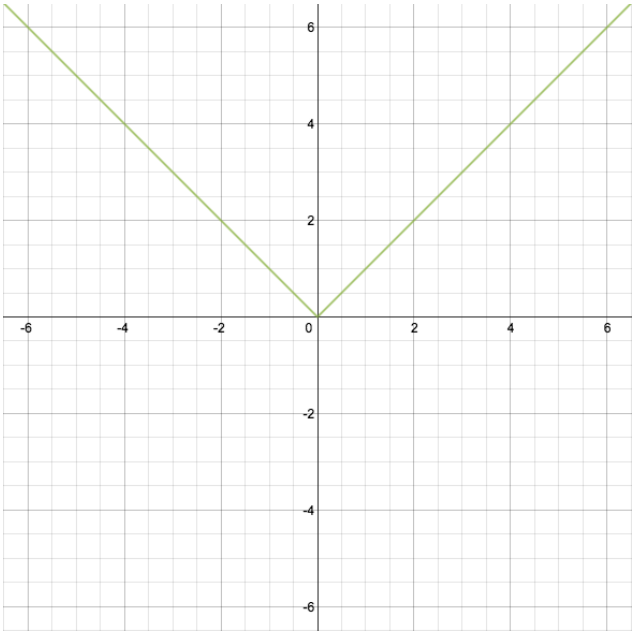
P.S. #12.2 – Reflections and Vertical Stretches and Compressions

Name: _____ Class: _____

Let $f(x) = |x|$ for every real number x. The graph of $y = f(x)$ is shown below. Describe how the graph for each function below is a transformation of the graph of $y = f(x)$. Then use this same set of axes to graph each function for problems 1 – 3. Be sure to label each function on your graph (*by* $y = a(x)$, $y = b(x)$, etc.).

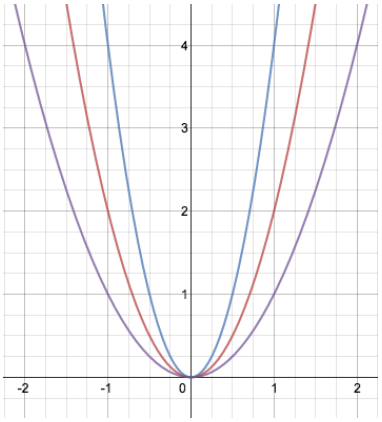


1.) $b(x) = -|x|$

2.) $c(x) = 2|x|$

3.) $d(x) = \frac{1}{3}|x|$

4.) Let $f(x) = x^2$, $g(x) = 2x^2$, and $h(x) = (2x)^2$, where x can be any real number. The graphs are of the functions $y = f(x)$, $y = g(x)$, and $y = h(x)$.



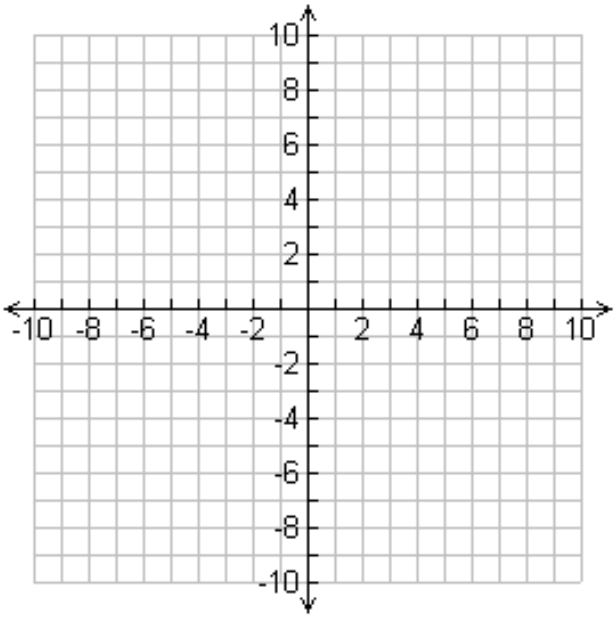
a. Label each graph with the appropriate equation.

b. Describe the transformation that takes the graph of $y = f(x)$ to the graph of $y = g(x)$.

c. Describe the transformation that takes the graph of $y = f(x)$ to the graph of $y = h(x)$.

