MA 126-6A, CALCULUS II
October 17, 2007

Name (Print last name first): .....

Student ID Number (last four digits): ....

TEST II

Closed book test – No calculators are permitted!

PART I - Basic Skills

Each question is worth 5 points.

Part I consists of 6 questions. Clearly write your answer (only) in the space provided after each question. You do not need not to show your work for this part of the test. No partial credit is awarded for this part of the test!

Question 1

If $\int_0^{10} f(x)\,dx = -20$ and $\int_8^{10} f(x)\,dx = -35$, find the numerical value of $\int_0^8 f(x)\,dx$.

Answer: .....

Question 2

Find the derivative of the function $g(x) = \int_1^x \sin(t^3)\,dt$.

Answer: .....

Question 3

Evaluate the definite integral

$$\int_1^e \frac{1}{x}\,dx$$

(Your answer must be a real number!)

Answer: .....

Question 4

Evaluate the indefinite integral $\int \frac{1}{1+x^2}\,dx$.

Answer: .....

Question 5

Evaluate the indefinite integral $\int \sin x \cos x\,dx$.

Answer: .....

Question 6

Evaluate the definite integral $\int_0^1 xe^x\,dx$. (Your answer must be a real number!)

Answer: .....

PART II - Problem Solving skills

Each problem is worth 14 points.

Part II consists of 5 problems. You must show your work on this part of the test to get full credit. Displaying only the final answer (even if correct) without the relevant steps will not get full credit.

Problem 1

The velocity function (in miles per second) of an object moving along a line is given by

$$v(t) = 3t - 5, \qquad 0 \leq t \leq 2.$$

(a) Find the displacement (in miles) of the object during the given time interval.

(b) Find the distance (in miles) traveled by the object during the given time interval. (Simplify and express your answer as a fraction if need be!)

Problem 2

Consider the function $f(x) = (x-1)^2$ on the interval $[1, 4]$.

(a) Find the average value, f_{ave}, of the function f on the given interval.

(b) Find the numerical value of c such that $f_{\text{ave}} = f(c)$. [Hint: only one value lies in the given interval!]

Problem 3

(a) Evaluate the definite integral

$$\int_1^2 \frac{3x^3 + 2x^2 + x}{x}\, dx.$$

(b) Evaluate the indefinite integral $\int x \ln x \, dx$.

Problem 4

(a) Evaluate the definite integral

$$\int_0^4 \sqrt{16 - x^2}\, dx$$

by interpreting it in terms of areas.

(b) Evaluate the definite integral

$$\int_{-\pi/3}^{\pi/3} \tan x\, dx.$$

(Your answer must be a number!)

Problem 5

(a) Evaluate the indefinite integral

$$\int x^2 \cos x \, dx.$$

(b) Find the exact area of the region between the graph of the function $f(x) = 2xe^{-x^2}$ and the x-axis when $0 \leq x \leq 1$. (Hint: Substitution method might prove useful here!)

SCRATCH PAPER

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