

7. What horizontal translation is applied to $y = x^2$ if the translation image graph passes through the point (5, 16)?

$$y = (x - h)^2$$

$$16 = (5 - h)^2$$

$$\sqrt{16} = \sqrt{(5 - h)^2}$$

$$\pm 4 = 5 - h$$

$$h = 5 \pm 4$$

$$h = 1 \text{ or } h = 9$$

10. The graph of $f(x) = |x|$ is transformed to the graph of $g(x) = f(x - 9) + 5$.

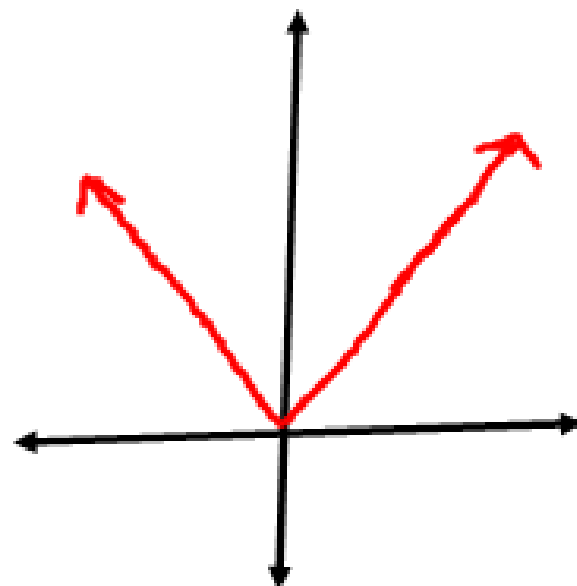
- Determine the equation of the function $g(x)$.
- Compare the graph of $g(x)$ to the graph of the base function $f(x)$.

