Quiz 1

1. Sketch the curve \( x = \sec 2t, \ y = \tan 2t, \ -\pi/4 \leq t \leq \pi/4 \). Find the Cartesian equation of the curve.

2. Find the \( \frac{dy}{dx} \) and \( \frac{d^2y}{dx^2} \) where \( x = \cos 2t \ and \ y = \cos t \).

3. Find the equations of the tangents to the curve \( x = 3t^2 + 1, \ y = 2t^3 + 1 \) that passes through the point (4,3).

4. Find the area shared by the cardioids \( r = 4(1 + \cos \theta) \) and \( r = 4(1 - \cos \theta) \).

5. Find the length of the parabolic segment, \( r = 6/(1 + \cos \theta) \), \( 0 \leq \theta \leq \pi/2 \).

6. Find the area of the surface obtained by rotating the curve \( x = t^3, \ y = t^2, 0 \leq t \leq 1 \) about the x-axis.