

Chapter 2b - Transformations of Functions - REVIEW

MCR3U

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1) List the transformations of, in words, of $f(x)$ for each of the following functions.

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

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

c) $j(x) = f\left(\frac{1}{3}x\right)$

d) $k(x) = f(-x)$

e) $m(x) = f(x) - 3$

2) List the transformations, in words, of $f(x)$ for each of the following functions in the order you would do them in.

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

b) $h(x) = f(3x) + 2$

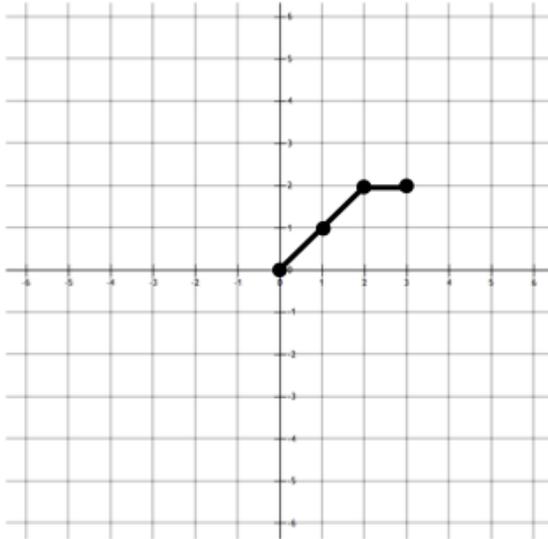
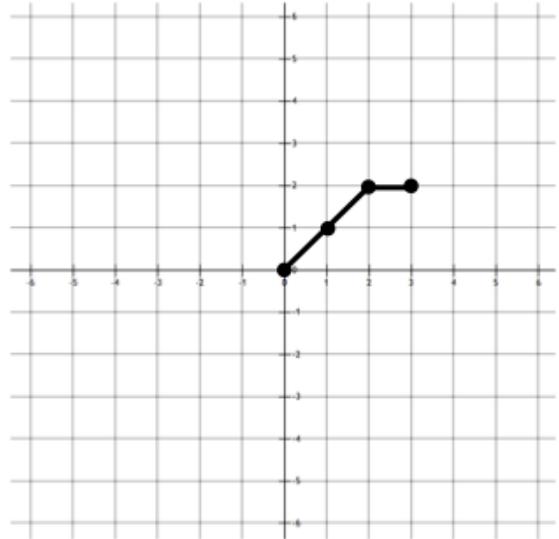
c) $j(x) = 3f(-x)$

3) List the transformations, in words, of $f(x) = x^2$ to $g(x) = 3(x - 2)^2 - 11$ in the order you would do them.

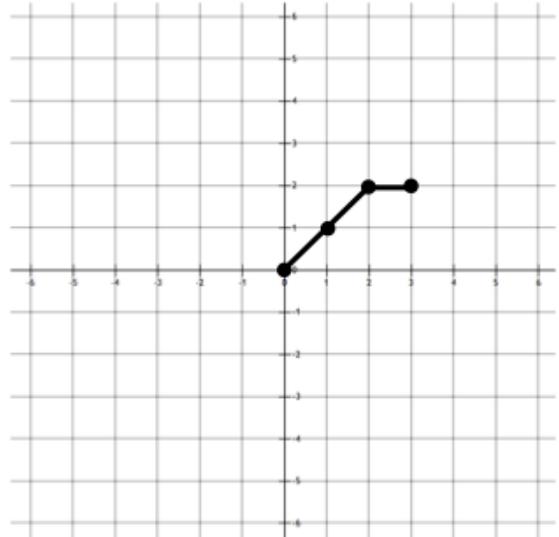
4) List the transformations, in words of $f(x) = \sqrt{x}$ to $g(x) = 2\sqrt{(x - 3)} - 9$ in the order you would do them.

