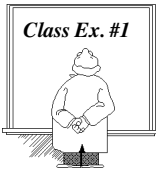


Transformations Lesson #4: Reflections - Part Two

Review

Given the function $y = f(x)$:

- replacing x with $-x$, (i.e. $x \rightarrow -x$) describes a reflection in the y -axis.
 $y = f(-x)$ describes a reflection in the y -axis. $(x, y) \rightarrow (-x, y)$
 - replacing y with $-y$, (i.e. $y \rightarrow -y$) describes a reflection in the x -axis.
 $-y = f(x)$ or $y = -f(x)$ describes a reflection in the x -axis. $(x, y) \rightarrow (x, -y)$
 - interchanging x and y , (i.e. $x \rightarrow y, y \rightarrow x$) describes a reflection in the line $y = x$.
 $x = f(y)$ or $y = f^{-1}(x)$ describes a reflection in the line $y = x$. $(x, y) \rightarrow (y, x)$
- nota f'n is a f'n*



Class Ex. #1

Write the equation of the image of:

a) $y = x^2$ after a reflection in the line $y = x$

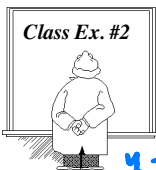
$x \leftrightarrow y$
 $\sqrt{x} = \sqrt{y^2}$
 $y = \pm\sqrt{x}$

b) $y = 10^x$ after a reflection in the y -axis

$x \rightarrow -x$
 $y = 10^{-x}$

c) $y = \sqrt{x}$ after a reflection in the x -axis.

$y \rightarrow -y$
 $-y = \sqrt{x}$
 $y = -\sqrt{x}$



Class Ex. #2

Describe how the graph of the second function compares to the graph of the first function.

a) $y = x^3$
 $y = -x^3$

$y \rightarrow -y$
 refl. on the x -axis

b) $y = 2^x$
 $x = 2^y$

$x \leftrightarrow y$
 refl. on $y = x$

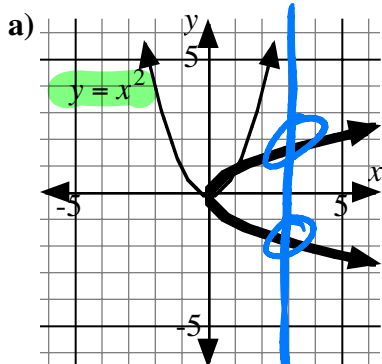
c) $y = \sin x$
 $y = \sin(-x)$

$x \rightarrow -x$
 refl. on y -axis



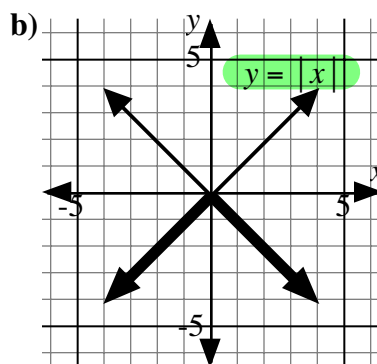
Class Ex. #3

The graph drawn in the thick line is a transformation of the graph drawn in the thin line. Write an equation for each graph drawn in the thick line and state whether this graph represents a function.



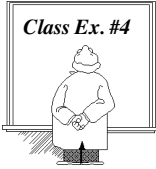
$x \leftrightarrow y$
 $\sqrt{x} = \sqrt{y^2}$
 $\pm\sqrt{x} = y$

not a function



$y \rightarrow -y$
 $-y = |x|$
 $y = -|x|$

yes it's a f'n !!



a) Sketch the graph of $f(x) = \frac{6}{x^2 + 3}$.

b) Write the equation for

i) $y = -f(x)$

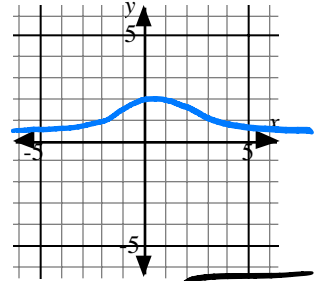
ii) $y = f(-x)$

iii) $x = f(y)$

$y \rightarrow -y$
 $-y = \frac{6}{x^2 + 3}$
 $y = -\frac{6}{x^2 + 3}$

$x \rightarrow -x$
 $y = \frac{6}{(-x)^2 + 3}$
 $y = \frac{6}{x^2 + 3}$

$x \leftrightarrow y$
 $x = \frac{6}{y^2 + 3}$
 $\frac{1}{x} = \frac{y^2 + 3}{6}$



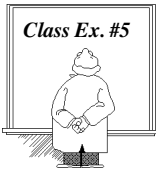
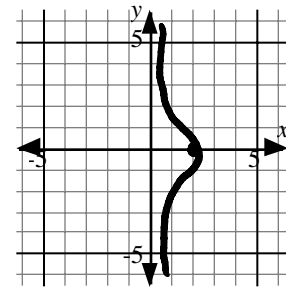
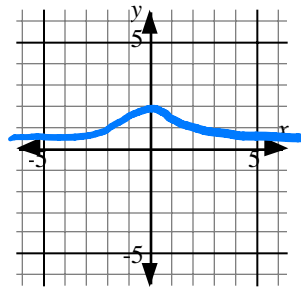
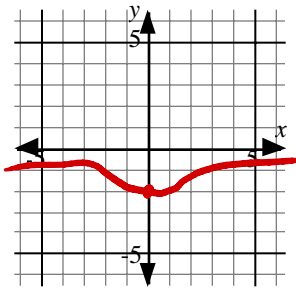
$\frac{6}{x} = y^2 + 3$
 $\sqrt{\frac{6}{x} - 3} = \sqrt{y^2}$
 $\pm \sqrt{\frac{6}{x} - 3} = y$

c) Sketch each graph in b) and state whether the graph represents a function.

i) $y = -f(x)$

ii) $y = f(-x)$

iii) $x = f(y)$



a) Given $f(x) = 3x + 2$, determine:

i) $x = f(y)$

ii) $x = f(-y)$

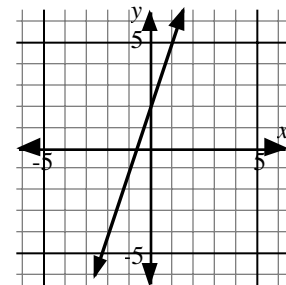
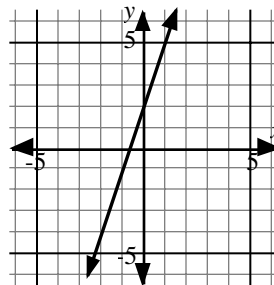
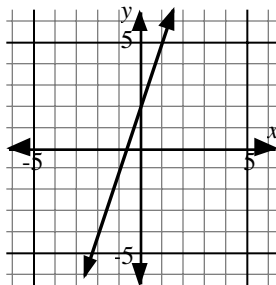
iii) $x = -f(y)$

b) The graph of $y = 3x + 2$ is given. Sketch each graph in a).

i) $x = f(y)$

ii) $x = f(-y)$

iii) $x = -f(y)$



Complete Assignment Questions #1 - #9

#1, 2, 4, 5