Math 107-Sec 450　　　　**Exam 1**　　　　　　　　　　**Name:** _____

Spring 2001　　　　　　　　　**Recitation Instructor:** _____

No.	1	2	3	4	5	6	Total
score							

1. (36 points) Evaluate each of the following integrals **(You must show all of your work to receive full credit. Here, no calculators allowed).**

   a. $\int \frac{x}{\sqrt{x+1}}dx$

   b. $\int (3x+1)\cos(2x)dx$

c. $\int_0^{\frac{\pi}{2}} \sin^4 x \cos x \, dx$

d. $\int \frac{e^{2x}}{1+e^{4x}} \, dx$

2. (10 pts) Find **(but don't evaluate)** an integral whose value gives the arc-length of the curve $f(x) = 1 + \ln x$ on the interval $[1, 2]$.

3. (12 pts) The following table gives some values of a function $y = f(x)$ on the interval $[0, 4]$:

x	0	1	2	3	4
f(x)	-1	2	1	-2	0

To approximate the value of the integral $\int_0^4 f(x)dx$ compute the following sums (**Please pay attention to the notation and how many subdivisions in each part. Show details by writing the actual sum and not just an answer**):

a. $Left(4)$

b. $Mid(2)$

c. $Trap(4)$

4. (12 pts) Find (**but don't evaluate**) an integral whose value gives the volume of the solid obtained by revolving the bounded region between the curves $y = \sqrt{x}$ and $y = x^2$ in the first quadrant about the x-axis.

5. (20 points) Determine whether the following improper integrals are convergent or divergent. **Show all details.**

  a. $\int_1^5 \frac{1}{\sqrt{x-1}} dx$

  b. $\int_2^\infty \frac{1}{x \ln x} dx$

6. (10 points) By using a comparison theorem determine whether the following integral is convergent or divergent: $\int_1^\infty \frac{1}{x^{1.01}+x+3} dx$.