5) Perform the following transformations on the graphs below.

a) translate up 2 units



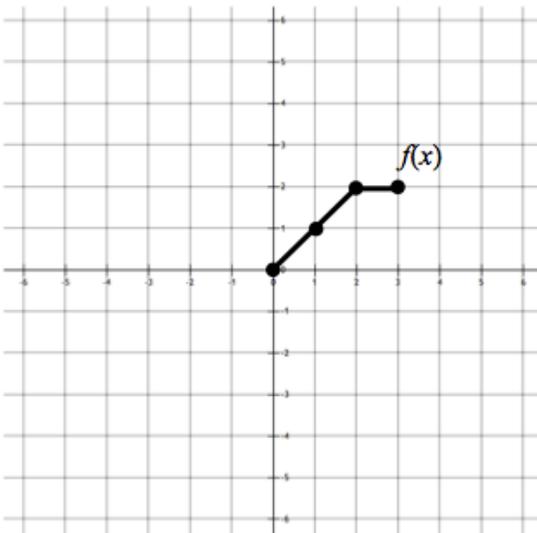
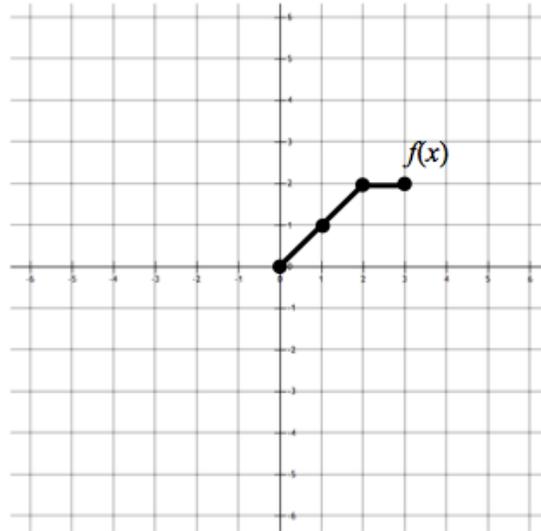
b) horizontal stretch by a factor of 2



c) vertical compression by a factor of $\frac{1}{2}$

6) For the graph of $f(x)$ given, sketch the graph of $g(x)$ after the given transformation. List the transformations in words as well.