5.) How would the graph of $f(x) = \sqrt{x}$ be affected if it were changed to $g(x) = -2\sqrt{x}$?

6.) Sketch and label the graphs of both $f(x)$ and $g(x)$ on the grid. Do not use a calculator.

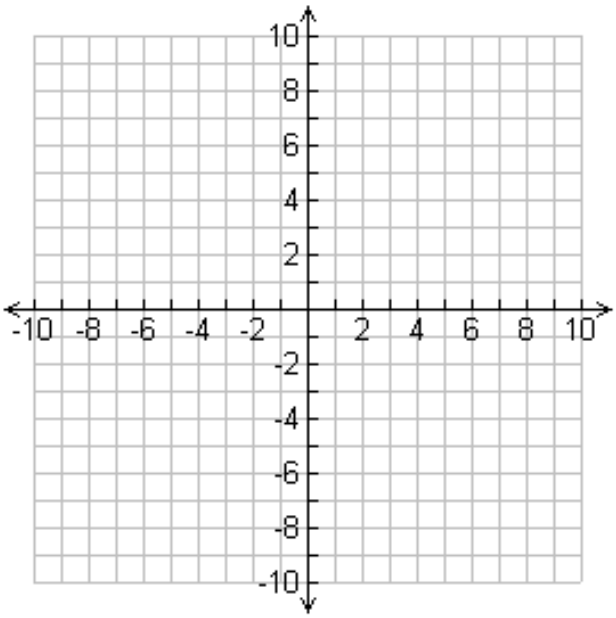


7.) Graph the functions in the same coordinate plane. Do not use a calculator.

$\boldsymbol{f(x) = |x|}$

$\boldsymbol{g(x) = 2|x|}$

$\boldsymbol{h(x) = |3x|}$



8.) If the graph of the function $y = 2^x$, find the equation of the graph after a transformation of:

a. Translation 5 units up.

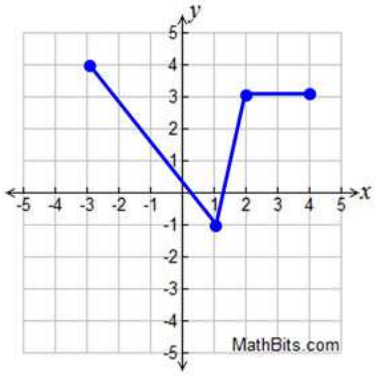
b. Translation 5 units right.

c. Reflection over the x-axis.

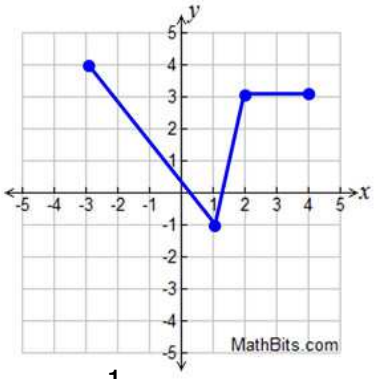
d. Reflection over the y-axis.

9.) The following graph represents $f(x)$. Please complete the following transformations.

