Math 1312 Fall 2008

Calculus II

First Midterm Exam

Monday, September 29, 7:30 pm - 9:00 pm

Your name (please print):

Instructions: This is a closed book, closed notes exam. **Use of calculators is not permitted.** You must justify all of your answers to receive credit. Notation is important, and points will be deducted for incorrect use. Please do all of your work on the paper provided.

The Honor Code requires that you neither give nor receive any aid on this exam.

Please indicate that you have read and understood these guidelines by signing your name in the space provided:

Pledged: _____

Do not write below this line

Problem	1	2	3	4	5	6	7	8	9	10
Points	8	8	8	8	8	8	15	18	10	10
Score										

Total:_____

Problems 1 - 6: Evaluate the given definite or indefinite integral.

1. $\displaystyle\int x \, (\ln x)^2 \ dx$

2. $\displaystyle\int_0^{\pi/4} \cos^2 \theta \tan^3 \theta \, d\theta$

3. $\displaystyle\int \frac{1}{t^2\sqrt{t^2-4}}\, dt$

4. $\displaystyle\int \frac{z}{z^2+6z+13}\, dz$

5. $\displaystyle \int \frac{r^3 + 2}{r^2 + r - 6} \, dr$

6. $\displaystyle \int_2^\infty \frac{x}{(x^2 - 1)^{3/2}} \, dx$

7. Write out the continued fraction expansions of the following functions. *Do not* solve for the coefficients.

a. $\dfrac{3x + 6}{x^4 - 4x^3 + 3x^2}$

b. $\dfrac{x^3 - x - 5}{(x - 1)(x + 1)(x^2 - x + 10)}$

c. $\dfrac{x^2 - 5x + 6}{(x^2 + 7)^2}$

d. $\dfrac{1}{(x^2 - 9)^2}$

e. $\dfrac{2x + 1}{(x + 1)^3(x^2 + 4)^2}$

8. Let R denote the region in the xy-plane described by $0 \le x \le \pi$, $0 \le y \le \sin x$.

   a. Find the volume of the solid obtained when R is rotated about the x-axis.

   b. Find the volume of the solid obtained when R is rotated about the y-axis.

9. Find the length of the curve $y = \ln(\cos x)$, $-\pi/4 \le x \le \pi/4$.

10. The curve $y^2 = 4x + 5$, $0 \le x \le 4$, is rotated about the x-axis. Find the area of the resulting surface.