a) $g(x) = -f(x)$

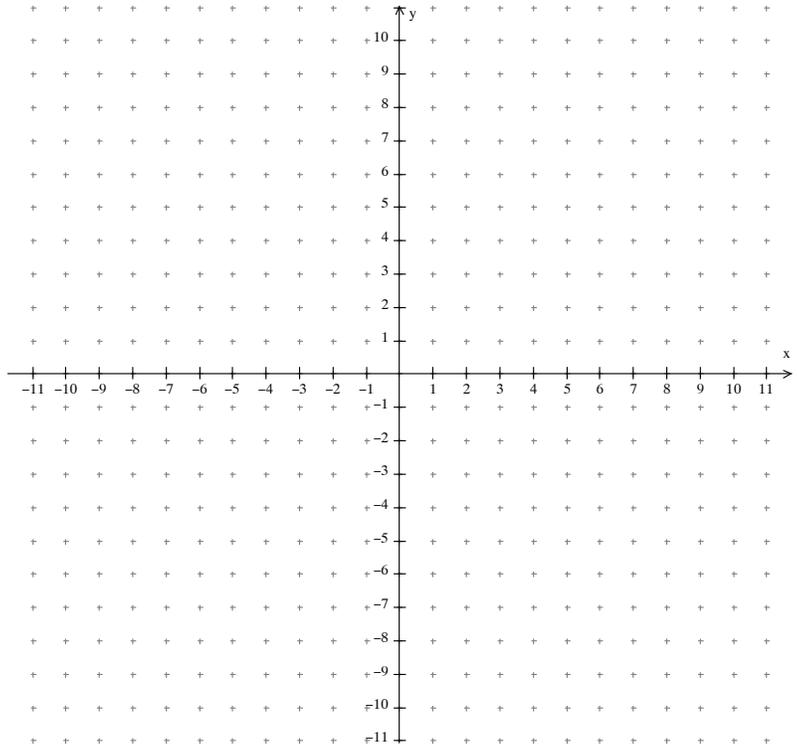


b) $g(x) = f(-x)$

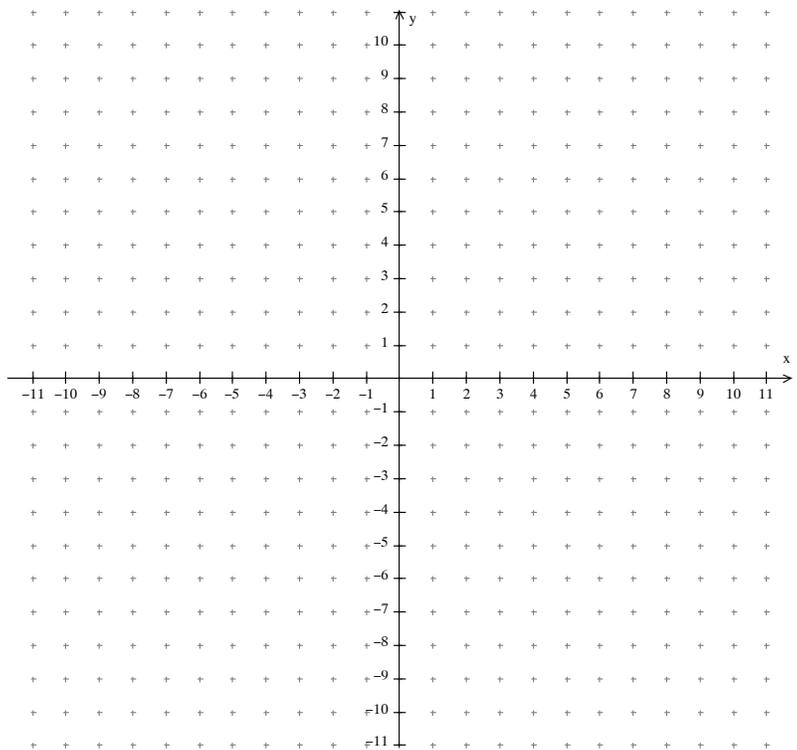
7) For each function $g(x)$:

- i) describe the transformations from the parent function $f(x)$
- ii) create a table of values of image points for the transformed function
- iii) graph the parent function and the transformed function and write its equation

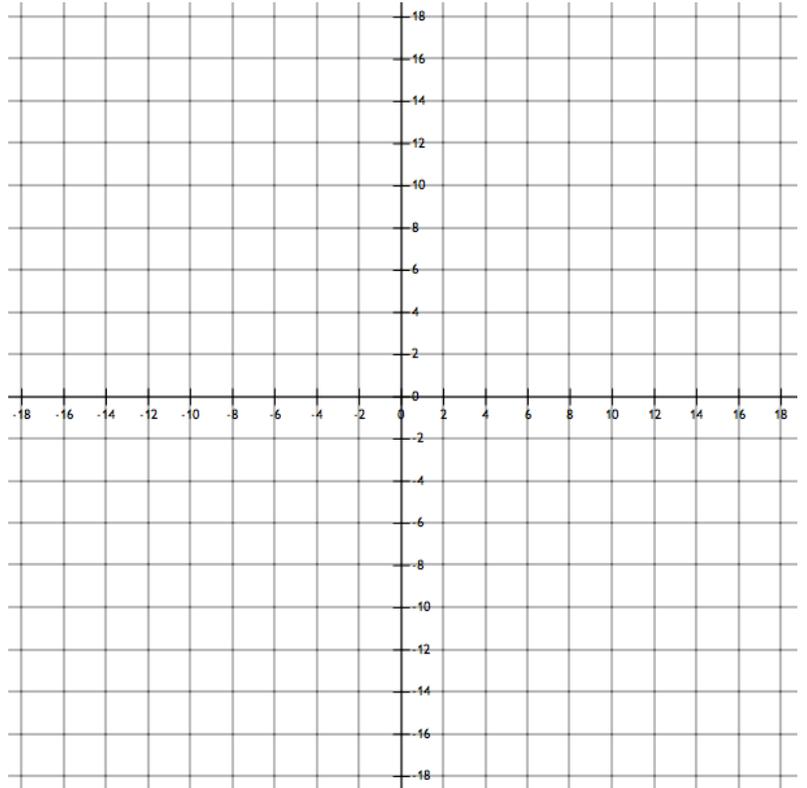
a) $f(x) = x^2$. Graph $g(x) = 2f(x - 2)$.



