KOÇ UNIVERSITY

MATH 102 - CALCULUS

Final May 28, 2009

Duration of Exam: 120 minutes

INSTRUCTIONS: No calculators may be used on the test. No books, no notes, 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.**

Surname, Name: _____

Signature: _____

Section (Check One):

Section 1: Aybike Özer M-W (15:30) ___
Section 2: Burak Özbağcı M-W (14:00) ___
Section 3: E. Şule Yazıcı Tu-Th(11:00) ___
Section 4: E. Şule Yazıcı Tu-Th(14:00) ___
Section 5: Sinan Ünver M-W(11:00) ___

PROBLEM	POINTS	SCORE
1	25	
2	5	
3	10	
4	15	
5	10	
6	25	
7	10	
TOTAL	**100**	

Problem 1. (25 points) Calculate the following integrals

(a) $\displaystyle\int \frac{3x+1}{x^2+1}\,dx =$

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

(c) $\displaystyle\int \frac{x+3}{(x+1)(x+2)}\,dx =$

(d) $\displaystyle\int_0^{\frac{\pi}{2}} x\sin 2x\,dx =$

(e) $\displaystyle\int_e^{e^2} \frac{1}{x \ln x}\, dx =$

Problem 2. (5 points) Calculate $\displaystyle\frac{d}{dx}\int_1^2 te^{t^3}\, dt$

Problem 3. (10 pts) Calculate the following limit using the L'hospital rule

$$\lim_{x\to\pi/2} \frac{1-\sin x}{1+\cos 2x} =$$

Problem 4. (15 pts) If $1200cm^2$ of material is available to make a box with a square base and an open top, find the largest possible volume of the box.

Problem 5. (10 pts) Find the domain and sketch the graph of the function $f(x) = \log(x+2)$.

Problem 6.

(a) (10 points) Find the volume of the solid obtained by revolving the region bounded by the curve $y = \sqrt[4]{x}$ and the lines $y = 0$ and $x = 4$ about the x-axis.

(b) (15 points)Find c if the area of the region enclosed by $y = x^2 - c^2$ and $y = c^2 - x^2$ is 576 cm^2

Problem 7. (10 pts) Find the equation of the tangent line to the curve $\frac{x^2}{8} + \frac{y^2}{18} = 1$ at the point $(-2, -3)$.