Name (Last, First) ______________________________ **ID #** ____________

Signature ____

Lecturer ______________________________________ **Section #** ________

UNIVERSITY OF MASSACHUSETTS AMHERST
DEPARTMENT OF MATHEMATICS AND STATISTICS

Math 132 DRAFT Exam 2 March 26, 2008 7:00-8:30 p.m.

Instructions

- **Turn off all cell phones and watch alarms!** Put away iPods, etc.
- Do ***not*** use a calculator; do ***not*** use any "cheat sheet" or other paper.
- Do all work in this exam booklet. You may continue work to backs of pages and the blank page at the end, but if you do so indicate where.
- Organize your work in an unambiguous order. Show all necessary steps.
- **Answers given without supporting work may receive 0 credit!**
- Be ready to show your UMass ID card when you hand in your exam booklet.

QUESTION	PER CENT	SCORE
1	10	
2	10	
3	10	
4	10	
5	10	
6	10	
7	10	
8	10	
9	10	
10	10	
TOTAL	100	

The printed exam will have 1 question per page with space for work.

1. (10%) A car moves forward on a straight road. The following table gives the car's speed $v(t)$, in feet per second, at various times t, in seconds:

t (sec)	0	5	10	15	20	25	30	35	40
$v(t)$ (ft/sec)	3	8	11	13	14	12	9	6	1

   Approximate the total distance the car travels over the time interval $[0, 40]$ by using the **Trapezoidal Rule** with $n = \mathbf{4}$ (***four***) subintervals.

2. ($2 \times 5\% = 10\%$) Determine whether the given sequence converges, and why; if it does, find its limit.
   (a) The sequence $\left\{1, -\frac{2}{3}, \frac{4}{9}, -\frac{8}{27}, \frac{16}{81}, \dots\right\} = \left\{(-2/3)^{n-1}\right\}_{n=1}^{\infty}$.
   (b) The sequence $\{s_n\}_{n=1}^{\infty}$ where $s_n = \dfrac{5n^5 + 2n^3 + 7}{6n^6 + 4}$.

3. (10%) Evaluate:
$$\int \left(x^2\sqrt{x} + e^{-2x}\right)\,dx$$

4. (10%) Evaluate:
$$\int \frac{1}{x\ln x}\,dx$$

5. (10%) Evaluate:
$$\int x\ln(1+5x)\,dx$$

6. (10%) Evaluate:
$$\int \frac{\cos^3 x}{\sin^4 x}\,dx$$

7. (10%) Evaluate:
$$\int \frac{x^2+1}{x^2+x-6}\,dx$$

8. (10%) Evaluate:
$$\int \frac{4}{\sqrt{x^2-8x}}\,dx$$

9. (10%) If the improper integral converges, determine its value; if it diverges, say so and indicate why:
$$\int_{-3}^{1} \frac{x+1}{\sqrt{x+3}}\,dx$$

10. (10%) Using integration by parts gives
$$\int e^{-2x}\cos x\,dx = e^{-2x}\sin x + 2\int e^{-2x}\sin x\,dx,$$
   and then using integration by parts for $\int e^{-2x}\sin x\,dx$ gives
$$\int e^{-2x}\sin x\,dx = -e^{-2x}\cos x - 2\int e^{-2x}\cos x\,dx.$$
   Use this information to find $\displaystyle\int e^{-2x}\cos x\,dx$.