Math 1210-90 Calculus I
Examination 3, November 20 and 22, 2003
WARNING: You may use calculators, but you must show enough work to convince me that you can do the problem.

1. Find the function $y = f(x)$ which satisfies the differential equation $x^2y' + (1+x^2)y^2 = 0$ such that $f(1) = 2$.

2. Find the definite Integrals:

a) $$\int_{-\pi/2}^{\pi/2} \cos^2 x \sin x dx =$$

b) $$\int_1^2 (x^2 + x^{-2}) dx =$$

3. Find the area of the region above the x-axis and below the curve $y = \sec^2 x$ lying between the lines $x = -\pi/4$ and $x = \pi/4$,

4. The region in the first quadrant between the coordinate axes and the curve $y = 1 - x^{2/3}$ is rotated about the y-axis. Find the volume of the resulting solid.

5. The region bounded by the x-axis and the curve $y = 2x - x^2$ is rotated about the x-axis. Find the volume of the resulting solid.