



ÇANKAYA UNIVERSITY

Department of Mathematics and Computer Science

MCS 101 - Mathematics for International Trade I

Final Examination - Sample Exam

**STUDENT NUMBER:**

**NAME-SURNAME:**

**SIGNATURE:**

**INSTRUCTOR:**

**DURATION:** 90 minutes

| Question | Grade | Out of |
|----------|-------|--------|
| 1        |       |        |
| 2        |       |        |
| 3        |       |        |
| 4        |       |        |
| 5        |       |        |
| Total    |       |        |

**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.
- 4) If you don't take the exam in the right place then your exam will not be graded.

1) a) Solve the following equalities,

i.  $|x^2 - 8x + 7| = 4$ .

ii.  $5(2^{(4x/3)} + 1) = 20$ .

b) Evaluate the limit,  $\lim_{x \rightarrow 0^+} \frac{8x^5 - 3x + 2}{7 - 5x^2 + 3x^4}$ .

2) Evaluate the derivatives of the following functions,

a)  $y = 4^x + 4^{x^2} + 4^{\ln x}$ .

b)  $y = \frac{x - e^{2x}}{x + e^{3x}}$ .

c)  $y = x \cdot \sqrt[3]{x^4 - x^3 + 1}$ .

d)  $y = \ln(\ln(2x) + 3x)$ .

e)  $y = \frac{\ln^3(x)}{x}$

**3) a)** If  $y = \frac{3}{x+1}$  then evaluate  $y^{(3)}(1)$ .

**b)** Find  $f'(x)$ , if  $y = x^{(x+1)}$ .

**c)** Find  $\frac{dy}{dx}$ , where  $x^3y^3 + x^2 = 4$ .

4) For the function  $f(x) = 2x^3 - 9x^2 + 12x$ ,  
a) find critical points.

b) determine local maximum and minimum values by using,  
i. First Derivative Test.

ii. Second Derivative Test.

5) a) Find the absolute maximum and minimum of the function  $y = x^3 - 5x^2 - 8x + 10$  on the interval  $[0, 5]$ .

b) If the demand function for a manufacturer's product is given by  $p = \frac{100}{(q + 5)^2}$ , find the marginal revenue function and evaluate it when  $q = 5$ .