VT+5 HT9

$$A) g(x) = |x-9| + 5$$

$$y = |x|$$

x	y
-3	3
-2	2
-1	1
0	0
1	1
2	2
3	3

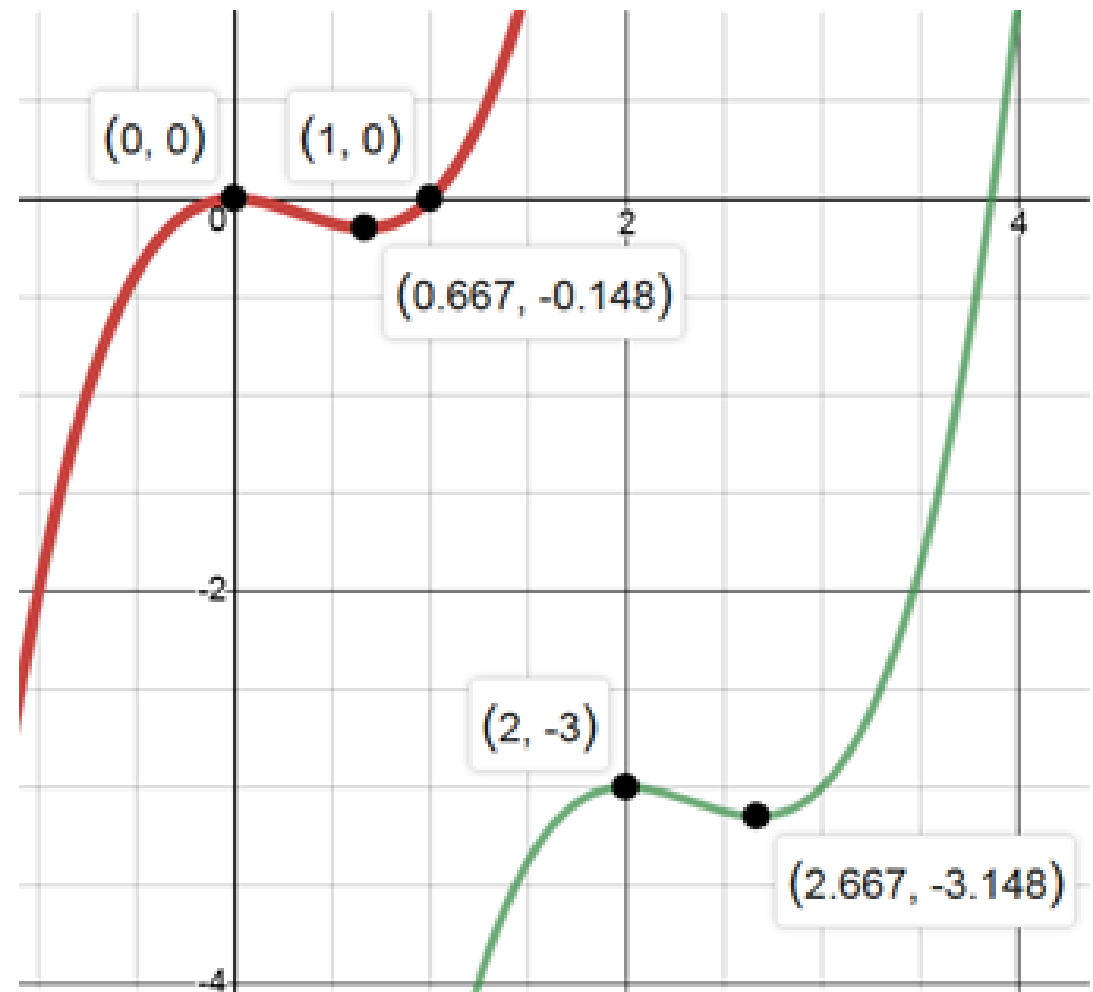


19. a) Predict the relationship between the graph of $y = x^3 - x^2$ and the graph of $y + 3 = (x - 2)^3 - (x - 2)^2$.

$$y = (x-2)^3 - (x-2)^2 - 3$$

$$HT+2 \quad VT-3$$

- b) Graph each function to verify your prediction.



1.2

Reflections and Stretches

Focus on...

- developing an understanding of the effects of reflections on the graphs of functions and their related equations
- developing an understanding of the effects of vertical and horizontal stretches on the graphs of functions and their related equations

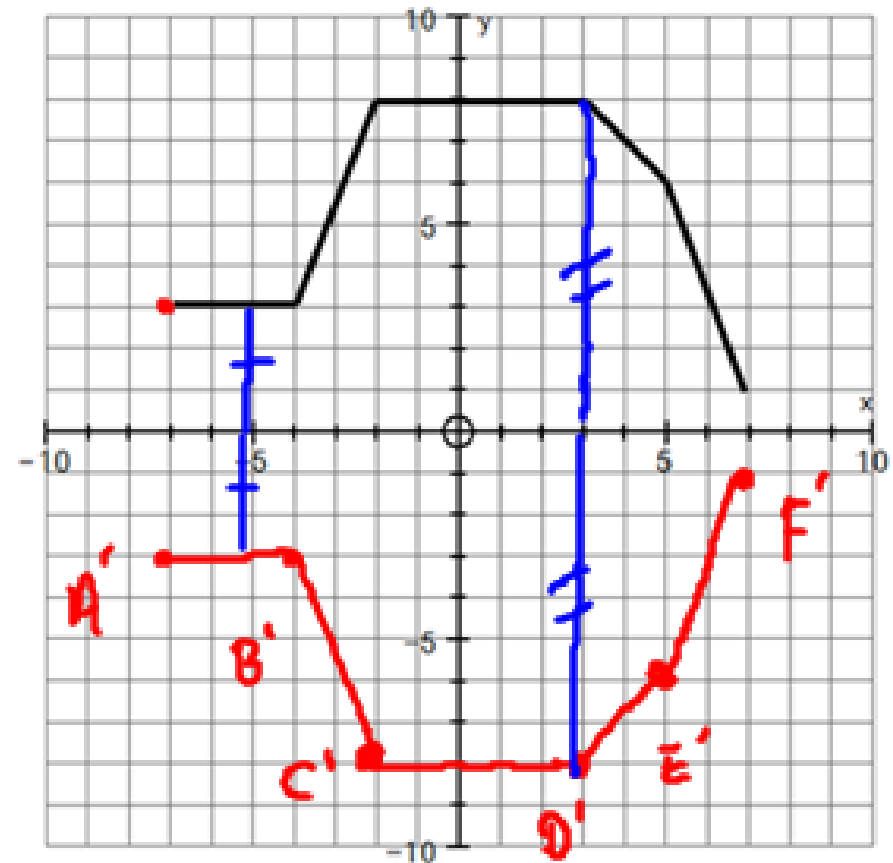
There are two types of reflections: in the x-axis and the y-axis