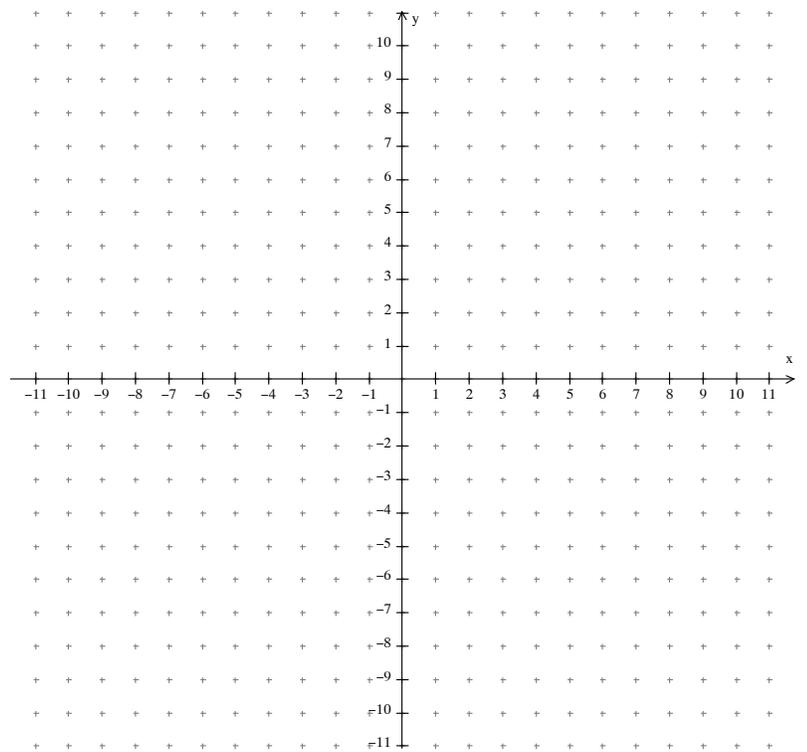
b) $f(x) = \sqrt{x}$. Graph $g(x) = -f(2x)$.



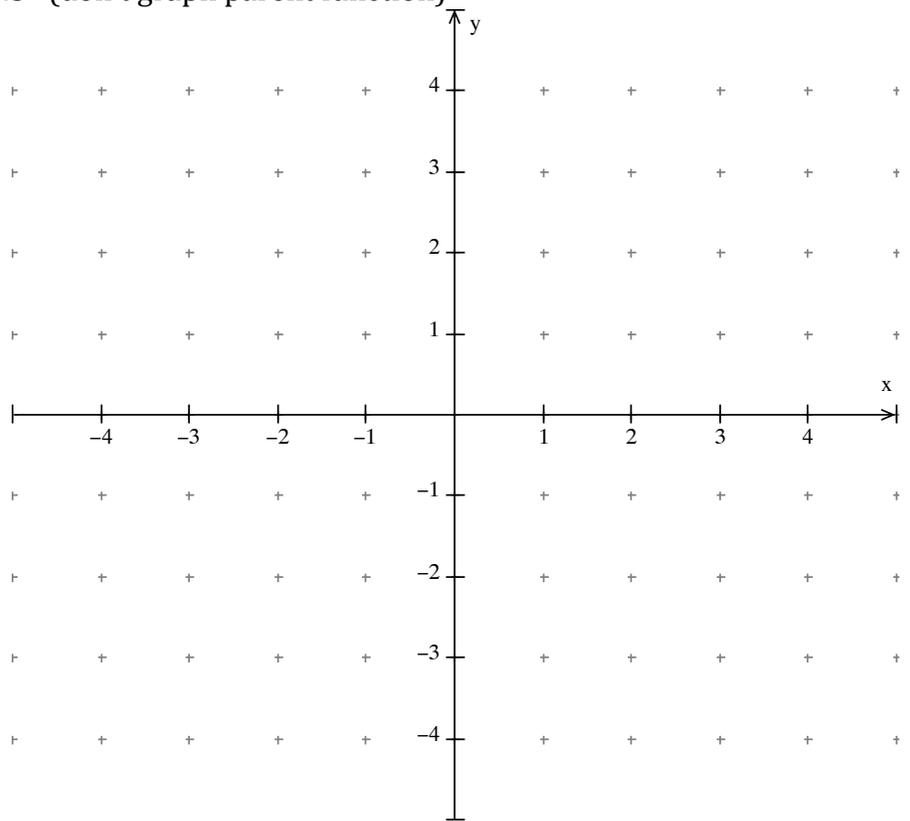
c) $f(x) = x^2$. Graph $g(x) = 4f(x - 3)$



d) $f(x) = \sqrt{x}$. Graph $g(x) = 3f(-x) - 2$.



