KOÇ UNIVERSITY

MATH 102 - CALCULUS

Final Exam January 22, 2009

Duration of Exam: 90 minutes

INSTRUCTIONS: No calculators may be used on the test. No books, no notes, and no 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: T. Etgü (11:00) ___
Section 2: T. Etgü (15:30) ___
Section 3: S. Ünver (9:30) ___

PROBLEM	POINTS	SCORE
1	20	
2	20	
3	20	
4	20	
5	20	
TOTAL	**100**	

Problem 1. Compute the following: (5 points each)

(i) $\lim_{x\to 9} \frac{3-\sqrt{x}}{9-x}$

(ii) $\lim_{x\to\infty} \left(x - \sqrt{x^2-3x}\ \right)$

(iii) $\frac{d}{dx}\left(x\sqrt{x-\sqrt{x}}\right)$

(iv) $\frac{d}{dx}(\cos(1+x^2))$

Problem 2. Find the volume of the solid obtained by rotating the region between the curve $y = \sqrt{3\cos x}$ and the lines $y = 0$, $x = 0$, $x = \pi/2$ about the x-axis. (20 pts.)

Problem 3. Compute the following: (4 points each)

(i) $\arctan(\tan(\frac{5\pi}{4}))$

(ii) $e^{3\ln x}$

(iii) $\frac{d}{dx}(\ln(3+2x^3))$

(iv) $\frac{d}{dx}(e^{\sin x})$

(v) $\int_1^4 \frac{dx}{x}$

Problem 4. Compute the following integral using integration by parts: (20 pts.)

$$\int x^2 e^{4x}\, dx$$

Problem 5. Compute the following integral using partial fractions: (20 pts.)

$$\int \frac{x^2 + 2x - 1}{(x-1)(x^2+1)}\, dx$$