Ex: Reflection in the x-axis

$$A(-7,3) \rightarrow A'(-7,-3)$$

$$F(7,1) \rightarrow F'(7,-1)$$

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

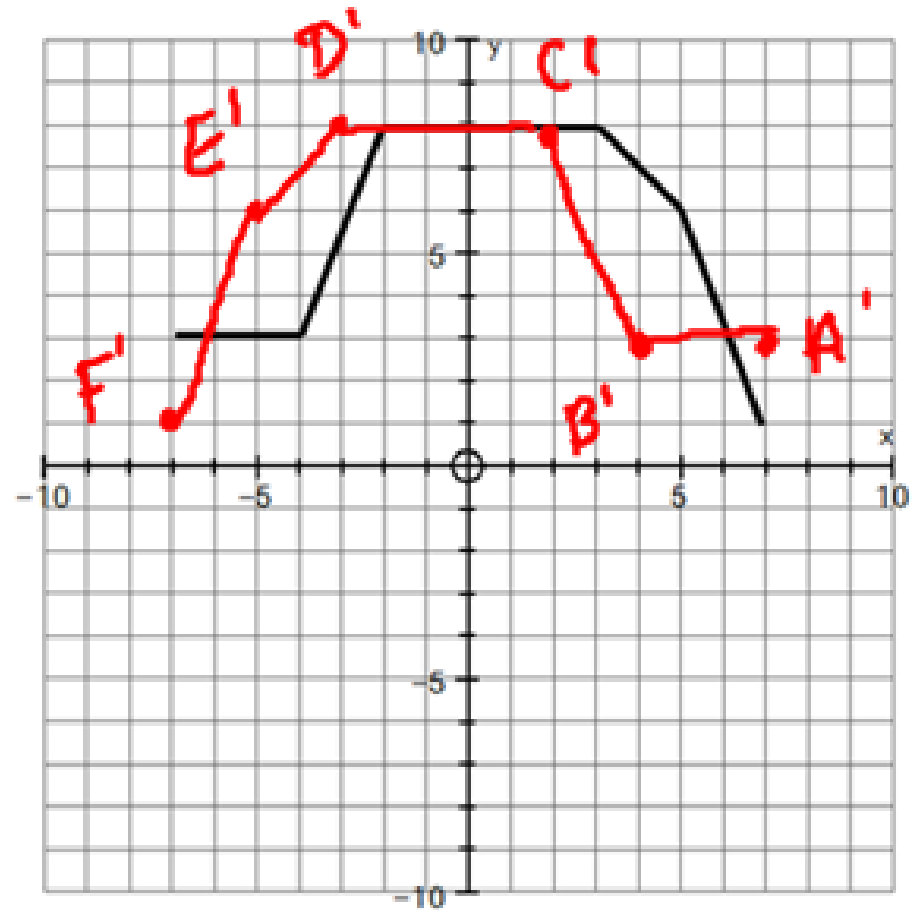


Ex: Reflection in the y-axis

$$A(-7, 3) \rightarrow A'(7, 3)$$

$$F(7, 1) \rightarrow F'(-7, 1)$$

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



Stretches

There are two types of stretches that can be applied: horizontal and vertical.

