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:

$$(5 \text{ points each})$$

(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.)

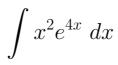
Problem 3. Compute the following:

- (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) $\int_{1}^{4} \frac{dx}{x}$

(4 points each)

Problem 4. Compute the following integral using integration by parts:

(20 pts.)



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

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