

EASTERN MEDITERRANEAN UNIVERSITY
DEPARTMENT OF MATHEMATICS

Math104 – Mathematics for Business and Economics II
 2017 – 2018 Fall Semester
 Second Midterm Exam



Date: 18.11.2017; Duration: 90 min.;
 Note: Calculator is allowed.



Question	Mark
1.	
2.	
3.	
4.	
TOTAL	

 Name surname :
 Student Number : Group Number:
 Department : İmza:

1. Given $y = f(x) = \frac{1}{3}x^3 - \frac{1}{2}x^2 - 6x + 10$.

a) Find the critical values/points of the function $f(x)$. (6 p.)

b) Use first derivative test to determine the nature of the critical values/points. (6 p.)

c) Write the increasing and decreasing intervals of $f(x)$. (4 p.)

d) Find the inflection point of the function, $f(x)$. (4 p.)

e) Use second derivative test for concavity of $f(x)$. Write the concave up and concave down intervals of $f(x)$. (5 p.)

2. The total revenue; R , and the total cost; C , functions for a product are given below:

$$R = 500q - 0.005q^2 \quad \text{and}$$

$$C = 150000 + 100q + 0.003q^2$$

where q is the quantity demanded

a) Find the marginal revenue function. (5 p.)

b) Find the marginal cost function. (5 p.)

c) Use marginal approach to determine the profit maximizing level of output (quantity). (5 p.)

d) Construct the profit function. (5 p.)

e) Find the amount of maximum profit. (5 p.)

3. The demand function for a firm's product is $q = 150000 - 75p$, where p is the price of the product (in dollars) and q is the number of units demanded.

a) Determine the price that should be charged in order to maximize the total revenue. (10 p.)

d) Determine and identify the elasticity of demand at the revenue maximizing level of price. (7 p.)

b) How many units must be demanded for the maximizing level of price? (5 p.)

e) Sketch the graph of revenue function. (8 p.)

c) What is the maximum revenue? (5 p.)

4. The demand function for a firm's product is $p = 500 - 0.05q$, where p is the price of the product (*in dollars*) and q is the quantity demanded. It is also known that the cost function of the firm is $C = 1250 - 7.5q + 0.375q^2$, where q is the number of units produced.

a) Determine how many units must be produced in order to minimize the total cost. (8 p.)

c) Find the total revenue function. (4 p.)

b) What is the minimum total cost? (5 p)

d) Find the marginal revenue function. (4 p.)

e) Find the marginal revenue when $q = 20$. (4 p.)