$$\text{Graph: } \frac{2}{a}y = f(x) \quad y = \frac{1}{a}f(x)$$

→ compressed the function

$$(-5, 5) \rightarrow (-5, 2.5)$$

$$(0, 2) \rightarrow (0, 1)$$

$$(x, y) \rightarrow (x, \frac{1}{2}y)$$

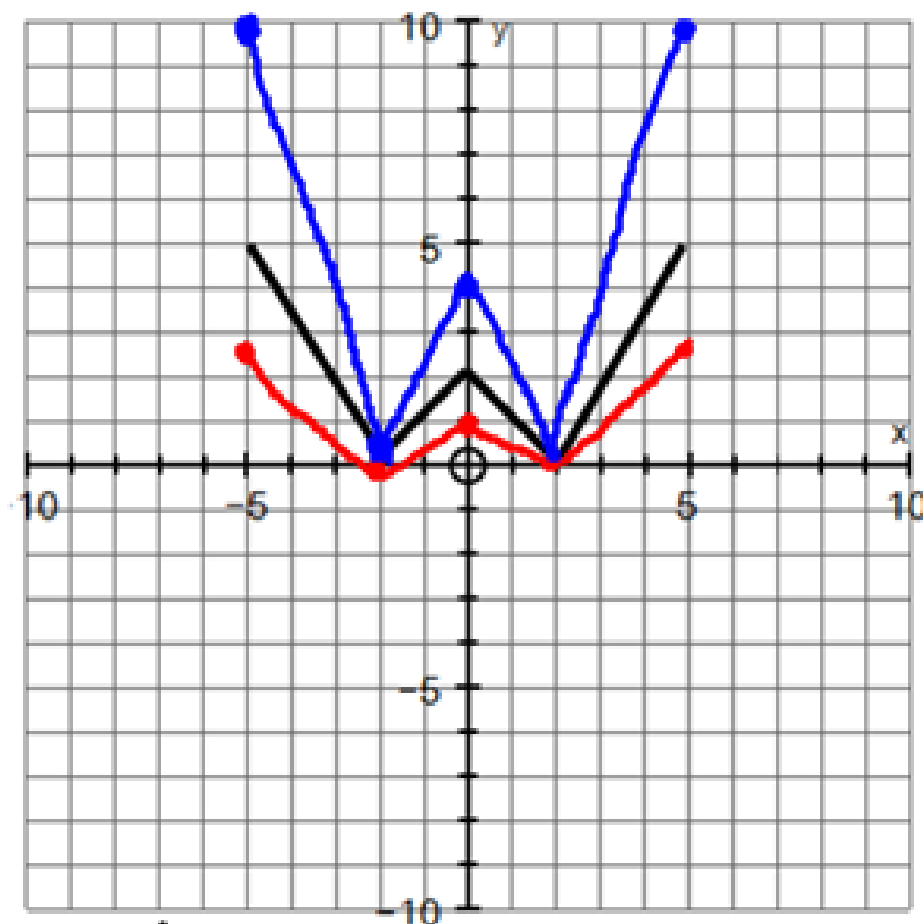
$$\text{Graph } \frac{1}{2}y = f(x) \quad y = 2f(x)$$

