1. (15 pts) Determine if the limit of the following functions exist. If it exists, find the limit.
   A (5 pts): \( \lim_{x \to 0} \frac{1}{x^2 + 2x} \)
   B (5 pts): \( \lim_{x \to -2} \frac{x^2 - x - 2}{x - 2} \)
   C (5 pts): \( \lim_{x \to \infty} \frac{x - 4}{x^4 + 4} \)

2. (15 pts) For the function \( f(x) = \frac{1}{2x - 1} \)
   A (5 pts): Calculate the first derivative.
   B (10 pts): Use definition of the derivative
   \[
   f'(x) = \lim_{h \to 0} \frac{f(x + h) - f(x)}{h}
   \]
   to compute the derivative at \( x = 1 \).

3. (25 pts) Calculate the first and second order derivatives of the following functions
   A (5 pts): \( f(x) = 3x^3 + 2x^2 + 3 \)
   B (5 pts): \( f(x) = \sqrt{1 + 2x} \)
   C (5 pts): \( f(x) = (1 + x + 2x^2)^2 \)
   D (5 pts): \( f(x) = \left( \frac{\sqrt{x}}{x + 1} \right)^{3/2} \) (find only the first derivative)
   E (5 pts): For equations in questions A and C determine how many non-zero derivatives that can be found.

4. (25 pts). An object travels \( s(t) \) km in \( t \) hours, where \( s(t) = \frac{t^3}{8} - \frac{2t^2}{3} + 6t + 15 \).
   A (5 pts): What is the velocity at \( t = 6 \) hours?
   B (5 pts): What is the acceleration at \( t = 1 \) hour?
   C (5 pts): How far can the object travel in \( t = 2 \) hours?
   D (5 pts): When is the object traveling with a velocity of 6 km/hour?
   E (5 pts): What is the average velocity during the first 3 hours?

5. (25 pts). For the function \( f(x) = x^3 - 2x^2 + x + 9 \) defined for \( 0 \leq x \leq 1.5 \).
   A (5 pts): Relative max/min points.
   B (5 pts): Absolute max/min points.
   C (5 pts): Describe concavity of the function.
   D (5 pts): Find possible inflection points.
   E (5 pts): Sketch the graph.