



ÇANKAYA UNIVERSITY

Department of Mathematics and Computer Science

MCS 102 - Calculus for International Trade II

FIRST MIDTERM EXAMINATION

2014-2015 Spring Semester

19.03.2015

STUDENT NUMBER:

NAME-SURNAME:

SIGNATURE:

INSTRUCTOR:

SECTION:

DURATION: 100 minutes

Question	Grade	Out of
1		25
2		15
3		25
4		10
5		30
Total		105

IMPORTANT NOTES:

- 1) Please make sure that you have written your student number and name above.
- 2) Check that the exam paper contains 5 problems.
- 3) Show all your work. No points will be given to correct answers without reasonable work.

Question 1. Evaluate the following indefinite integrals.

a. $\int (2x^2 + 1)(2x^2 - 1)dx$

b. $\int \frac{x^3 + x^2}{3x^4 + 4x^3 + 1}dx$

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

d. $\int (x^2 + 1)e^{-x}dx$

Question 2. Calculate the following definite integrals.

a. $\int_1^3 \frac{\sqrt[5]{x} + \sqrt[3]{x}}{x^2} dx$

b. $\int_{-1}^1 \frac{6x}{\sqrt{3x^2 + 1}} dx$

Question 3.

a. Find the area of the region bounded by $y = 2x^2 + 1$ and $y = 1 - 2x$.

b. Find the area of the shaded region ($S_1 + S_2$).

Question 4.

a. If the marginal revenue function is given by

$$\frac{dr}{dq} = q\left(2 - \frac{500}{q^{3/2}}\right)$$

and the revenue from 100 units of product is 600 (which means $r(100) = 600$), find the revenue function.

b. By using the revenue function you have found in part (a), evaluate $r(50)$.

Question 5.

a. Consider the following matrices:

$$A = \begin{bmatrix} -2 & -1 \\ 3 & 5 \end{bmatrix} \quad B = \begin{bmatrix} -4 & 9 \\ 1 & 2 \end{bmatrix}$$

By computing $(AB)^T$ and $B^T A^T$, verify that $(AB)^T = B^T A^T$.

b. Solve the following system of linear equations, by using matrix reduction.

$$\begin{cases} 3x + y & = & 4 \\ y + z & = & 3 \\ -x + 2y + 3z & = & 4 \end{cases}$$