

Math 211  
Exam III  
Lecture 1

Fall 2004  
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, together with the formula sheet, to your TA.

I. Evaluate the indefinite integrals

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

(b)  $\int xe^{2x} dx.$

(c)  $\int \frac{(1 + e^{\sqrt{x}})e^{\sqrt{x}}}{\sqrt{x}} dx.$

II. Evaluate the definite integrals

(a)  $\int_1^2 \frac{\ln x}{x} dx.$

(b)  $\int_2^3 \frac{dx}{x(x-1)}.$

(c) Evaluate the improper integral  $\int_0^{\infty} \frac{x}{(x^2+1)^2} dx.$

III. Find the total area of the finite region enclosed between the curves  $y = \frac{6}{x}$  and  $y = 5 - x$ .

IV. Suppose you open an account with interest rate 5% and start depositing money continuously at a rate  $500t$  dollars per year, where  $t$  is the number of years since the account was opened.

(a) Find how much money you will have after 30 years.

(b) What is the present value of this money?

(c) What is the average amount of money you deposited in one year?

V. Find the solution of the differential equation  $\frac{dy}{dt} = \frac{y^2}{t} + 2ty^2$  satisfying the initial condition  $y(1) = 1$ .