

Math 230, BL1 - Test #1 - February 20, 2006

**DO NOT OPEN EXAM UNTIL TOLD TO DO SO**

Name: \_\_\_\_\_

Signature: \_\_\_\_\_

**Circle your Recitation Section:**

8:00 (BD1, Hailong Hu)

9:00 (BD2, Hailong Hu)

11:00 (BD3, Caleb Eckhardt)

12:00 (BD4, Caleb Eckhardt)

12:00 (BD7, Carolyn Wendler)

1:00 (BD5, Carolyn Wendler)

3:00 (BD6, Bin Wang)

Time: 55 minutes. You may not use any books or notes or calculator. There are 100 points possible. To get full credit, you must show your work. Partial credit will be based only on what is actually written on the paper. All intermediate steps should be correct as written.

problem number	1	2	3	4	5	6	7	8
possible points	13	13	13	13	13	16	16	3
score								

For problems 1 through 7, evaluate the integral. If it is an improper integral, determine whether it converges or diverges; if it diverges, explain why and if it converges, find its value.

1. (13 points)

$$\int x e^x dx.$$

2. (13 points)

$$\int \cos^3 x \sin x \, dx.$$

3. (13 points)

$$\int \frac{1}{x^2 + x} dx.$$

4. (13 points)

$$\int_3^{\infty} \frac{1}{\sqrt{x}} dx.$$

5. (13 points)

$$\int \frac{1}{x^2 \sqrt{25x^2 + 1}} dx.$$

For this integral, use the following formula from the table of integrals:

$$\int \frac{du}{u^2 \sqrt{u^2 \pm a^2}} = \mp \frac{\sqrt{u^2 \pm a^2}}{a^2 u} + C$$

6. (16 points)

$$\int_0^1 \ln x \, dx.$$

7. (16 points)

$$\int \frac{\sqrt{x^2 - 4}}{x} dx.$$

8. (3 points) This problem is multiple choice. You do not need to explain your answer and there is no partial credit.

$$\int \frac{x^2 - x}{(x - 1)^2 (x^2 + 1)} dx$$

When doing partial fraction decomposition for the above integral, the first step would be to write the integrand in the form:

(a)

$$\frac{A}{x - 1} + \frac{B}{(x - 1)^2} + \frac{Cx + D}{x^2 + 1}$$

(b)

$$\frac{A}{x - 1} + \frac{B}{x - 1} + \frac{C}{x^2 + 1}$$

(c)

$$\frac{Ax + B}{(x - 1)^2} + \frac{Cx + D}{x^2 + 1}$$