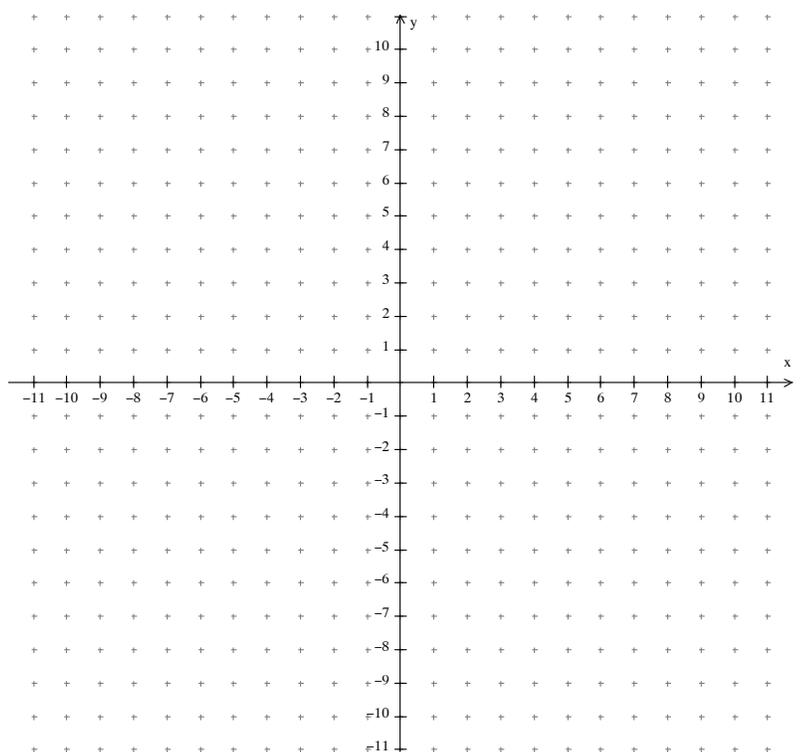
e) $f(x) = \frac{1}{x}$. Graph $g(x) = 2f(x - 1) + 0.5$ (don't graph parent function)



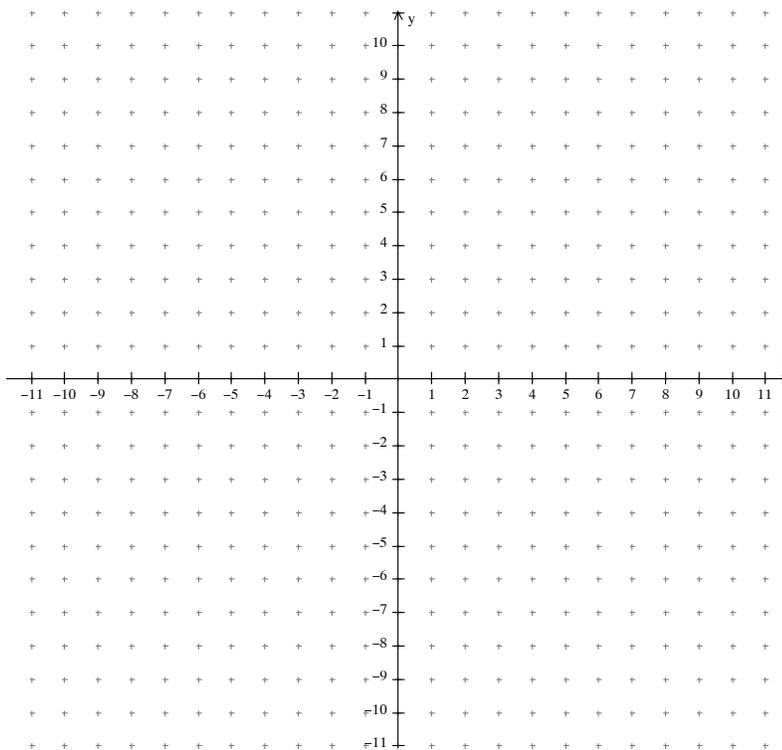
8) For each function $g(x)$:

- i) determine the parent function and describe the transformations from the parent function $f(x)$
- ii) create a table of values of image points for the transformed function
- iii) graph the parent function and the transformed function

