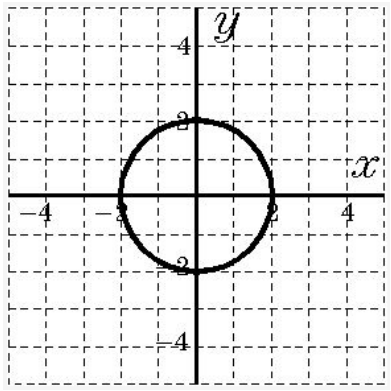
TRANSFORMATIONS

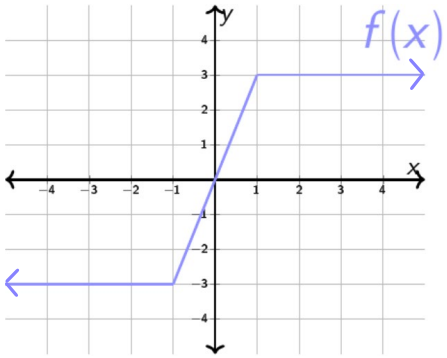
Name:	
Date:	
My Achievement Goal for this chapter is… (Circle one) A+ A B C D	
This Assignment is:	
Good to Go	Needs Corrections

Please answer all questions on this sheet and remember to show all your work!

1. Use the following four relations to answer questions a) through d) below.

   i) $\{(-1,3),(2,4),(-1,4),(-2,3),(1,4)\}$ ii) $g(x) = -5x^2 + 3$

   iii) 

   iv) 

   a) Which of the above relations are NOT functions and *why*?

   b) State the Domain and Range of relations i) and ii) only.

      i) Domain: Range:

      ii) Domain: Range:

   c) In relation ii), find $g(2)$ *and* write the corresponding point as an ordered pair.

   d) In relation iv), for which approximate value of x does $f(x) = 2$?

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2. The graph below shows a student's rough work. It has the original graph of the function $y = f(x)$ along with 6 other hand-drawn transformations of $f(x)$. **Correctly label each of the 6 curves with either a, b, c, d, e, or f** (these correspond to the transformations listed directly below) to identify the transformations.

