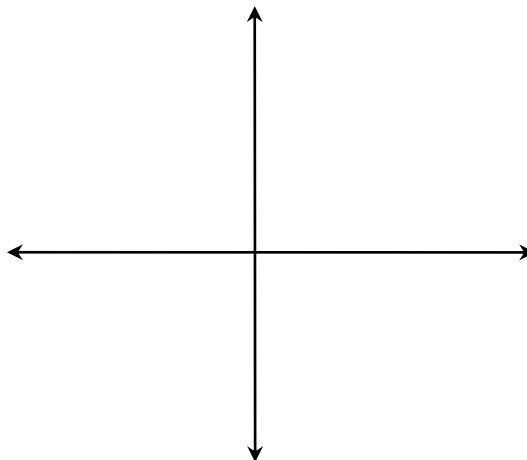


Show all work for each of the following in the space provided.

1. Given the function  $f(x) = \begin{cases} x + 4 & \text{if } x \leq -2 \\ (x + 1)^2 - 3 & \text{if } -2 < x \leq 2 \\ 1 & \text{if } x > 2 \end{cases}$  [8]

- (a) Evaluate  $f(0) - 3f(-2)f(3) + 5f(2)$  (b) Sketch the graph that represents  $f(x)$



2. Given that  $f(x) = 2 + 3x^2$ ,  $g(x) = 5x + 1$ , and  $w(x) = \sqrt{x + 9}$  ...

- (a) Evaluate  $(g \circ f \circ w)(0)$ . (b) Evaluate  $(g - f)(-1)$  [6]

(c) What is the domain and range of  $w(x)$ ? [2]

(b) Determine an expression in simplest form for...  $f[w(3y)] - 2f(y - 1)$  [5]

3. The base function  $y = f(x)$  is reflected in the y-axis, stretched horizontally by a factor of 6, stretched vertically by a factor of  $\frac{1}{3}$ , and translated 5 units to the left and 2 units down to create a new function  $g(x)$ .

(a) Write the equation of the transformed function  $g(x)$  in the form  $y = af(b(x - c)) + d$ . [4]

(b) Write a mapping rule that would transform the graph of  $f(x)$  into the graph of  $g(x)$ . [4]

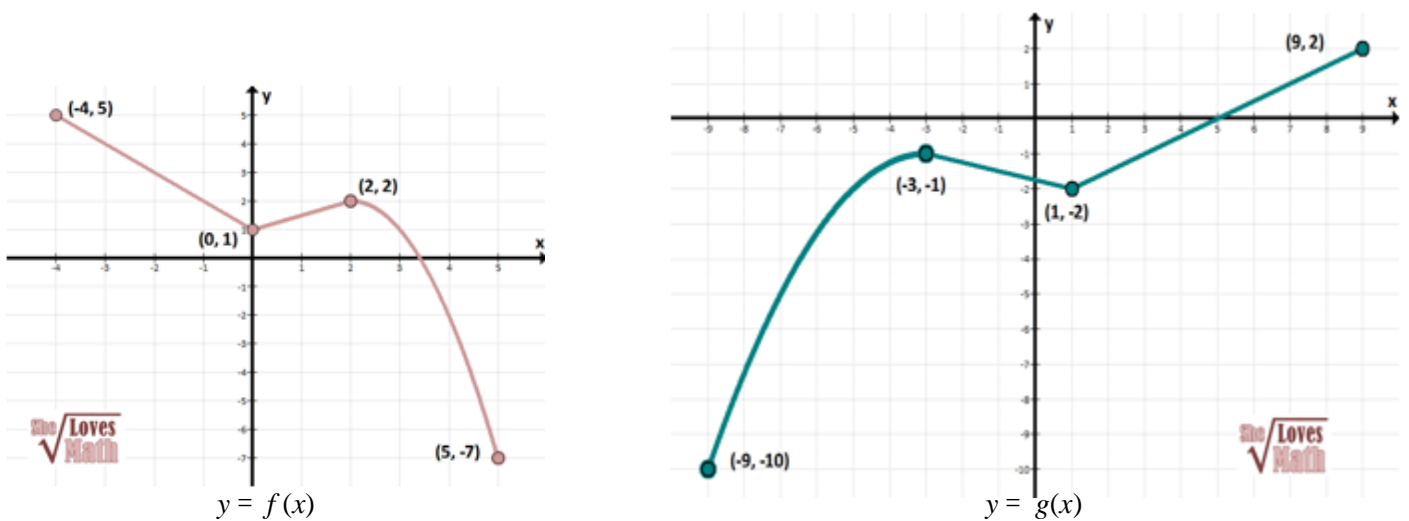
(c) If the ordered pair  $(-12, 9)$  lies on the graph of  $f(x)$ , what are the coordinates of this point on the graph of  $g^{-1}(x)$ ? [3]

4. Given that  $y + 7 = 15f(-2x + 12) + 21$ , complete the chart shown below. *When identifying translations be sure that you indicate both the number of units and direction of the shift.* [7]

Reflected in $x$ -axis	YES or NO (circle correct solution)
Reflected in $y$ -axis	YES or NO (circle correct solution)
Horizontal translation of...	
Vertical translation of...	
Horizontally stretched by a factor of...	
Vertically stretched by a factor of ...	

5. Given the function  $f(x) = 7x^3 - 1$ , determine  $f^{-1}(x)$  and the coordinates of  $f^{-1}(55)$ . [5]

6. Given the graphs of  $y = f(x)$  and  $y = g(x)$ , express the equation for  $g(x)$  in the form  $g(x) = af(b(x - c)) + d$ . [4]



7. Using the graph shown above, state the **domain** and **range** of  $f(x)$ . [2]