Precalculus Quiz 3 Due:

Hand your completed quiz in before the due date. Do not forget to write down your name and student ID number. Marks will be awarded for this quiz based on the clarity of your answers. The marker will pay close attention to the logic of your answers. Please show all your working.

Q1. The following is a graph of a function? Why? or Why not? Explain.

Q2. Let \( f(x) = \frac{\sqrt{x}}{x+1} \).
   (a) Evaluate \( f(0) \), \( f(2) \), and \( f(a + 2) \).
   (b) Find the domain of \( f \).
   (c) Compute the average rate of change of \( f \) between \( x = 2 \) and \( x = 10 \).

Q3. Let \( f(x) = \begin{cases} 1 - x & x \leq 1 \\ 2x + 1 & x > 1 \end{cases} \).
   (a) Sketch the graph of \( f \).
   (b) Is the function \( f \) continuous? Explain.

Q4. Solve each inequality and sketch the solution on the real number line.
   (a) \( x(x - 1)(x + 2) > 0 \).
   (b) \( |x - 4| < 3 \).

Q5.
   (a) Sketch the graph of \( f(x) = x^3 \).
   (b) Use part (a) to graph the function \( g(x) = (x - 1)^3 - 2 \).

Q6. If \( f(x) = x^2 + x + 1 \) and \( g(x) = x - 3 \), find the following.
   (a) \( f + g \).
   (b) \( f \circ g \).
   (c) \( g \circ f \).
   (d) \( g \circ g \circ g \).
Q7. Determine whether the function is one-to-one.

(a) \( f(x) = x^3 + 1 \).

(b) \( g(x) = |x + 1| \).

Q8. Find the inverse function of \( f(x) = \frac{x-3}{2x-5} \).

Q9. Prove that \( f(x) = \frac{1}{x-2} \) is the inverse of \( g(x) = \frac{1}{x} + 2 \).

Q10.

(a) If \( f(x) = \sqrt{3 - x} \), find the inverse function \( f^{-1} \).

(b) Sketch the graphs of \( f \) and \( f^{-1} \) on the same coordinate plane.