Calculus I
Exam 3, Spring 2003

WARNING: You may use calculators, but you must show enough work to convince me that you can do the problem.

1. Find the Indefinite Integrals:

a) $\int (x^3 - 3x^2 + x^{-2})dx =$

b) $\int \frac{xdx}{(4x^2+1)^2} =$

2. Find the Definite Integrals:

a) $\int_0^{\pi/2} \cos x \sin x dx =$

b) $\int_0^3 (4x+1)^2 dx =$

3. Find the function $y = f(x)$ which satisfies the differential equation

$$\frac{dy}{dx} = \frac{1}{yx^2}$$

such that $f(1) = 1$.

4. Find the area of the region bounded by the curves $y = x + 3$ and $y = x^2 + 1$.

5. The base of a solid is the region between the parabolas $x = y^2$ and $x = 3 - 2y^2$. Find the volume of the solid given that the cross sections perpendicular to the x-axis are squares.