

Show all work.

1. **(5 points)** Find the equation of the tangent line to the curve $y = \frac{x^3 - 3x^2}{x - 3}$ at the point $(4, 16)$.

2. **(4 points)** Determine $\frac{d}{dx} (x^3 \sec x)$.

3. **(4 points)** Determine $\frac{d}{du} \frac{e^u}{u^2 + \cot u}$.

4. **(4 points)** Determine $\frac{d^2}{d\theta^2} \tan \theta$.

5. **(3 points)** Determine $\frac{d^{27}}{dx^{27}} (2e^x - 4 \cos x)$.