$$(-5, 5) \rightarrow (-5, 10)$$

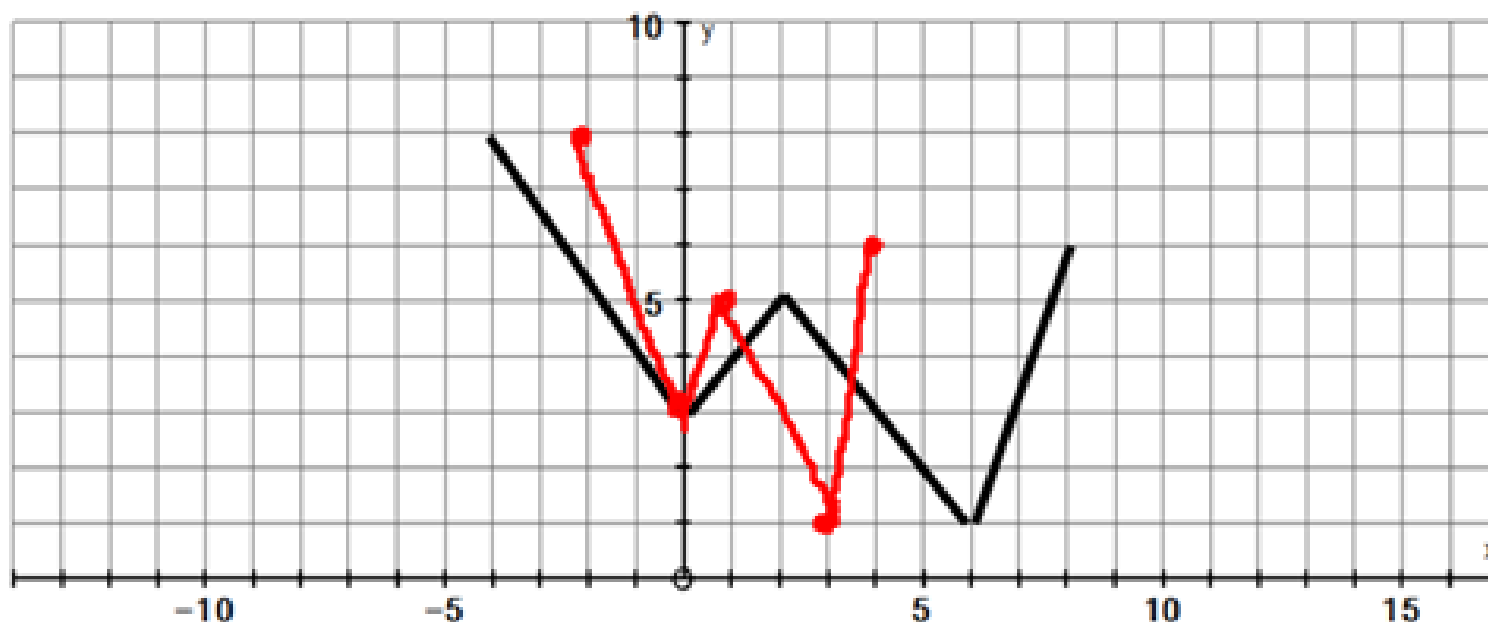
$$(0, 2) \rightarrow (0, 4)$$

$$(x, y) \rightarrow (x, 2y)$$

elongated



Horizontal Stretch:



Graph $y = f(2x)$ by multiplying the x-coordinates by $\frac{1}{2}$

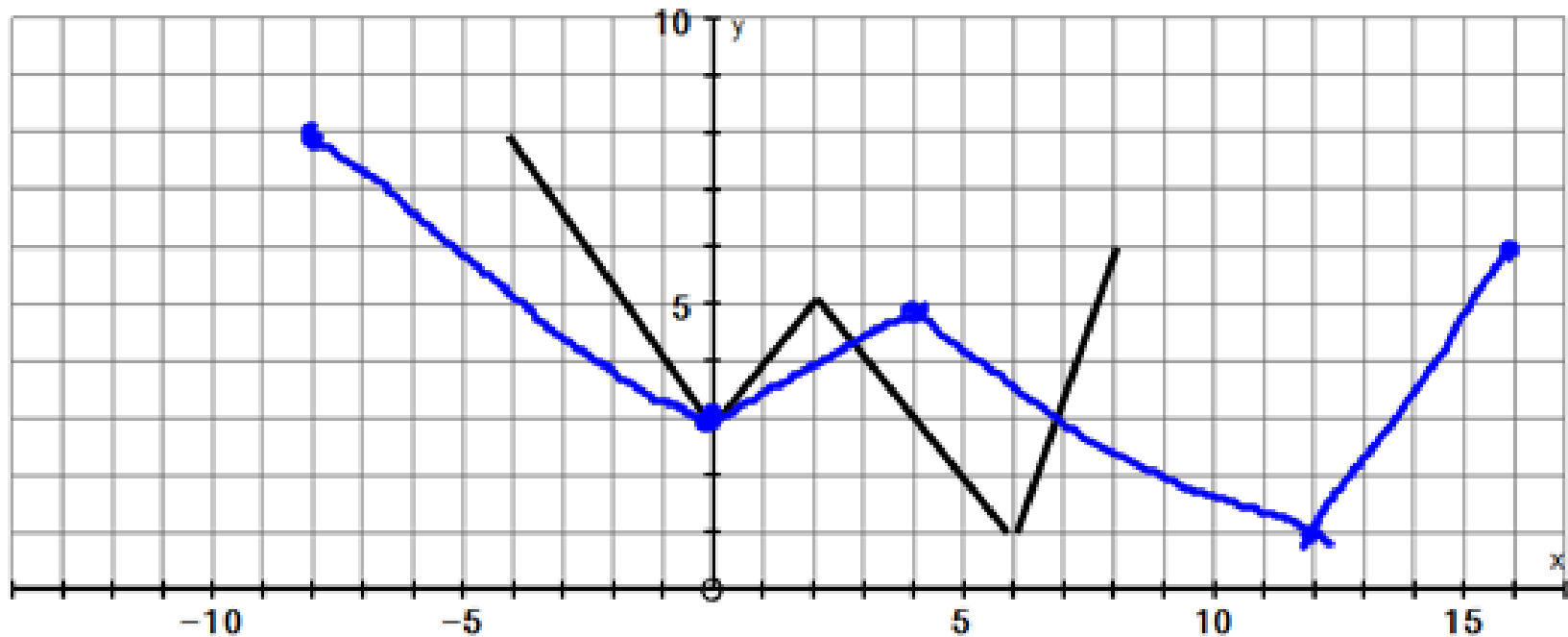
What happens to the graph? **compressed** $(-4, 8) \rightarrow (-2, 8)$

