Math 211

Exam I

Lecture 1

Spring 2004

S. Bolotin

Your Name: _____

Your TA: _____

Your Section Meeting time: _____

PROBLEM	POINTS	SCORE
I	20	
II	15	
III	20	
IV	15	
V	10	
VI	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. You may use the last page as scratch paper, but it will not be checked. Hand in your exam, together with the formula sheet, to your TA.

I. (20 points) In each problem find the limit, if it exists, or show that the limit does not exist.

(a) $\lim_{x \to -1} \dfrac{x+1}{x^2 - 2x - 3}$

(b) $\lim_{x \to \infty} \dfrac{x^2 + 2x + 1}{3x^2 - 1}$

II. (15 points) (a) Find $f'(x)$ for the function $f(x) = 2\sqrt{x^3} + 5\sqrt{x} - 3x$.

(b) Find $f''(x)$.

IV. (15 points) Suppose you plan to retire in 40 years, and would like to have \$1000000 at your retirement. Suppose you can invest your money with interest 10% compounded continuously for these 40 years. How much money you should invest now?

V. (10 points) Solve the equation $\ln(x-1) - \ln(x-2) = 1$.

VI. (20 points) The cost of printing 1 book is \$60, while the fixed costs are \$3000, so the cost of printing x books is $C(x) = 60x + 3000$. Research shows that if the selling price is \$60, then 160 books will be sold, and for every \$1 increase in price the number of books sold is decreased by 4.

(a) Find the demand equation relating the selling price p of a book and the number x of books sold.

(b) Find the profit $P(x)$ as a function of the number x of books printed, assuming that all printed books are to be sold.

(c) Find the marginal profit $MP(x)$. Up to what level it makes sense to increase the number of books printed?

Scratch paper