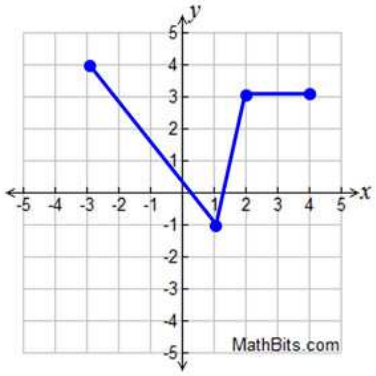
a. $g(x) = -f(x)$ Describe: _____



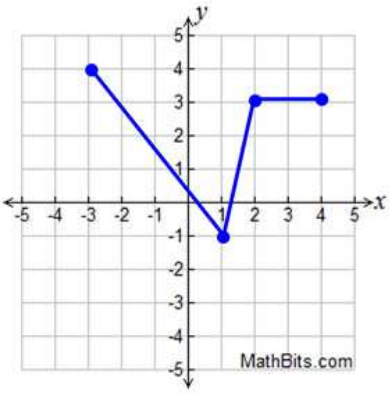
c.) $q(x) = f(x+2)$ Describe: _____



b. $h(x) = f(-x)$ Describe: _____

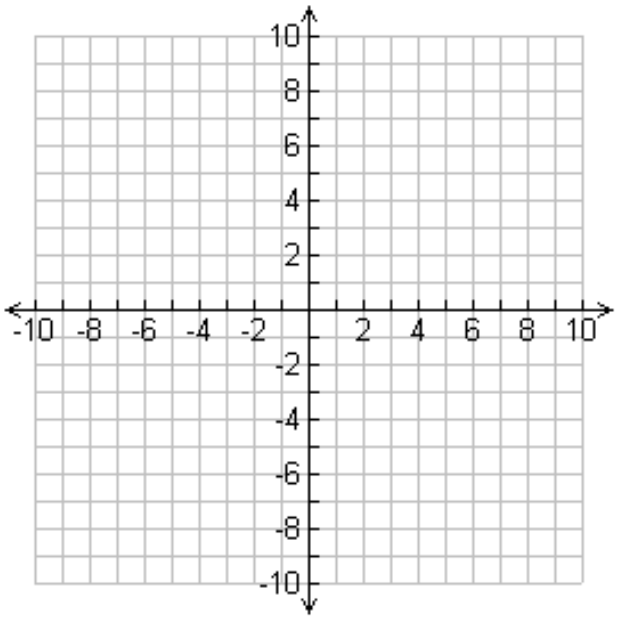


d.) $r(x) = \frac{1}{2}f(x)$ Describe: _____

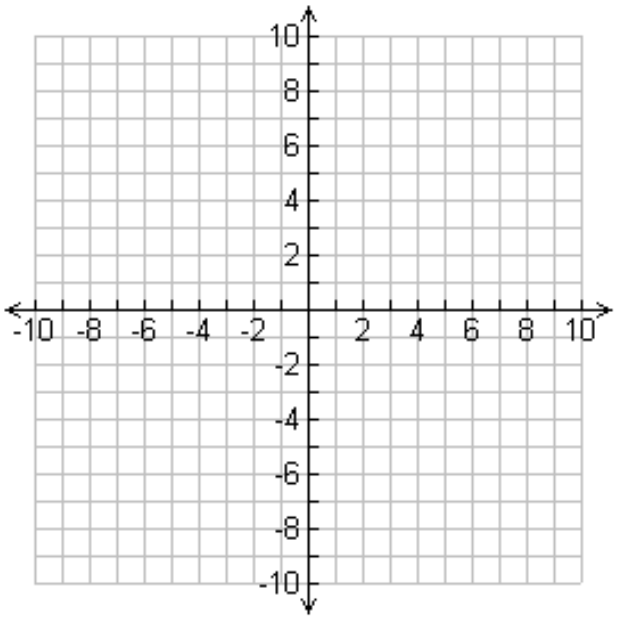


For 10 – 14, transform the following functions using your knowledge of parent functions and transformations.

