1. If \( y = \cos^{-1}\left(\frac{1 + 2 \cos x}{2 + \cos x}\right) \) and \( 0 < x < \frac{\pi}{2} \), then find \( \frac{dy}{dx} \).

2. \( \lim_{x \to 1} \frac{\sin(x - 1)}{x^2 + x - 2} \)
3. The position of a particle is given by the equation

\[ s(t) = 2t^3 - 9t^2 + 12t \]

where \( t \) is measured in seconds and \( s \) in meters. Find the total distance traveled by the particle during the first 3 seconds.

4. For \( f(x) = \frac{(x + 1)(x + 4)(x + 8)e^{x^2}}{\sqrt{x + 2}} \), find \( f'(0) \)