MATH 111 - Exam Two - Winter 2020

1. [8pts] Let $f(x) = 2x - 1$ and let $g(x) = \left\{ \begin{array}{ll} 2 - 3x & \text{if} \quad x \leq 2 \\ 4x + 1 & \text{if} \quad x > 2 \end{array} \right\}$

Determine the following values:
$(f \circ g)(2) =$

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2. [15pts] Given that $x = -1$ is a solution to the cubic equation

$$x^3 - 2x^2 - 10x - 7 = 0$$

find two other solutions to the equation. Give your solutions in exact form.

3. [15pts] Solve the inequality

$$\frac{(x+1)(2x-5)}{x-2} \geq 0.$$

Give your answer in interval notation.

4. [12pts] Let $f(x) = 6x-2$. Determine an expression for the inverse function $f^{-1}(y)$.

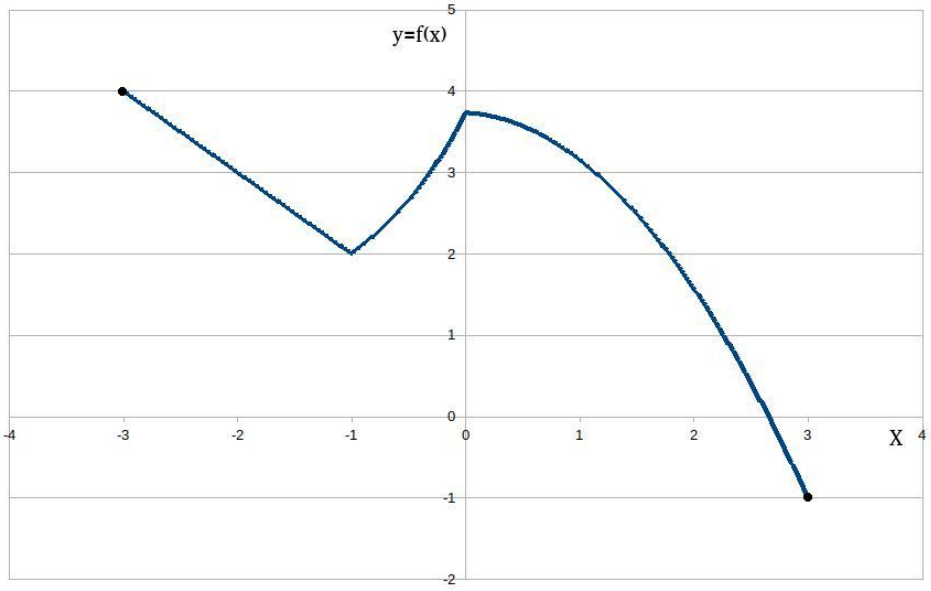
Below is the graph of a function $f(x)$.

5a. [5pts] What is the domain of the function?

5b. [5pts] What is the range of the function?

5c. [5pts] Does this function have an inverse $f^{-1}(y)$? Why or why not?

5d. [10pts] Below the graph, sketch a graph of the function $g(x) = 2f(x+3)$. Be sure to identify to label your graph well enough so that the coordinates of important points are easy to identify.



6. [15pts] Sketch a graph of the function

$$g(x) = \left\{ \begin{array}{ccc} 3-x & \text{if} & x \leq -2 \\ x^2 & \text{if} & -2 < x < 2 \\ 8-2x & \text{if} & x \geq 2 \end{array} \right\}$$

7. [10pts] Determine the domain of the function $h(x) = \dfrac{1}{\sqrt{x^2 - 2x - 8}}$.