

Name: _____

MA 160 Dr. Katiraie Quiz 4 Sections 3.1 – 3.3 (20 POINTS + 3PTS Extra Credit)

1. Find the derivative of each function. (3 Points)

(a) $f(x) = 6e^x - \frac{x^2}{3}$

(b) $g(w) = \frac{w^4 - 8w^2 - 4}{w^2}$

(c) $y = (3x^2)^4$ (Hint: First simplify using properties of exponents.)

2. If $f(x) = \frac{4}{\sqrt{x}}$ find (3 Points)

(a) $f'(x)$

(b) $f'(4)$

(c) Write the equation of the tangent line to $f(x) = \frac{4}{\sqrt{x}}$ at $x = 4$.

3. The equation of motion of a moving object is $s(t) = 6t^2 + 2t^{3/2}$ where $s(t)$ is measured in feet and t is the time in seconds. Find each of the following and **use appropriate units in your answers.**

(a) Find the velocity after 4 seconds (2 Points)

(b) Find the acceleration after 4 seconds (2 Points)

4. The average price for a major league baseball game x years after 1990 can be modeled by $p(x) = 9.41 - 0.19x + 0.09x^2$.

(a) Use the model to find the instantaneous rate of change of the average ticket price in 2010. (2 Points)

(b) In a sentence, explain the meaning of your answer to part (a). **Use appropriate units.** (2 Points)

5. Use the product rule to find the derivative. (2 Points)

$$f(x) = x^3 e^x$$

6. Differentiate the following using quotient rule and simplify your result. (2 Points)

$$f(x) = \frac{3x+1}{3x-1}$$

7. Find the equation of the tangent line to the function

$$f(x) = \frac{x^2+1}{x-1} \text{ when } x = 3 \text{ on the curve.} \quad (2 \text{ Points})$$

Extra Credit ☺

8. Suppose that the cost, in dollars, for a company to produce x pairs of a new line of jeans is

$$C(x) = 1700 + 4x + 0.09x^2 + 0.0007x^3. \quad (3 \text{ Points})$$

(a) Find the average cost function. **Please include Units**

(b) Find $C'(100)$ **Please include Units**

(c) What does this $C'(100)$ predict? Please pick one of the following:

i) The approximate cost of the 101st pair of jeans

ii) The exact cost of the 100th pair of jeans.

iii) The approximate cost of the 100th pair of jeans.

iv) The exact cost of the 99th pair of jeans.