1. (25 pts) Evaluate the following limits:
   
   (a) \( \lim_{x \to 2^+} \frac{2x}{(x-2)^3} \).
   
   (b) \( \lim_{x \to -1} \frac{2x^2 - x - 3}{x^2 + x} \).
   
   (c) \( \lim_{x \to 3} \frac{\pi x}{4} \).

2. (15 pts) Using the definition of continuity, determine whether the following functions are continuous. If the function is not continuous, find the points of discontinuity. Be sure to state your reasons in each case.
   
   (a) \( y = \frac{5 - 3x^2 - 32x^3}{17 + x^4} \).
   
   (b) \( f(x) = \begin{cases} 
   3x - 2 & x \leq 2 \\
   \sqrt{x + 7} & x > 2 
   \end{cases} \).

3. (10 pts) Given \( g(x) = \frac{3 + 2x}{9 - 4x^2} \):
   
   (a) Find all \( x \)-values where \( g \) is discontinuous and describe which part of the definition of continuity fails.
   
   (b) Are the discontinuities found in (a) removable? Why or why not?

4. (10 pts) Use the intermediate Value Theorem to prove there exists at least one solution of \( x^2 + x - 3 = 2 \) in the interval \([0, 4]\). You do not need to find the solution.

5. (10 pts) Use the definition of \( f' \) to find the derivative of \( f(x) = \sqrt{2x} \) at \( x = 8 \).

6. (10 pts) Use the definition of derivative to show that \( f'(x) = 4 - 2x \) for \( f(x) = 4x - x^2 + 3 \).

7. (10 pts) Find the equation of the tangent line to \( f(x) = 4x - x^2 + 3 \) at \( x = -3 \).