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

Lecture 3: MIDTERM EXAM 3
November 20, 2000

This is a 50 minute exam. No books, notes or calculators are allowed. There are 11 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.	
10.	
11.	
Total	

Problem 1. $\displaystyle\int \frac{3\cos x + 4}{\sin^2 x}\,dx$

Problem 1. $\displaystyle\int \frac{3\cos x + 4}{\sin^2 x}\,dx$

Problem 2. $\displaystyle\int \frac{x^5}{\sqrt{1+x^3}}\,dx$

Problem 2. $\displaystyle\int \frac{x^5}{\sqrt{1+x^3}}\,dx$

Problem 3. $\displaystyle\int_1^2 (5x^2 - 4x + 3)\ dx$

Problem 4. State the mean value theorem and draw a picture which illustrates the statement of the theorem.

Problem 5. A hole of diameter a is bored through the center of a sphere of radius a. Find the remaining volume.

Problem 6. $\displaystyle\int (7 - 3x)^4 \; dx$

Problem 7. Find the area enclosed between the curve $y = \cos 2x$, $0 \le x \le \pi/4$ and the axes.

Problem 8. $\int \left(\sqrt{x} - 1/\sqrt{x} \right) dx$

Problem 8. $\int \left(\sqrt{x} - 1/\sqrt{x} \right) dx$

Problem 9. Why is the Fundamental Theorem of Calculus true? Explain carefully and thoroughly.

Problem 10. $\int \dfrac{x^2 - 1}{x^2 + 1}\, dx$

Problem 10. $\int \dfrac{x^2 - 1}{x^2 + 1}\, dx$

Problem 11. Find the angle which increases twice as fast as its sine.