1. Evaluate the limit \( \lim_{x \to 1} \frac{x^4 + x - 2}{x - 1} \), if it exists.

2. Let \( f(x) = \begin{cases} 3 & \text{if } x \leq 0 \\ 3 - x^2 & \text{if } 0 < x < 3 \\ 6 - 4x & \text{if } x \geq 3 \end{cases} \). Is the function \( f \) differentiable at \( x = 0 \)? Why?

3. Find the position of the curve \( y = 2x^3 + 3x^2 - 12x + 1 \) where the tangent line is horizontal.
4. Differentiate \( z = w^2 (w + e^w) \)

5. The position of a particle is given by the equation \( s = f(t) = 2t^3 - 9t^2 + 12t \) (where \( t \) and \( s \) are measured in seconds and meters respectively.) Find the total distance travelled by the particle during the first three seconds.