Mapping Rule: $(x, y) \rightarrow (\frac{1}{2}x, y)$

Graph $y = f\left(\frac{1}{2}x\right)$ by multiplying the x-coordinates by 2

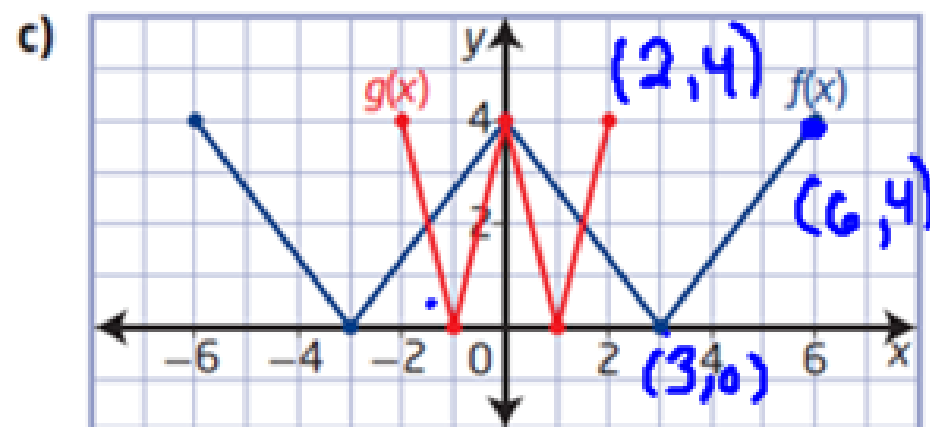
What happens to the graph? *elongated* $(-4, 8) \rightarrow (-8, 8)$

Mapping Rule: $(x, y) \rightarrow (2x, y)$ $(6, 1) \rightarrow (12, 1)$



Invariant Point: A point on the graph that remains unchanged after a transformation is applied to it.

7. Describe the transformation that must be applied to the graph of $f(x)$ to obtain the graph of $g(x)$. Then, determine the equation of $g(x)$ in the form $y = af(bx)$.



compressed horizontally
HS $\frac{1}{3}$

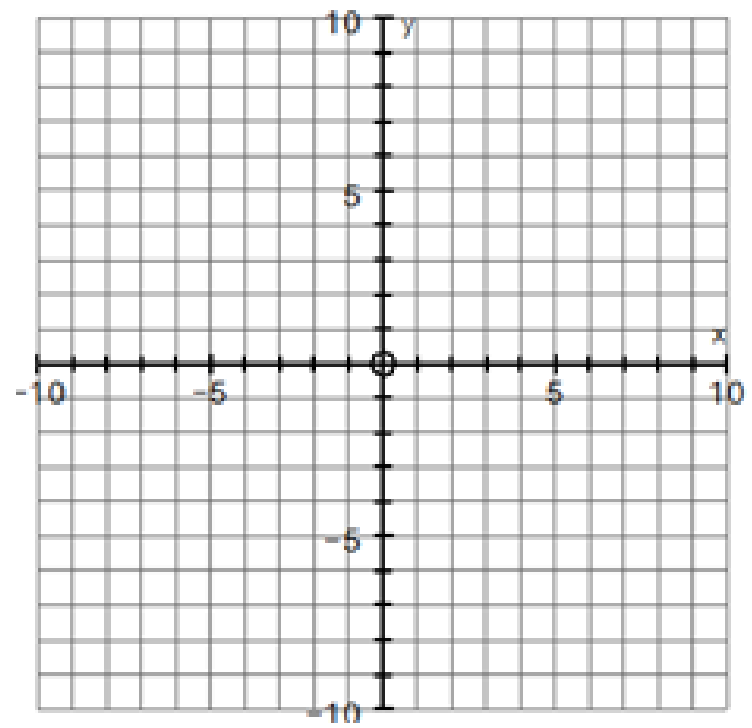
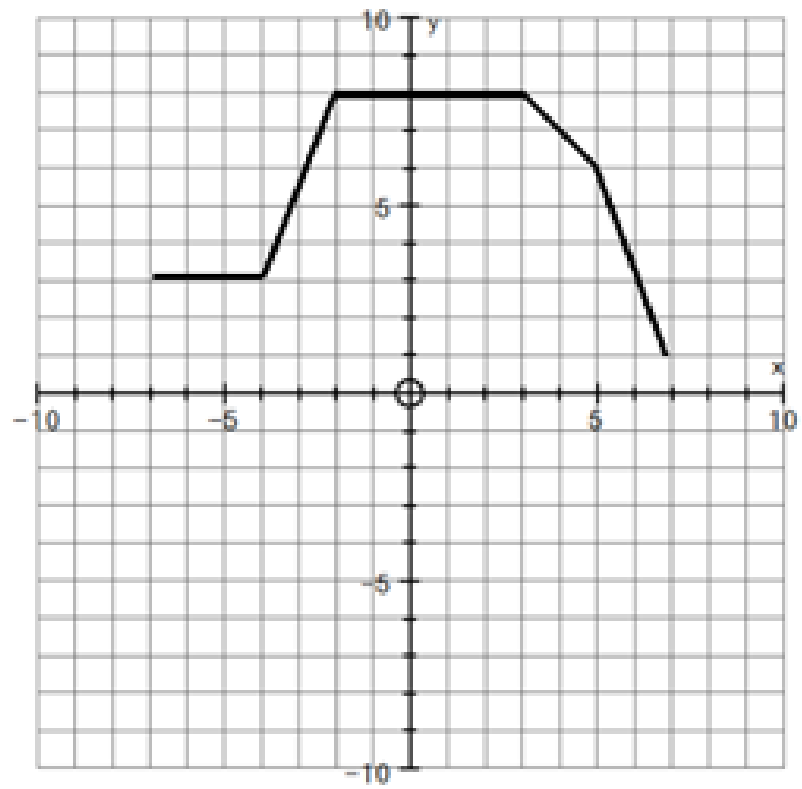
$$g(x) = f(3x)$$

