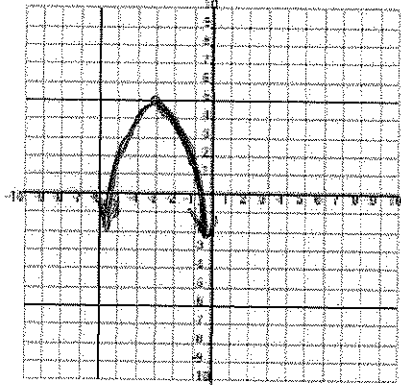
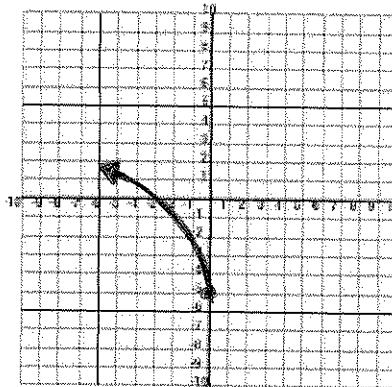


1. For each function below:
- Describe the transformations that have been applied to obtain the function from the given "base function".
 - Use your knowledge of the graph of the base function, and the transformations, to graph the function.

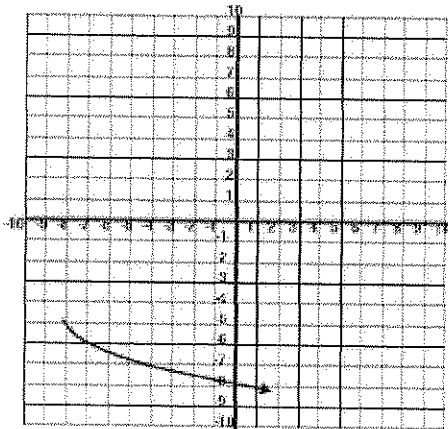
a. $y = -2(x+3)^2 + 5$, $y = x^2$
 - REFLECT OVER X AXIS
 - SCALE VERTICALLY BY 2
 - UP 5 & LEFT 3



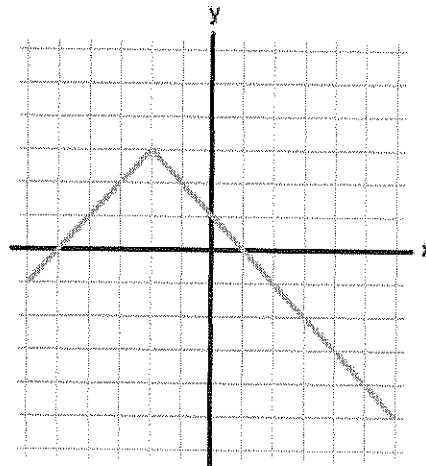
b. $y = 3\sqrt{-x-5}$, $y = \sqrt{x}$
 - REFLECT OVER Y AXIS
 - VERTICALLY SCALED BY 3
 - DOWN 5



2. Write the equation of the following functions, given the graph.
- -



$$y = -\sqrt{x+8} - 5$$



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

3. Now write the transformations that have occurred in notation form. $(x,y) \rightarrow (x',y')$

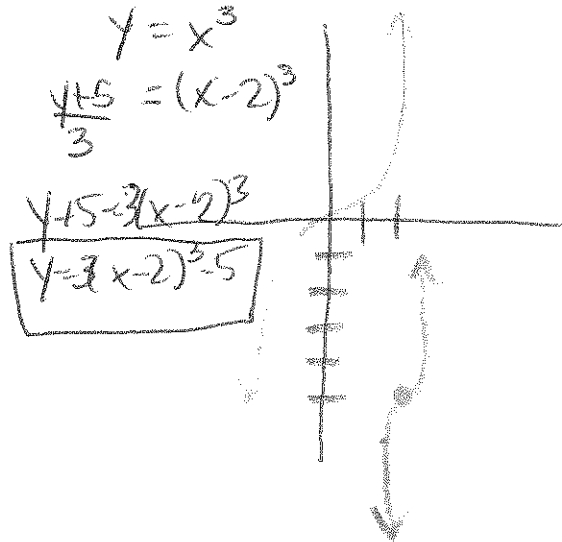
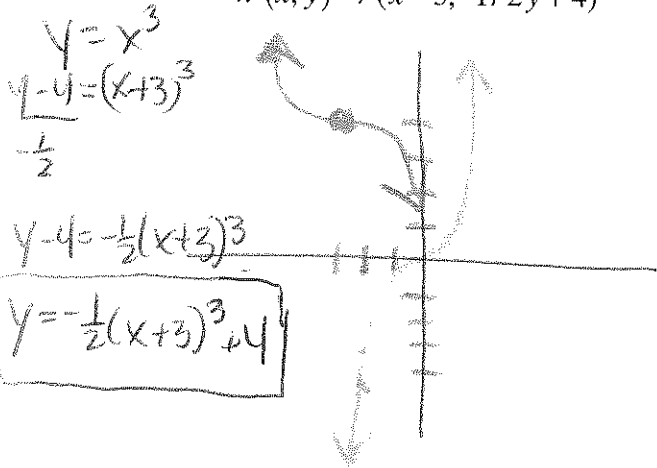
$$(x,y) \rightarrow (x-8, -y-5)$$

$$(x,y) \rightarrow (x-2, -y+3)$$

Given the pre-image (parent) function of $y = x^3$, use the transformation notations given to write the equation of the image formed. Sketch a picture of the pre-image in blue and the image in red.

4. $(x, y) \rightarrow (x-3, -1/2y+4)$

5. $(x, y) \rightarrow (x+2, 3y-5)$



Now check to make sure that you get the same picture by using your calculator. ONLY do this AFTER you have sketched the graph.

For numbers 6-7 you will be given the equation of a transformed image. Write the transformations that occurred, if the pre-image is $y = x^{1/2}$

6. $y = -\frac{1}{3}(x+4)^{\frac{1}{2}} - 2.4$

7. $y = -4(x+1)^{\frac{1}{2}} + 3$

- REFLECTED OVER X AXIS
- VERTICALLY SCALED BY $(\frac{1}{3})$ SO HORIZONTAL STRETCH BY 9
- LEFT 4
- DOWN 2.4

- REFLECTED OVER X AXIS
- VERTICALLY SCALED BY 4 SO HORIZONTAL SHRINK (BY 16)
- LEFT 1
- UP 3

8. Write the equation of the following functions, given the original function and the transformations performed.

- a. $f(x) = \frac{1}{x}$, vertically stretched by a factor of 7, reflected in the y-axis, translated 5 units to the right and translated 3 units downwards.

$$y = \frac{1}{x}$$

$$\frac{y+3}{7} = \frac{1}{-x-5}$$

$$y+3 = \frac{7}{-x-5}$$

$$y = \frac{7}{-x-5} - 3$$

- b. $f(x) = x$, horizontally compressed by a factor of $\frac{1}{3}$, reflected in both the x-axis and the y-axis, translated 11 units to the left and 4 units up.

$$y = x$$

$$\frac{y-4}{-1} = \frac{x+11}{-\frac{1}{3}}$$

$$y-4 = -1(x+11)$$

$$y-4 = 3(x+11)$$

$$y = 3(x+11) + 4$$

- c. $f(x) = \sqrt{x}$, vertically stretched by a factor of 2, horizontally stretched by a factor of 5 and translated 21 units to the right.

$$5x$$

$$x+21$$

$$2y$$

$$y = \sqrt{x}$$

$$\frac{y}{2} = \sqrt{\frac{x-21}{5}}$$

$$y = 2\sqrt{\frac{x-21}{5}}$$