

Name _____

- You have 15 minutes
- No calculators
- Show sufficient work

1. (2 points) What is the slope of the line tangent to the graph of $g(x)$ at its y -intercept? Simplify your answer.

$$g(x) = 40 + 3e^x + 5 \sin x$$

2. (2 points) Explain carefully why there is no line which is both tangent to the graph of $f(x)$ and parallel to the line $10x + 2y = 9$.

$$f(x) = 3e^x + 2x^3 - 4x - 8$$

3. (2 points each) Using Leibniz notation (i.e., $\frac{dy}{dx}$, $\frac{dP}{dt}$, etc.), find derivatives for each of the following functions.

(a) $\theta = (t^2 \sqrt[3]{t})^6$ (simplify your answer)

(b) $R = x^3 \sec x + 2e^5$

(c) $V = \frac{e^z + \tan z}{z^5 + 8z}$