

P.S. #12.3 - Horizontal Compressions and Review

Name: _____ Class: _____

Graph the following functions using your knowledge of parent functions and transformations of functions.

1.) $f(x) = \sqrt{2x}$
 Horizontal compression
 s.f. = $\frac{1}{2}$

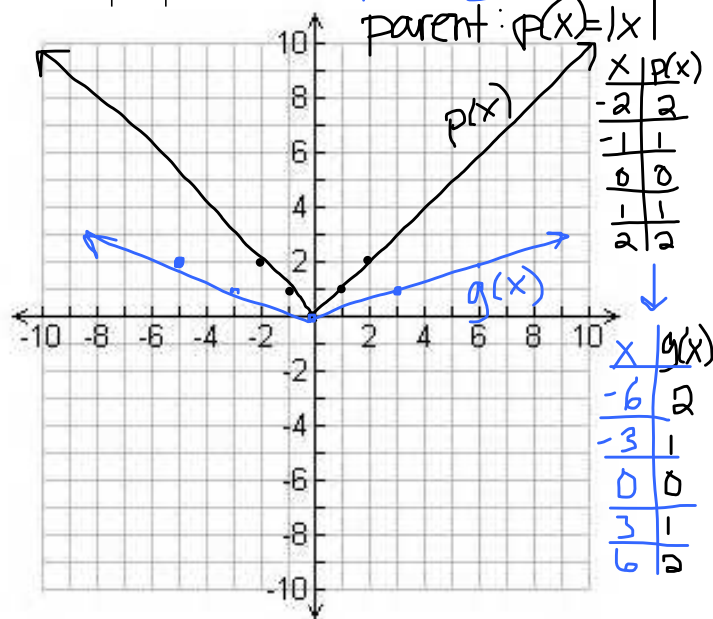
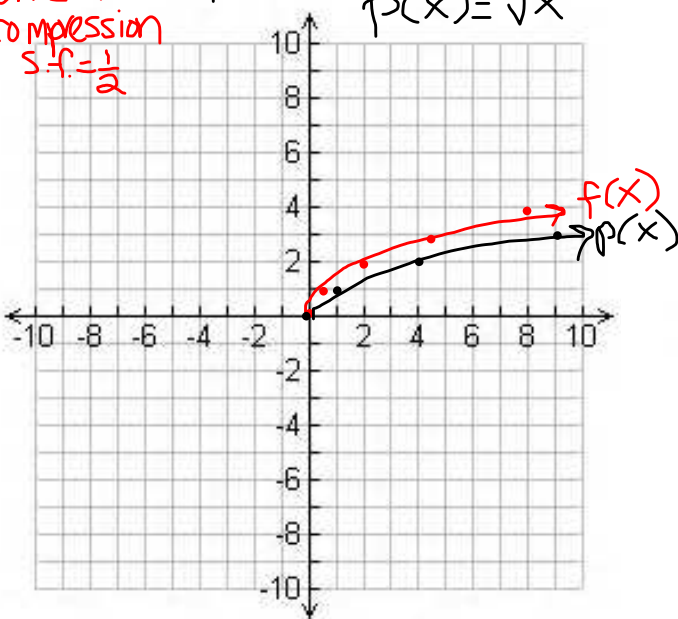
parent \rightarrow
 $p(x) = \sqrt{x}$

2.) $g(x) = \left| \frac{1}{3}x \right|$ Horizontal stretch
 s.f. = 3

parent: $p(x) = |x|$

x	p(x)
0	0
1	1
4	2
9	3
16	4

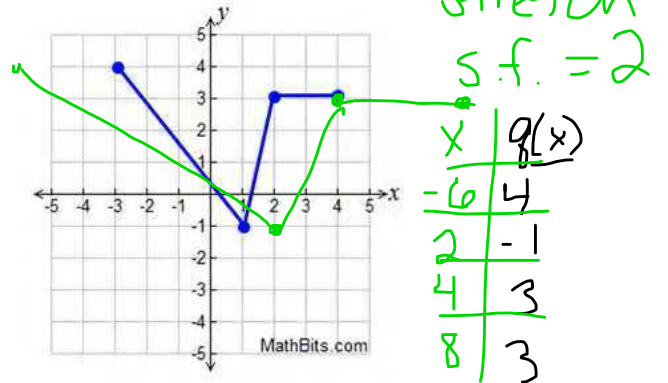
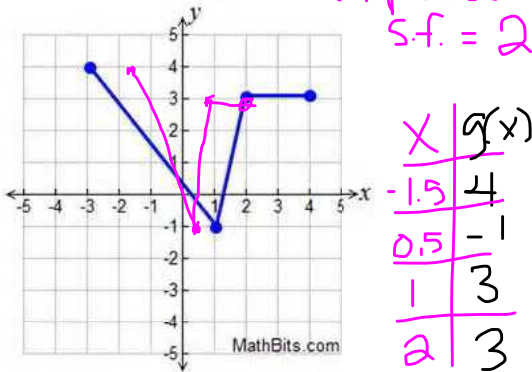
x	f(x)
0	0
0.5	1
2	2
4.5	3
8	4



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

a.) $g(x) = f(2x)$ Describe: horizontal compression
 s.f. = 2

b.) $q(x) = f\left(\frac{1}{2}x\right)$ Describe: horizontal stretch
 s.f. = 2



x	-3	1	2	4
f(x)	4	-1	3	3

4.) Suppose the graph of f is given. Write an equation for each of the following graphs after the graph of f has been transformed as described.

a. Translate 5 units upward.

$$y = f(x) + 5$$

b. Translate 3 units downward.

$$y = f(x) - 3$$

c. Translate 2 units right.

$$y = f(x - 2)$$

d. Translate 4 units left.

$$y = f(x + 4)$$

e. Reflect about the x -axis.

$$y = -f(x)$$

f. Reflect about the y -axis.

$$y = f(-x)$$

g. Stretch vertically by a factor of 2.

$$y = 2f(x)$$

h. Shrink vertically by a factor of $\frac{1}{3}$.

$$y = \frac{1}{3}f(x)$$

i. Shrink horizontally by a factor of $\frac{1}{3}$.

