

Quiz 6

Name: SOLUTIONS

1. Compute the first derivative of each of the following functions:

(a) $f(x) = \sqrt[3]{x^6 + x^3 + 1} = (x^6 + x^3 + 1)^{1/3}$

$$f'(x) = \frac{1}{3}(x^6 + x^3 + 1)^{-2/3}(6x^5 + 3x^2)$$

(b) $f(x) = (x^2 + x)e^{x^4}$

$$f'(x) = (2x + 1)e^{x^4} + (x^2 + x)(e^{x^4})(4x^3)$$

(c) $f(x) = \frac{e^{2x}}{(x+3)^8}$

Sol'n #1: $f(x) = e^{2x}(x+3)^{-8}$

$$f'(x) = (2e^{2x})(x+3)^{-8} + e^{2x}(-8)(x+3)^{-9}$$

Sol'n #2: quotient rule \Rightarrow

$$f'(x) = \frac{2e^{2x}(x+3)^8 - e^{2x}(8)(x+3)^7}{(x+3)^{16}}$$

These are the same! Either expression can be simplified, but these forms are okay for this quiz.