September 28, 2012

**Instructions:** Show all of your work and mark your answers clearly. Each problem is worth 5 points.

1. Find the derivative of the function \( g(x) = \sqrt{9 + x} \) using the definition of the derivative. State the domain of the function and the domain of its derivative.

2. Differentiate \( F(y) = \left( \frac{1}{y^2} - \frac{3}{y^4} \right) (y + 5y^2) \).
3. Differentiate \( f(t) = \frac{2t}{2 + \sqrt{t}} \).

4. If \( H(\theta) = \theta \sin \theta \), find \( H'(\theta) \) and \( H''(\theta) \).