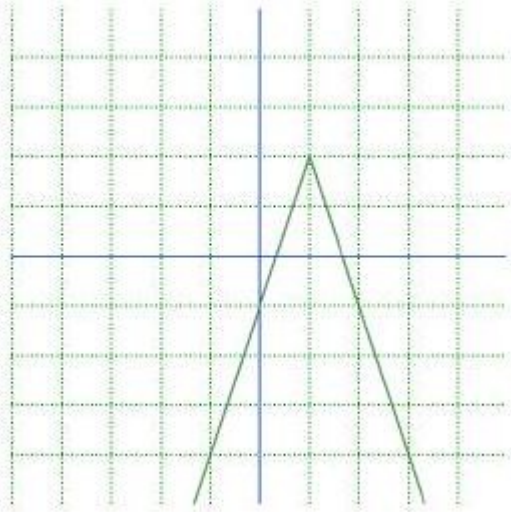
EX 2

Write an equation for each of these graphs.

2a)

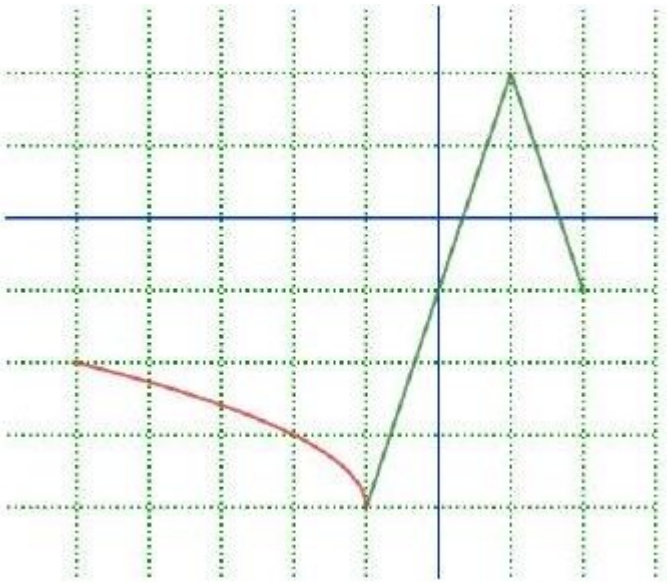


2b)



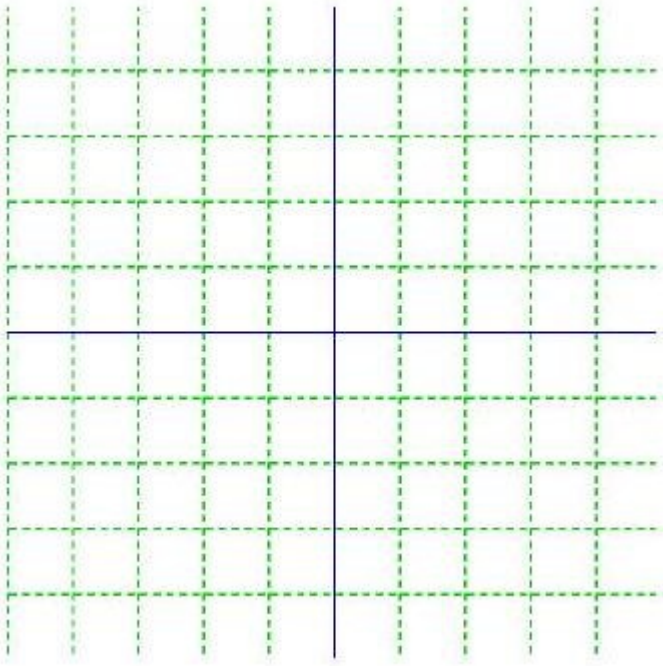
EX 3

Given this graph for $f(x)$, sketch the graphs of the transformed functions.



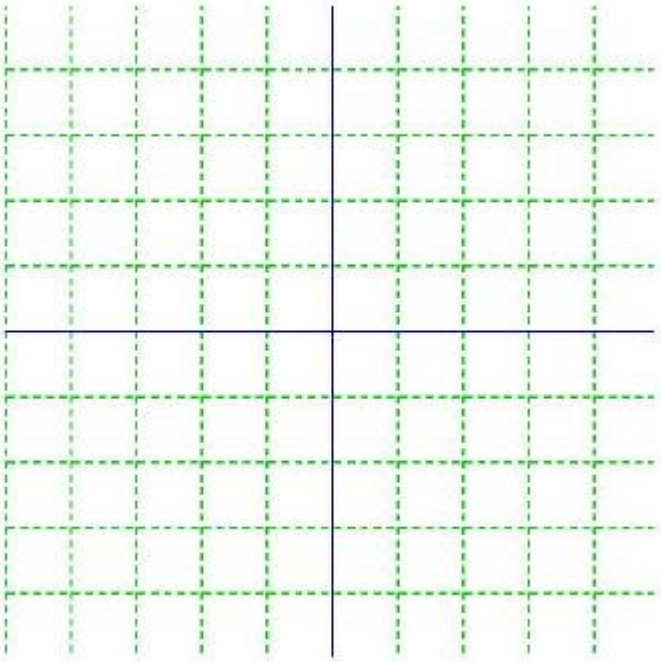
3a)

$f(-x)$



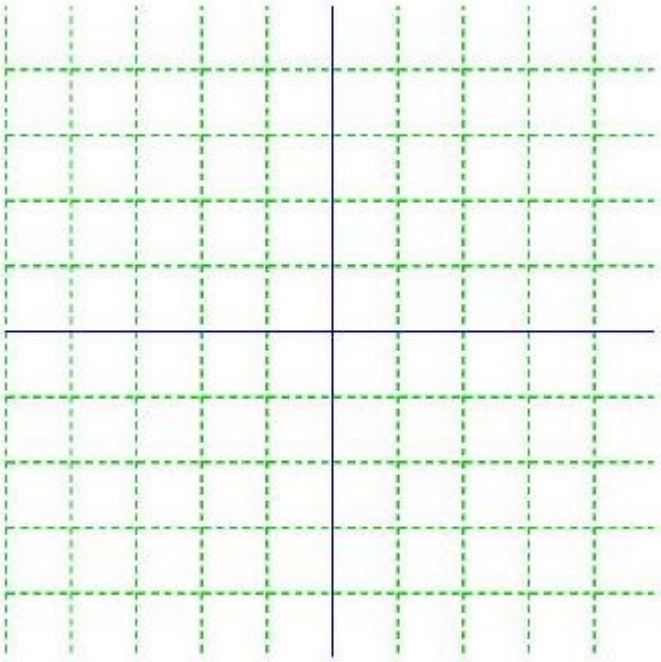
3b)

$f(x-1)+3$



3c)

$-2f(x)$



EX 4

Describe transformations compared to the base toolkit graph for each of these.

4a)

$f(x) = 2(x+1)^3 - 9$

4b)

$f(x) = -2\sqrt{x+1} + 3$

It may be helpful to use the table method to sketch a graph with several transformations. Let's look at a way to sketch this function.

$$f(x) = \left(-\frac{1}{2}x - 1\right)^3 + 3$$

EX 5

Use the table method above to sketch this function.

$$f(x) = -3(x-2)^2 + 4$$