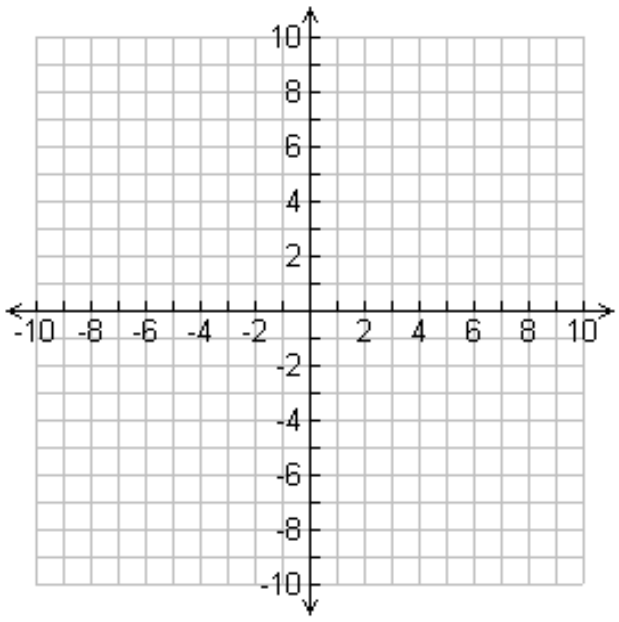
10.) $f(x) = \sqrt{x}$



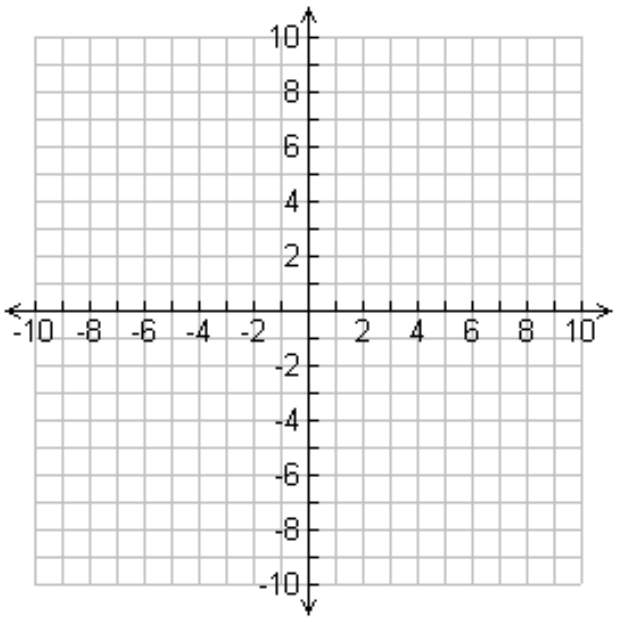
11.) $g(x) = \sqrt{x-5}$



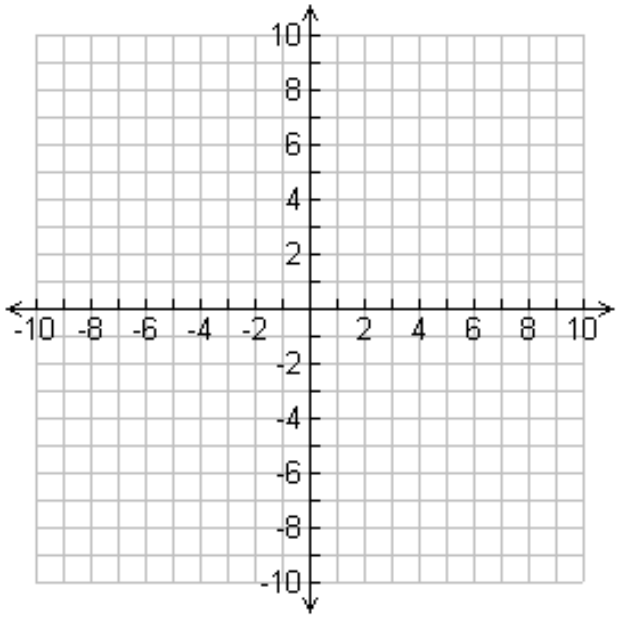
12.) $h(x) = -2\sqrt{x-5}$



13.) $r(x) = -2\sqrt{x-5} - 3$



14.) $w(x) = 2(x-1)^2 - 4$



15.) Find the average rate of change of $f(x) = x^2 + 3x$ from $-5 \le x \le -2$.