Calculus I
Exam 3, Summer 2002

1. Integrate:

a) $\int (x^3+3x+5)^3(x^2+1)dx =$

b) $\int (\sin^2 x+1)\cos x dx =$

2. Solve the differential equation: $\frac{dy}{dx} = (1+x)y^2, \quad y(1)=2.$

3. Calculate the definite integrals:

a) $\int_0^4 (x^3+3x+1)dx$

b) $\int_0^{\pi/2} (\sin x \cos x)dx$

4. Find the area of the region in the third quadrant bounded by the curves $y = x^3$ and $y = 2x - x^2$.

5. The region in the first quadrant bounded by the curves $y = \sqrt{x}$ and $y = x$ is rotated about the y-axis. What is the volume of the solid so produced?