   a. $g(x) = f(x) + 2$

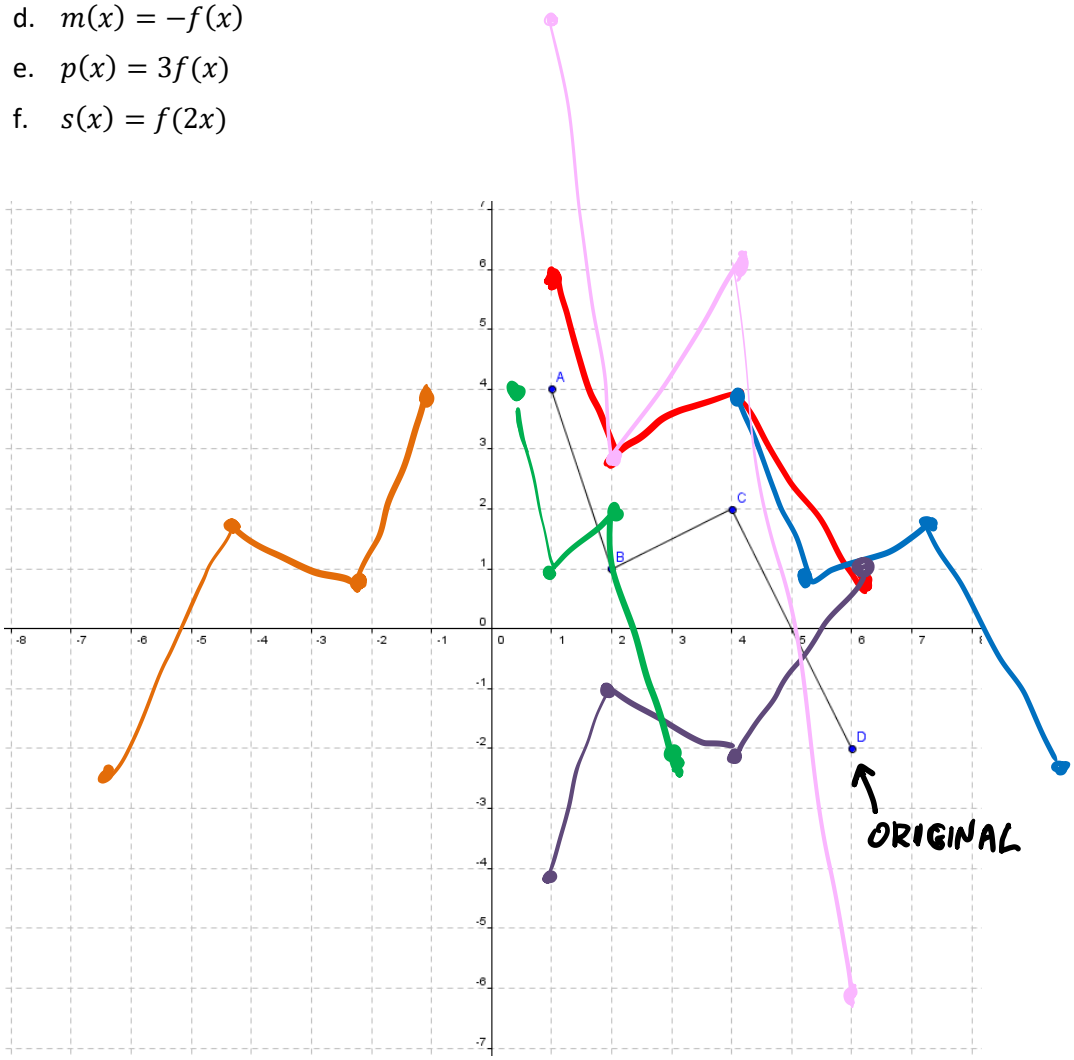
   b. $h(x) = f(x - 3)$

   c. $k(x) = f(-x)$

   d. $m(x) = -f(x)$

   e. $p(x) = 3f(x)$

   f. $s(x) = f(2x)$



3. The function $f(x)$ contains the point $P(2, -16)$. State the image (the new location) of point P under each of the following general transformations:

   a. $y = f(x + 2) - 3$

   b. $y - 1 = 2f(x - 4)$

   c. $-\frac{1}{3}y = f(-2x)$

   d. $2y = f\left(\frac{x+2}{3}\right)$

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4. Explain why the following two transformations are different.

$$y = 4f\left(\frac{1}{2}x - 1\right) + 2 \quad \text{and} \quad y = 4f\left(\frac{1}{2}(x - 1)\right) + 2$$

5. For the following transformations applied to the graph of $y = f(x)$, describe the transformation in terms of the function and in terms of its effect on the graph. (The first one is done for you, as an example.)

   a. Replace $\boldsymbol{x}$ ***with*** $\boldsymbol{x - 2}$ and $\boldsymbol{y}$ ***with*** $\boldsymbol{-y}$.

   Function: $-y = f(x - 2)$ Graph: Moves right 2, reflection over the x-axis

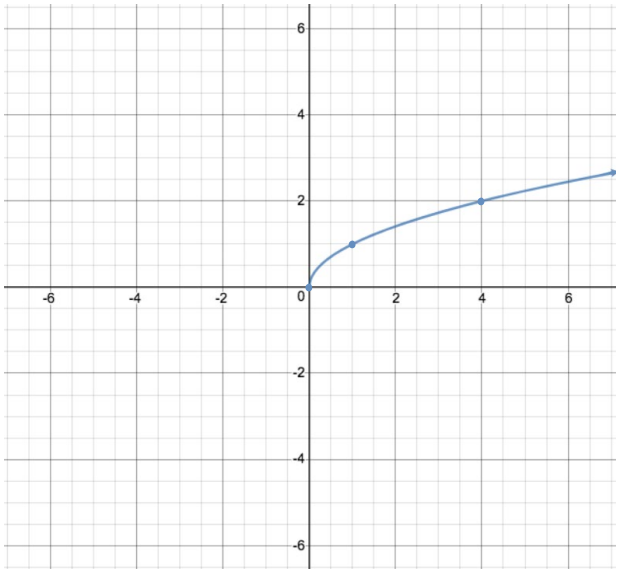
   b. Replace $\boldsymbol{x}$ ***with*** $\boldsymbol{2x}$ and $\boldsymbol{y}$ ***with*** $\boldsymbol{\frac{1}{2}y}$.

   Function: Graph:

   c. Replace, in the following order: $\boldsymbol{x}$ ***with*** $\boldsymbol{-\frac{1}{5}x}$, $\boldsymbol{x}$ ***with*** $\boldsymbol{x - 1}$, and $\boldsymbol{y}$ ***with*** $\boldsymbol{\frac{1}{3}y}$.

