CALCULUS II – EXAM 2 – SPRING 2001
NO CALCULATORS

NAME ______________________
Rec. Instr. ______________________
Rec. Time. ______________________

1.(30pts) Integrate:

a. $\displaystyle\int \frac{x+1}{x^2-x+1}dx =$

b. $\displaystyle\int \ln(t)dt =$

c. $\displaystyle\int_0^{\pi/2} \cos^3(y)dy =$

2.(25pts) Assume that Manhattan has a population of 40,000 people and that an epidemics of the flu runs through town. The Number N of sick people satisfies dN/dt = k N (40,000-N). If at time t=0 only 1000 people are sick and the instanteneous rate of growth dN/dt at time t=0 is 300 new infected people per day, find the constant of proportionality k mentioned above. Then solve the differential equation and determine how long it takes before 5000 people are infected?

3.(30pts) a. Check that $f(x) = 9x^{-4}\ln(x)$ is a probability density on the interval $[1, \infty)$.

b. Compute the expectation $E(X) = \int_1^\infty x f(x) dx$.

c. Compute $Var(X) = \int_0^\infty x^2 f(x) dx - E(X)^2$.

4.(25pts) Let Y be a random variable with density $g(y) = re^{-r(y-1)}$ on $[1, \infty]$.

a. How should you choose r so that $E(Y) = 9/4$?

b. Compute the median T in terms of r. Recall that T is a number so that $\int_1^T g(y)dy = 1/2$.