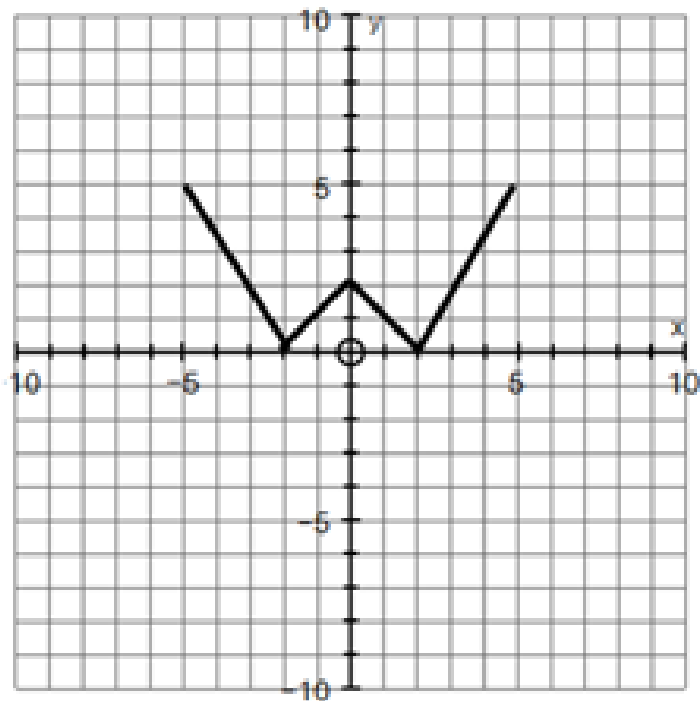
HW: pg 28 #1-7,9,10,14,15,16

HW: pg 12 # 1-5, 7-10, 17-19 \leftarrow last night

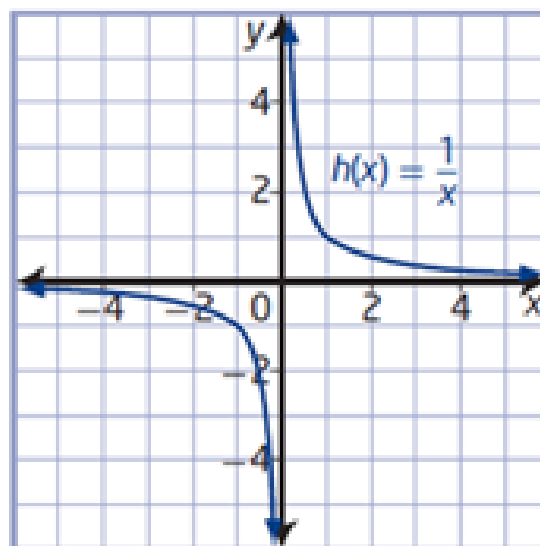
HW: pg 28 #1-7,9,10,14,15,16

HW: pg 12 # 1-5, 7-10, 17-19 } last night





c)



c)

