

Name:

Solutions

MAC 2311 - Analytical Geometry and Calculus I

Quiz # 4, February 6, 2024

(6 points)

Problem 1 .

Calculate the derivatives of the following functions:

(2 pts)
1.)

$$f(x) = 9x^{10} + \frac{8}{x^{10}} + 12 = 9x^{10} + 8x^{-10} + 12$$

$$\underline{f'(x) = 90x^9 - 80x^{-11}}$$

(2 pts)
2.)

$$h(x) = e^{x+2} = e^2 \cdot e^x$$

$$h'(x) = \frac{d}{dx}(e^2 e^x) = e^2 \frac{d}{dx}(e^x) = e^2 \cdot e^x = \underline{e^{x+2}}$$

(2 pts)
3.)

$$k(t) = \frac{t^5 + 8t^2 - 2}{t}$$

$$= \frac{t^5}{t} + \frac{8t^2}{t} - \frac{2}{t}$$

$$= t^4 + 8t - 2t^{-1}$$

$$\underline{\text{Then } k'(t) = 4t^3 + 8 + 2t^{-2}}$$

Problem 2 .

(2pts) 1. What is the derivative of

$$h(x) = 8\sqrt[3]{x}.$$

$$h(x) = 8x^{\frac{1}{3}} \quad \text{so} \quad h'(x) = \frac{8}{3} x^{-\frac{2}{3}}.$$

(2pts) 2. What is the slope of the tangent line of function h at the point $x = 16$.

$$\text{And} \quad h'(16) = \frac{8}{3} (16)^{-\frac{2}{3}}$$