Math1090 Practice Final Exam

1. Find the inverse, \( f^{-1}(x) \) for each given function and state the domain of the both the function and its inverse.

(a) \( f(x) = \ln(x-1) \)

\[ f^{-1}(x) = \] ________________

Domain of \( f^{-1}(x) : \) ________________

Domain of \( f(x) : \) ________________

(b) \( f(x) = \frac{x^5}{x^5-1} \)

\[ f^{-1}(x) = \] ________________

Domain of \( f^{-1}(x) : \) ________________

Domain of \( f(x) : \) ________________
2. Find the function which relates Celsius to Fahrenheit using the fact that 32 degrees Fahrenheit corresponds with 0 degrees Celsius, and 212 degrees Fahrenheit corresponds to 100 degrees Celsius.

3. For an investment that earns 6% interest compounded monthly, how much should be deposited at the beginning of each month in order to have $250,000 after 20 years?

Monthly deposit: ____________________
4. Showing all your steps clearly, solve this system of linear equations.

\[
\begin{align*}
2x - 4y + 2z &= -4 \\
4x - 9y + 7z &= 2 \\
-2x + 4y - 3z &= 10
\end{align*}
\]

Solution: _____________________________
5. Find the vertex, axis of symmetry and zeros of the parabola 

\[ y = -(x - 3)^2 + 6 \]

Vertex: _______________________
Axis of symmetry: ________________
Zeros: __________________________
6. Let $f(x) = 3x^2 + 1$, $g(x) = x + 6$, and $h(x) = \frac{x}{x^3 - 10}$. Find the following.

(a) $(fg)(x)$

(b) $(g \circ h)(x)$

(c) $(f \circ g)(1)$

(d) $(f + g)(x)$
7. You are buying your first home. You have found a home that costs $190,000. You have been able to secure a 30-year loan from a bank at an interest rate of 5.35% compounded monthly.

(a) What will your monthly payment be?

Monthly payment: _______________________

(b) How much will you pay in interest over the life of the loan?

Total interest paid: ______________________
8. Graph the solution set of the following system of inequalities and find and label all vertices of the boundary.

\[ 3x + 4y \geq 12 \]
\[ x - y \geq 2 \]
\[ x \leq 6 \]
\[ y \geq 0 \]