No notes, books, cellular devices or calculators are to be used. Fully justify your work and follow the directions in order to receive full credit.

1. (10pts) Describe the domain of the function

\[ g(x) = \frac{1}{\sqrt{x^2 - 4x - 5}}. \]

2. (10pts) Is the function

\[ f(x) = \begin{cases} 
  x^3 & \text{for } 0 \leq x \leq 1 \\
  x & \text{for } 1 < x \leq 2 
\end{cases} \]

continuous and/or differentiable at \( x = 1 \)? Why or why not?
3. (10pts) Evaluate the following limits if they exist.

(a) \( \lim_{x \to 4} \frac{x^2 - 16}{4 - x} \)

(b) \( \lim_{x \to \infty} \frac{-3x^2 + x - 7}{2x^2 + 9} \)

4. (10pts) Differentiate the following functions.

(a) \( f(x) = \frac{\pi}{x^9 - 7x} \)

(b) \( g(x) = \sqrt[3]{x^3 - x} \)
5. (5pts) Assign a value from the set \{-1, -.5, 0, .5, 1\} to the slope of the graph at the points:

- A = (0, 1) has slope approximately \_________
- B = (2, 5) has slope approximately \_________
- C = (4, -.2) has slope approximately \_________
- D = (5, -.2) has slope approximately \_________
- E = (6, -.1) has slope approximately \_________

6. (20pts) Use limits to compute \(f'(x)\) for \(f(x) = \sqrt{3x}\).
7. (15 pts) Consider the function \( g(x) = x + \frac{1}{x} \).

(a) Find an equation for a tangent line to the function at \( x = -1 \).

(b) At what points is the tangent line of \( g(x) \) parallel to \( y = \frac{3}{4}x - 2 \)?