EE2190 Quiz 1, Spring 2004

Show your work for full credit.

1. Given \( y = x^3 - 3x^2 + 5x - 4 \) and \( x = t^2 + t \), find \( \frac{dy}{dt} \). (4 points)

\[
\frac{dy}{dt} = \frac{dy}{dx} \frac{dx}{dt} = \left( 3x^2 - 6x + 3x^2 \right) \left( 2t + 1 \right)
\]

\[
= 5 + 4t - 15t^2 + 15t^4 + 6t^5
\]

2. Given the differential equation:

\[
\frac{d^2y}{dt^2} - \alpha^2 y = 0,
\]

find the solution for \( y(t) \) in terms of two constants, \( A \) and \( B \). (4 points)

\[
y(t) = Ae^{\alpha t} + Be^{-\alpha t}
\]