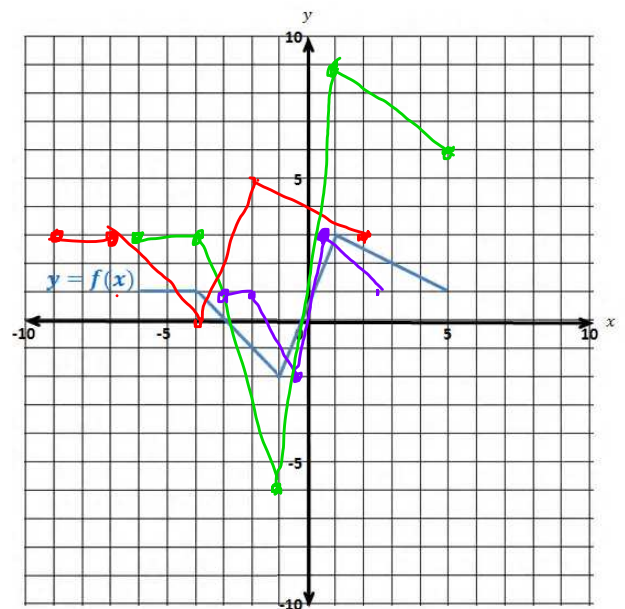
$$y = f(3x)$$

j. Stretch horizontally by a factor of 2.

$$y = f\left(\frac{1}{2}x\right)$$

5.) The graph of the equation $y = f(x)$ is provided.

For each of the following transformations of the graph, write a formula (in terms of f) for the function that is represented by the transformation of the graph of $y = f(x)$. Then draw the transformed graph of the function on the same set of axes as the graph of $y = f(x)$.



a. A translation 3 units left and 2 units up.

$$g(x) = f(x + 3) + 2$$

b. A vertical stretch by a scale factor of 3.

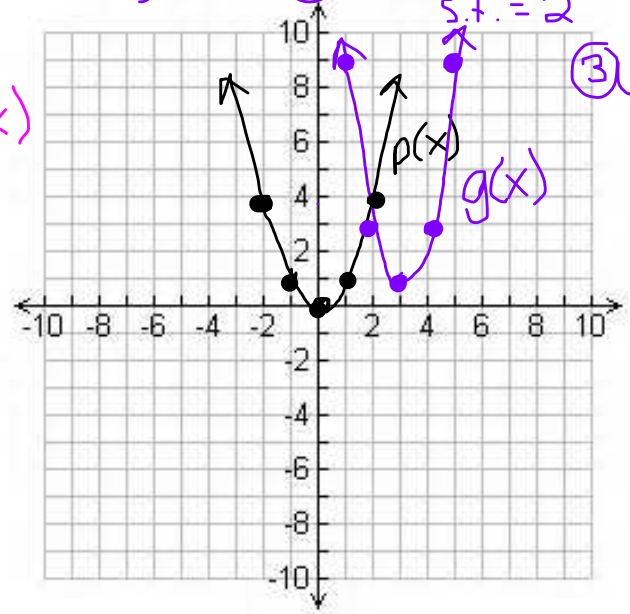
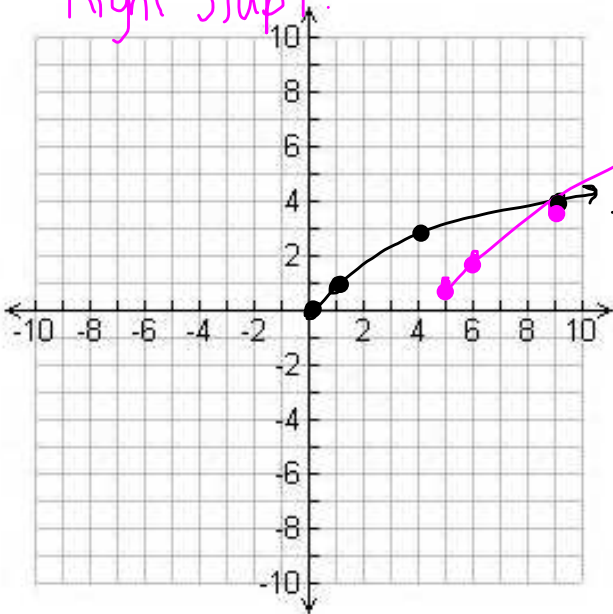
$$h(x) = 3f(x)$$

c. A horizontal shrink by a scale factor of $\frac{1}{2}$.

$$g(x) = f(2x)$$

For 6 – 9, transform the following functions using your knowledge of parent functions and transformations.

6.) $f(x) = \sqrt{x-5} + 1$ parent: $p(x) = \sqrt{x}$ 7.) $g(x) = 2(x-3)^2 + 1$ parent: $f(x) = x^2$
 Right 5, up 1. ① Right 3, ② vertical stretch s.f. = 2 ③ up 1



8.) $f(x) = |2x| + 1$ parent: $p(x) = |x|$ 9.) $g(x) = 3^{\frac{1}{2}x}$ parent: $f(x) = 3^x$
 ① horizontal compression s.f. = 1/2 ② up 1 Horizontal stretch s.f. = 2

