KOÇ UNIVERSITY
MATH 102 - CALCULUS
Midterm Exam   May 6, 2005

Duration of Exam: 90 minutes

INSTRUCTIONS: No calculators may be used on the test. No books, no notes, no questions, and talking allowed. You must always **explain your answers** and **show your work** to receive **full credit**. Use the back of these pages if necessary. **Print (use CAPITAL LETTERS) and sign your name, and indicate your section below. GOOD LUCK!**

Surname, Name: ———————————————————————

Student ID no: ———————————————————————

Signature: ———————————————————————

Section (Check One):

Section 1 (Vahap Erdoğdu) :   ——
Section 2 (Burak Özbağcı- MW: 11:30-13:20):   ——
Section 3 (Özgür Müstecaplıoğlu):   ——
Section 4 (Tolga Etgü - MW: 9:30-11:20):   ——
Section 5 (Tolga Etgü - MW: 12:30-14:20):   ——
Section 6 (Burak Özbağcı- MW: 14:30-16:20) :   ——

PROBLEM	1	2	3	4	TOTAL
POINTS	15	15	40	30	**100**
SCORE					

Name:

Problem 1

(1.a) **(5 pts)** Evaluate
$$\int \frac{\cos\sqrt{x}}{\sqrt{x}}\,dx.$$

(1.b) **(5 pts)** Find
$$\frac{d}{dx}\left(\int_{\sqrt{2x}}^{e} e^{\sin(t^2)}\,dt\right).$$

(1.c) **(5 pts)** Which one is bigger:
$$\frac{2\ln 77 + 2\ln(\frac{1}{11})}{\ln 49} \quad \text{or} \quad \arcsin(\cos(\frac{\pi}{4}))?$$

Why?

Name:

Problem 2 Find the derivatives of the following functions:

(2.a) **(5 pts)** $y = \arctan \sqrt{x^2 + 1}$

(2.b) **(5 pts)** $y = 5^{-\cos(2x)}$

(2.c) **(5 pts)** $y = \ln(\ln(\ln x))$

Name:

Problem 3

(3.a) **(15 pts)** Find the arc-length of the curve $y = \ln(\sec x)$ for $0 \leq x \leq \frac{\pi}{4}$.

(3.b) **(10 pts)** Find the volume of the solid obtained by revolving the region bounded by the curves $y = \cos x$, $y = 0$, $x = 0$ and $x = \frac{\pi}{4}$ about the x-axis.

(3.c) **(15 pts)** Find the area of the region bounded by the curves $y = 3x^2 + 15$ and $y = 6x + 24$ for $0 \leq x \leq 5$.

Name:

Problem 4

(4.a) **(10 pts)** Evaluate

$$\int_1^e x^3 \ln x \ dx.$$

(4.b) **(10 pts)** Evaluate

$$\int_0^1 \frac{dx}{(4 - x^2)^{3/2}}$$

Name:

(4.c) **(10 pts)** Evaluate
$$\int \frac{4\ dx}{x^3 + 4x^2 + 4x}$$