Name (Please Print) _____ Rec. Instr. _____

Your Signature _____ Class Time _____

ANALYTIC GEOMETRY AND CALCULUS II

Exam 1

September 23, 1997

Be neat, clear and complete. Show all work. No notes, books, reference material or calculators are allowed. No credit will be given for answers without supporting work.

1. Differentiate:

**(6)** (a) $D_x \ \ln|\tan x|$

**(6)** (b) $D_x \ 10^{(x^2)}$

**(6)** (c) $D_x \ (\sqrt{x})^{\sqrt{x}}$

**(6)** (d) $\log_2 \sqrt[3]{x}$

**(6)** (e) $D_x \ (\cos h^2 x + \sin h^2 x)$

2. Integrate:

**(8)** (a) $\displaystyle\int x^2 e^{x^3}\, dx$

**(8)** (b) $\displaystyle\int \frac{3x^2}{x^3+5}\, dx$

**(8)** (c) $\displaystyle\int_4^8 \frac{dx}{x\sqrt{x^2-4}}$

**(8)** (d) $\displaystyle\int \frac{dx}{x^2+5}$

**(11)** 3. Find the volume of revolution when the curve $y = \dfrac{1}{\sqrt[4]{1-x^2}}$, $\quad 0 \le x \le \dfrac{1}{2}$, is rotated about the $x$-axis.

**(8)** 4. Find the limit

**(8)** (a) $\lim_{x \to 0} \dfrac{e^x - x - 1}{x^2}$

**(8)** (b) $\lim_{x \to 0^+} x^{\sin x}$

**(11)** 5. Solve the initial value problem: $\dfrac{dv}{dt} = 3(10 - v), \quad v(0) = 0$