

# Math 122C

## FIRST HOUR EXAM

NAME \_\_\_\_\_

### General Notes:

1. Show work.
2. Look over the test first, and then begin.
3. No calculators on this exam.

Friday, Sept. 23, 2005  
100 pts.

I. Review (10 pts. each)

1. Give an informal definition of

$$\lim_{x \rightarrow a} f(x) = L$$

2. What two conditions must be met to be able to say that  $f(x)$  is continuous at a point  $a$ ?

II. Definitions, tools and the like

1. (10 pts.) Calculate  $\sum_{k=1}^5 (2k + 1)$  to a number using the rules of summation and the formulas we have studied.

II. Definitions, tools and the like (continued)

2. (5 pts.) On the interval  $[2,4]$  consider the following partition: 2, 2.6, 3.2, 4. What is the norm of this partition?

3. (5 pts.) Write down the general form of a Riemann sum.

4. (10 pts.) Given a function  $f(x)$  defined on  $[2, 4]$  given by  $f(x) = x^2$  and the partition given above (problem 2) with  $x_1^* = 2.1, x_2^* = 2.7, x_3^* = 3.5$ , write out the Riemann sum. Your answer should not include any special symbols (such as  $\square$ ), but you should not calculate to a final answer (setup only).

4. (5 pts.) Define  $\int_a^b f(x)dx$

III. Find the following antiderivatives (5 pts. each) Remember the constant of integration. Show work.

a.  $\int (x^3 + 4x^2 + 1)dx$

b.  $\int \cos \theta d\theta$

c.  $\int \sec \theta \tan \theta d\theta$

III. (Antiderivatives, continued)

d.  $\int ke^{x^2} dx$

e.  $\int x\sqrt{1+x} dx$

III. (5 pts. each) Calculate the following definite integrals. Show work.

a.  $\int_1^2 x^2 dx$

b.  $\int_0^{\pi/2} \sin^2 t \cos t dt$

c.  $\int_0^{\ln(5)} e^x dx$

IV. (5 pts.) What is the name of the theorem that enables you to do the problems in part III above?