   Function: Graph:

6. The radical function $fx) = \sqrt{x}$ is graphed below, along with a few key points. Sketch the following on the same grid.



a) Sketch $g(x) = f(-x - 2) + 2$ AND state its Domain. **Domain of $\boldsymbol{g(x)}$:**

b) Sketch $h(x) = -2f\left(\frac{1}{3}x\right) - 1$ AND state its Range. **Range of $\boldsymbol{h(x)}$:**

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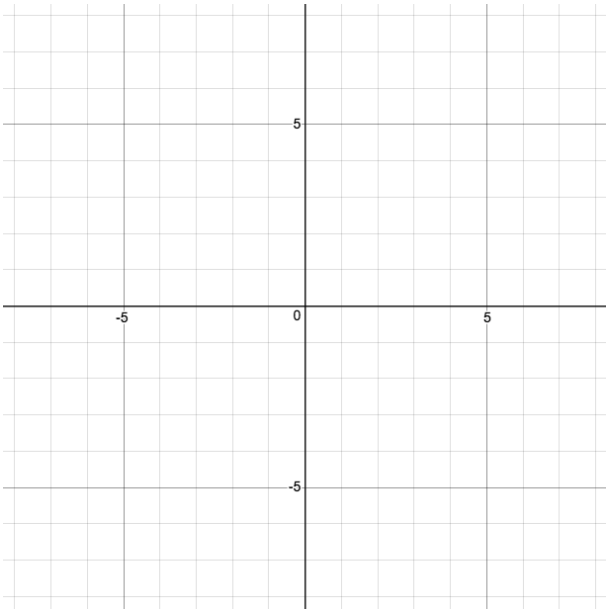
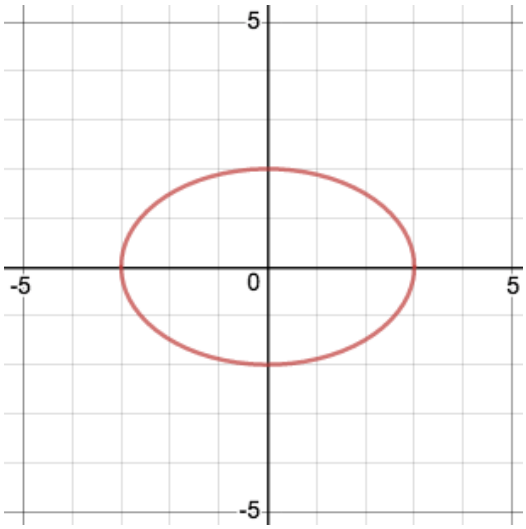
7. Let $f(x) = \frac{1}{x}$. If $g(x) = -\frac{1}{3}f(x-2) - 3$, sketch $g(x)$. (Hint: Graph $f(x)$ first and remember to include the asymptotes.)



8. The graph of a curve C is given below.



   a. If D is the transformation of curve C created by a vertical expansion by a factor of 2, horizontal compression by a factor of $\frac{2}{3}$, and a vertical translation of 1 unit upward, sketch the curve D on the same grid above.

   b. Describe a transformation to C where the curve becomes the shape of a circle.

   c. List any *invariant* point(s) under the transformation in b.

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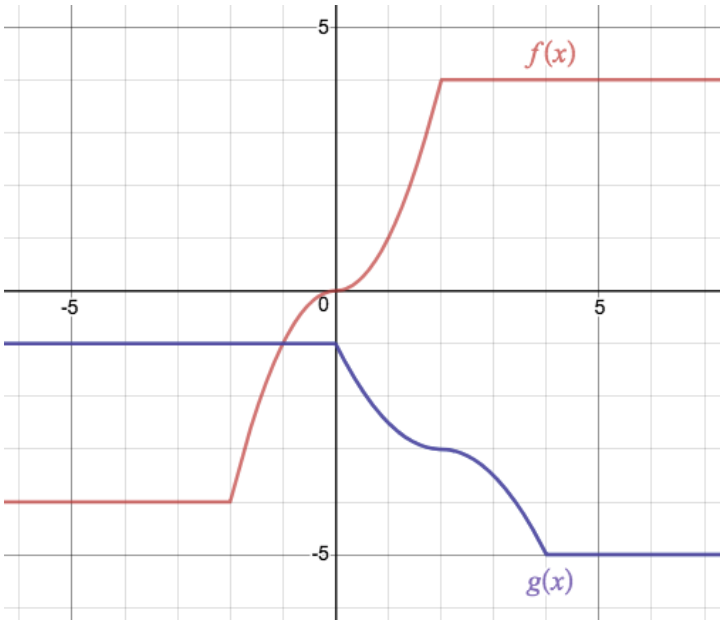
9. The graphs of $f(x)$ and $g(x)$ are shown below.



Write $g(x)$ as a transformation of $f(x)$.