

Math 211

Exam III

Lecture 1

Spring 2007

S. Bolotin

Your Name: _____

Your TA: _____

Your Section Meeting time: _____

PROBLEM	POINTS	SCORE
I	20	
II	20	
III	20	
IV	20	
V	20	
TOTAL	100	

Show all your work: no work - no credit. Leave your answers in exact forms (using e , $\ln 2$, $\sqrt{2}$ and similar numbers). Circle your answer. Hand in your exam to your TA.

I. Evaluate the indefinite integrals

(a) $\int \frac{x^3 + x^2}{3x^4 + 4x^3} dx$

(b) $\int x^7 \ln x dx$

(c) $\int \frac{dx}{x^2 + x}$

II. Evaluate the definite integrals

(a) $\int_0^2 x^3 e^{x^4} dx$

(b) $\int_1^2 x e^{4x} dx$

(c) Find the average value of the function $f(x) = 6\sqrt{x}$ on the interval $[1, 4]$.

III. Find the total area of the finite regions enclosed between the curves $y = 4x^3$ and $y = 12x^2 - 8x$.

IV. Suppose a man opens an account with interest rate 5% at the age of 25 and start depositing money continuously at the rate of 50000 dollars per year for the next 40 years, till he retires at 65. Then he starts withdrawing money continuously at the rate of 100000 dollars per year.

(a) Find how much money the man will have when he retires.

(b) Find how old the man will be when the account expires.

V. The demand equation for a product is $p = 300 - 0.03q^2$, and the supply equation is $p = 0.09q^2$, where p is the price and q is the quantity.

(a) Find the equilibrium price p_e and quantity q_e .

(b) Find the consumer surplus CS .

(c) Find the producer surplus PS .

Scratch paper