MATH 221: Calculus and Analytic Geometry
Prof. Ram, Spring 2000

Lecture 4: MIDTERM EXAM 3
November 20, 2000

This is a 50 minute exam. No books, notes or calculators are allowed. There are 9 problems on this exam. All problems are worth 10 points each. Doing the easier ones first will probably help to maximize your total points.

Name: ______________________________

TA and Section: ______________________________

Problem	Score
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
Total	

Problem 1. Find the equations of the tangent and normal to the curve $y = x^3 + 2x + 6$ at the point $(2, 18)$.

Problem 2. Give an example which illustrates the Fundamental Theorem of Calculus. In order to do this compute an area by summing up the areas of tiny boxes and then show that applying the Fundamental Theorem of Calculus gives the same answer.

Problem 3. $\displaystyle\int \frac{2x+3}{\sqrt{x^2+3x-2}}\,dx$

Problem 4. $\displaystyle\int (2-5x)(3+2x)(1-x)\ dx$

Problem 5. $\int x\sqrt{x-1}\ dx$

Problem 6. The base of a solid is the area bounded by $y^2 = 4ax$ and $x = a$. Each cross section perpendicular to the x-axis is an equilateral triangle. Find the volume of the solid.

Problem 7. $\int e^{1-3x}\ dx$

Problem 8. $\displaystyle\int \frac{x^3}{1+x^8}\,dx$

Problem 9. Find the local maxima and minima of $f(x) = -(x-1)^3(x+1)^2$.