

Name _____

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

1. (4 points) Determine the equation of the line which is tangent to $f(x) = 7 - 5e^x$ and perpendicular to the line $y = \frac{1}{10}x + 3$.

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

(a) $w = \left(\frac{x^2 \sqrt{x}}{\sqrt[5]{x}} \right)^{20} + 4e^{\sin^3(\pi/12)}$ (simplify your answer)

(b) $P = s^8 \cot(s)$

(c) $\theta = \frac{\sqrt[3]{t} + 10}{6t^2 + \sec(t)}$