

Midterm Test

Course code & title : EE2203 Modelling Techniques

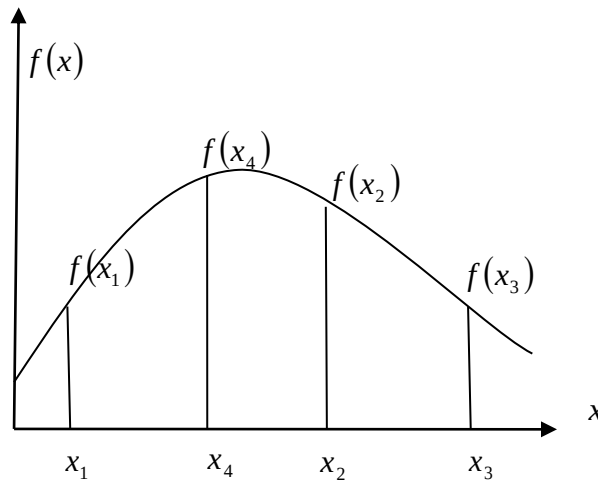
Date : 6 March 2019

Time allowed : 1 hour 45 minutes

Question 1

Multiple choice: please choose one correct answer (4 marks)

- a) In the graph below, the lower and upper boundary of the search is given by x_1 and x_3 respectively. If x_4 and x_2 are the initial intermediary points, which of the following statement is false?



- (A) The distance between x_2 and x_1 is equal to the distance between x_4 and x_3
- (B) The distance between x_4 and x_2 is approximately 0.618 times the distance between x_2 and x_1
- (C) The distance between x_4 and x_1 is approximately 0.618 times the distance between x_4 and x_3
- (D) The distance between x_4 and x_1 is equal to the distance between x_2 and x_3
- b) We need to enclose a field with a fence. We have 500 feet of fencing material with a building on one side of the field where we will not need any fencing. Determine the maximum area of the field that can be enclosed by the fence using f' and f'' .
- (A) $x = 125, y = 250$
- (B) $x = 150, y = 200$
- (C) $x = 125, y = 100$
- (D) $x = 200, y = 150$

Question 2

A company makes 2 types of products, A and B. Each kind of products requires a certain amount of time and raw material to produce. Further, there is limited on-site storage for each of the products. These factors are listed in the following table.

	A	B	Resource availability
Profit	\$15/unit	\$20/unit	
Production time	2 hr/unit	1.5 hr/unit	60 hr/week
Storage	40 units	35 units	
Raw material	50 kg	100 kg	2,400 kg/week

- (a) Use graphical method to find the optimal solution. **(5 marks)**
- (b) Use simplex method to find the optimal solution. **(5 marks)**

Question 3 (2 marks)

Solve the system of equations.

$$\begin{aligned}7x + y &= 0 \\ 14x + 2y &= 0\end{aligned}$$

Question 4 (4 marks)

True or False.

- a) For any square matrices of the same size, $AB=BA$.
- b) The determinant of the identity matrix is 1.