MATH 2300: Calculus III, Fall 2014
MIDTERM #1

Wednesday, September 17, 2014

YOUR NAME:

Circle Your CORRECT Section

001 M. Pelfrey ..... (9am)
002 E. Angel ..... (10am)
003 E. Angel ..... (11am)
004 J. Harper ..... (12pm)
005 B. Chhay ..... (2pm)
006 S. Weinell ..... (3pm)
007 C. Blakestad ..... (8am)
008 P. Washabaugh ..... (1pm)
009 J. Harper ..... (3pm)
010 K. Parker ..... (4pm)

Important note: SHOW ALL WORK. BOX YOUR ANSWERS. Calculators are not allowed. No books, notes, etc. Throughout this exam, please provide exact answers where possible. That is: if the answer is $1/2$, do not write 0.499 or something of that sort; if the answer is π, do not write 3.14159.

Problem	Points	Score
1	21	
2	7	
3	14	
4	12	
5	16	
6	20	
7	10	
TOTAL	100	

"On my honor, as a University of Colorado at Boulder student, I have neither given nor received unauthorized assistance on this work."

SIGNATURE:

NAME:	**SECTION:**

1. (7 points each) Compute the following indefinite integrals.

(a) $\int xe^x \, dx$

(b) $\int \tan^3(x) \sec(x) \, dx$

(c) $\int (\cos x)(e^{\sin x})\,dx$

2. (7 points) Suppose that $\int_0^1 f(t)\,dt = 13$. Calculate $\int_{0.1}^{0.2} f(10t-1)\,dt$. Choose the best answer below.

A. 13 B. 1.3 C. 12 D. 1.2 E. 129

3. (7 points each) Compute the following indefinite integrals.

(a) $\int e^x \sin(4x)\, dx$

(b) $\int x^2(x+5)^{25}\, dx$

4. (6 points each) Parts (a) and (b) refer to the following functions:

I. $f(x) = -x^3 + 3$ II. $f(x) = \sin x + 1$ III. $f(x) = e^x$

(a) For which of the functions is TRAP(8) an overestimate for the integral of the function on the interval $[0, 1]$? Choose the best answer.

A) I
B) II
C) III
D) I and II
E) II and III
F) I and III
G) I, II, and III

(b) For which of the functions is MID(8) an underestimate for the integral of the function on the interval $[-1, 0]$? Choose the best answer.

A) I
B) II
C) III
D) I and II
E) II and III
F) I and III
G) I, II, and III

5. (8 points each) Do the following integrals converge or diverge? Justify your answer.

(a) $\displaystyle\int_{25}^{\infty} \frac{1}{\sqrt{z}-4}\,dz$

(b) $\displaystyle\int_{2}^{\infty} \frac{d\theta}{\sqrt{\theta^3+1}}$

6. (10 points each) Find the following integrals.

(a) $\displaystyle\int_0^1 3\ln x\,dx$

(b) $\displaystyle\int_{-2}^1 \frac{1}{\sqrt{5-4x-x^2}}\,dx$

7. (10 points) Compute the indefinite integral $\displaystyle\int \frac{3x^2 - 16x + 6}{(x+2)(x-3)^2}\, dx$.