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Math 211

Spring 2003

Exam II

S. Bolotin

Lecture 1

Your Name: _____

Your TA: _____

PROBLEM	POINTS	SCORE
I	15	
II	10	
III	15	
IV	15	
V	15	
VI	10	
VII	20	
TOTAL	100	

Show your work. Circle your answer. Leave answers in the exact form.

I. (15 points) Suppose x and y satisfy the equation

$$\sqrt{5x^2 + y^2} - 2xy + 1 = 0.$$

It defines $y = y(x)$ as a function of x . Find the slope of the curve $y = y(x)$ at the point $x = 1, y = 2$.

II. (10 points) Suppose you know that the price of a bus ticket 30 years from now will be \$100. Suppose that you could invest the money with interest 10% compounded continuously for these 30 years. What is the present value of one of these bus tickets?

III. (15 points) In each problem find the derivative

(a) $f(x) = xe^{(2x-x^2)}$

(b) $f(x) = \ln(3x^2 + 2x + e^x)$

IV. (15 points) Evaluate the indefinite integrals

(a) $\int (x + 2)(x^2 + 3) dx$

(b) $\int (e^{2x} + \frac{x+1}{x}) dx$

V. (15 points) The marginal revenue for producing and selling x books a week is

$$MR(x) = 20 + \frac{3}{10}\sqrt{x}$$

How much will the total weekly revenue increase if the number of books produced and sold increases from 100 to 400?

VI. (10 points) Find the average value of the function $f(x) = e^{3x}$ on the interval $[-2, 2]$.

VII. (20 points) Find the total area of the finite regions between the graphs of the functions $f(x) = x^3 - x^2$ and $g(x) = 2x$.

Hint: $x^3 - x^2 - 2x = x(x + 1)(x - 2)$.