UCB Math 1B, Fall 2011: Midterm 1

Prof. Persson, October 4, 2011

Name: _____

SID: _____

Section: Circle your discussion section below:

Sec	Time	Room	GSI
01	MWF 8am - 9am	3 Evans	H. Lee
02	MWF 4pm - 5pm	45 Evans	A. Lieb
03	MWF 9am - 10am	6 Evans	H. Lee
04	MWF 10am - 11am	3111 Etcheverry	Z. Rosen
05	MWF 11am - 12pm	3111 Etcheverry	J. Chen
06	MWF 12pm - 1pm	3111 Etcheverry	Z. Rosen
07	MWF 1pm - 2pm	310 Hearst	W. H. Cook
08	MWF 2pm - 3pm	285 Cory	W. H. Cook
09	MWF 3pm - 4pm	35 Evans	J. Chen
10	MWF 4pm - 5pm	2 Evans	C. Y. Cho
12	MWF 5pm - 6pm	45 Evans	C. Y. Cho
13	MWF 11am - 12pm	230D Stephens	A. Adiredja

Other/none, explain: _____

Grading

1	/ 9
2	/ 9
3	/ 5
4	/ 5
5	/ 5
	/33

Instructions:

- One double-sided sheet of notes, no books, no calculators.
- Exam time 80 minutes, do all of the problems.
- You must justify your answers for full credit.
- Write your answers in the space below each problem.
- If you need more space, use reverse side or scratch pages. Indicate clearly where to find your answers.

1. Evaluate the integral or show that it is divergent.

a) (3 points) $\displaystyle\int \frac{\sin 2\theta}{\sin^2\theta + 1}\, d\theta$

b) (3 points) $\displaystyle\int_0^\infty \frac{\arctan x}{1 + x^2}\, dx$

c) (3 points) $\displaystyle\int \sec^6 x\, dx$

2. For the series below, find the sum or show that it is divergent.

a) (3 points) $\displaystyle\sum_{n=2}^{\infty} \frac{\ln n}{n}$

b) (3 points) $\displaystyle\sum_{n=1}^{\infty} \frac{e^n + 1}{3^n}$

c) (3 points) $\displaystyle\sum_{n=1}^{\infty} \left(e^{1/n} - 1\right)$

3. **a)** (3 points) Use Simpson's Rule to approximate the integral $\int_0^1 \frac{1}{1+x^2}\,dx$ using $n = 2$ subintervals.

b) (2 points) Use your result in **(a)** to approximate π.

4. (5 points) Find the centroid of the region bounded by the curves $x = 1 - y^3$, $x = 0$, and $y = 0$.

5. (5 points) Evaluate the integral: $\int \ln\left[(x^2 - 2x + 3)^2\right]\, dx$