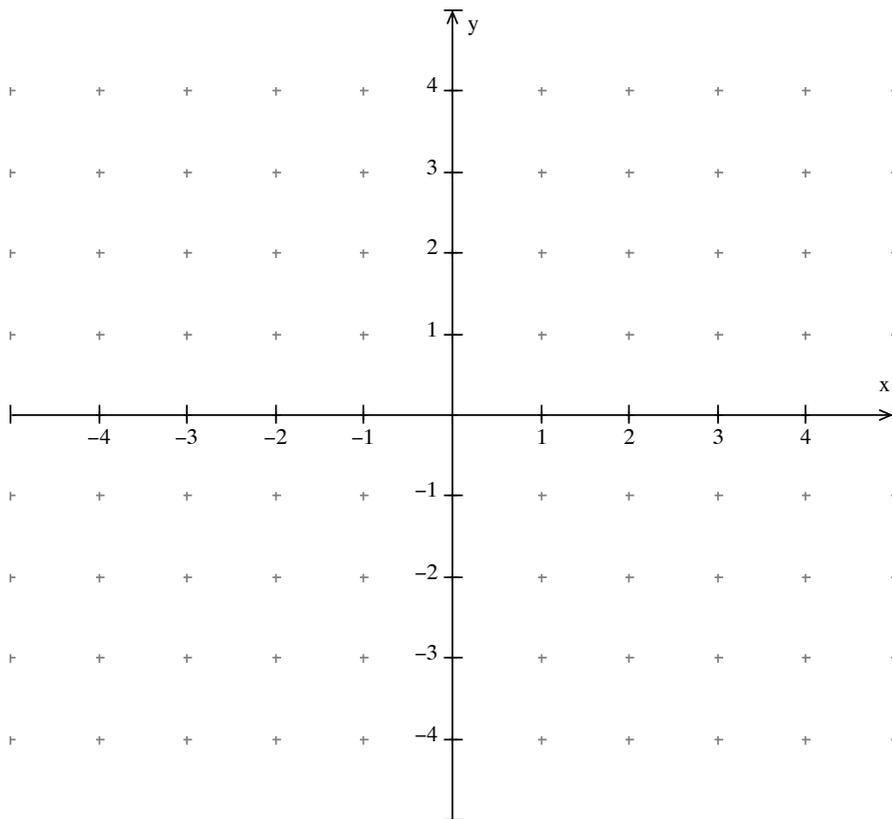
a) $g(x) = -2(x + 2)^2 + 4$



b) $g(x) = -2\sqrt{-4(x+2)} - 3$



c) $g(x) = \frac{-1}{\frac{1}{2}(x+0.5)} + 1$ (don't graph parent function)



9) Find the inverse, $f^{-1}(x)$, algebraically if $f(x) = -2\sqrt{x+1} - 5$

10) Find the inverse, $f^{-1}(x)$, algebraically if $f(x) = \frac{1}{3}(x-4)^2 + 2$

Answers

1) **a)** vertical stretch BAFO 2 **b)** phase shift right 3 units **c)** horizontal stretch BAFO 3
d) horizontal reflection in the y-axis **e)** shift down 3 units

2) **a)** vertical reflection in the x-axis and then shift left 2 units.

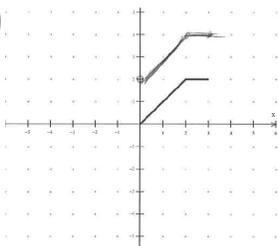
b) horizontal compression BAFO $\frac{1}{3}$ and then shift up 2 units.

c) vertical stretch BAFO 3 and then horizontal reflection in the y-axis.

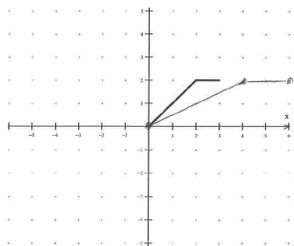
3) vertical stretch BAFO 3, then shift right 2 units and down 11 units.

4) vertical stretch by a factor of 2, then shift right 3 units and down 9 units.

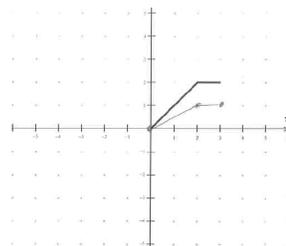
5) **a)**



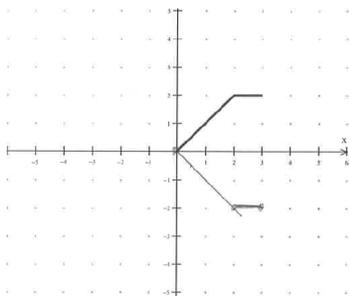
b)



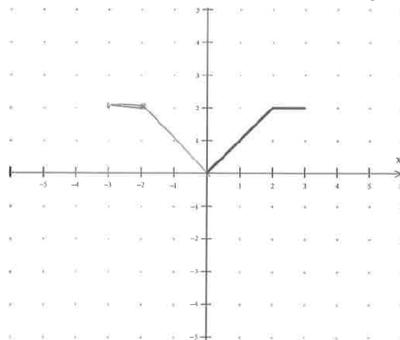
c)



6) **a)** vertical reflection in the x-axis



b) horizontal reflection in the y-axis



See posted solutions for 7&8

$$9) f^{-1}(x) = \left(\frac{x+5}{-2}\right)^2 - 1$$

$$10) f^{-1}(x) = \pm\sqrt{3(x-2)} + 4$$