Math 150 Name:________________________

Chapter 3 Review

Ms. Meier

1) Find each derivative:

a) $y = 5e^{2x}$ b) $y = (\ln x)^3$ c) $y = \ln(\frac{4x}{3})$ d) $y = e^x - 6x^3$

e) $y = 2e^x \ln x$ f) $y = \frac{e^{3x}}{x^6}$

2) Find the equation for the tangent line to $y = x^3 e^{1-x}$ at x = 1

3) Find the absolute maximum and minimum values of $y = x^2 e^{-x}$ over the interval [0,10] and state where they occur

4) The editor of a textbook estimates if x thousand copies are given away, the first years sales will be $s(x) = 20 - 12e^{-0.03x}$ thousand copies.

a) if they give away 3000 copies what will be the first years sales?

b) If the editor wants to sell about 10,500 copies the first year, about how many should he give away?

c) Find s'(4) and interpret

5) In the early stages of the Aids epidemic during the 1980's the number of cases in the United States could be modeled by: $A(t) = 1600(e)^{2t}$ where t is the number of years since 1983, and A(t) is the number of Aids cases in the United States. Had this trend continued answer the following:

a) Evaluate and Interpret A(3)

b) Find A'(t)

c) Evaluate and Interpret A'(5)

6) Given the price-demand function $q = D(x) = 300e^{-0.25x}$ where x is the price at which q are sold.

a) Find E(x)

b) Find E(3) and interpret

c) Find the price that will maximize the revenue

Answers:

1a. $y'=10e^{2x}$ b. $y'=\frac{3(\ln x)^2}{x}$ c. $y'=\frac{1}{x}$ d. $y'=e^x-18x^2$

e. $y'=2e^x(\ln x+\frac{1}{x})$ f. $\frac{3e^{3x}(x-2)}{x^7}$

2. $y=2x-1$

3. Absolute max occurs at x = 2 and is $\frac{4}{e^2}\approx 0.541$, absolute minimum is 0 it occurs when x= 0

4. a. 9033 textbooks will be sold b. he should give away approx. 7787 copies
c. s'(4)=.31929 which means when 4000 copies are given away the sales are increasing at a rate of 319 textbooks/1000 given away

5. a. In 1986 the number of Aids cases in the US was approximately 645486 b. $A'(t)=3200(e)^{2t}$
c. If this trend continued, then in 1988 the number of cases of Aids would be increasing at the rate of 70,484,691 cases/year

6. a. E(x)= 0.25x b. E(3) = 0.75 since E(3)<1 this is inelastic , so increase the price to increase revenue. c. $4 is the price that will maximize the revenue