

13. (a) Find  $[1 \ 2 \ 3] \begin{bmatrix} 4 & 2 & 0 \\ 1 & -1 & 3 \\ 7 & 2 & 1 \end{bmatrix} \begin{bmatrix} 8 \\ 6 \\ 4 \end{bmatrix}$ .

(b) Find the inverse of A.

$$A = \begin{bmatrix} 4 & 0 & 2 \\ 2 & 10 & 1 \\ 3 & 9 & 1 \end{bmatrix}$$

BUSINESS STATISTICS AND MATHEMATICS

(For those who joined in July 2003 and after)

Time : Three hours

Maximum : 100 marks

SECTION A — (4 × 10 = 40 marks)

Answer any FOUR questions.

All questions carry equal marks.

1. Explain the application of Statistics in business.
2. Calculate the arithmetic mean, median and mode from the following data :  

Value (more than) :	0	50	100	150	200	250
Frequency :	83	75	60	30	13	4
3. Distinguish between population and sample. Explain the various methods of sampling.
4. From the following data on daily sales of TV sets, calculate variance.  

No. of TV sets :	5	7	10	11	15	25	30
No. of days :	1	3	7	6	5	2	1

5. Find Rank correlation.

Marks X: 15 20 28 12 40 60 20 80

Marks Y: 40 30 50 30 20 10 30 60

6. What are the three types of distribution? Explain each of them.

7. Compute (a) Laspeyre's (b) Paasche's and (c) Fisher's index number.

Item	Price		Quantity	
	Base year	Current year	Base year	Current year
A	6	10	50	50
B	2	2	100	120
C	4	6	60	60
D	10	12	30	25

SECTION B — (3 × 20 = 60 marks)

Answer any THREE questions.

- 8. (a) What are the steps of Statistics?
- (b) Calculate mean, median and mode.

Marks	No. of students
below 10	3
below 20	8

Marks No. of students

below 30 17

below 40 20

below 50 22

9. (a) Find the second derivative of  $(2x - 7)^4$  and its value when  $x = 5$ .

(b) If  $y = (4x^3 - x)(7x^2 + 6x + 3)e^x$ , find  $\frac{dy}{dx}$ .

10. (a) Prove that  $\int_0^1 \frac{x dx}{1+x^2} = \frac{1}{2} \log 2$ .

(b) Solve  $\int x^2 e^x dx$  by integration by parts.

11. (a) The cost function of an item is given by  $C = 36x - 10x^2 + 2x^3$ . Find the minimum average cost.

(b) Find the relative maxima and minimum of  $x^3 - \frac{9}{2}x^2 - 12x - 6$ .

12. (a) Explain the term Break Event Point theory. How does it help in equipment replacement decision?

(b) The marginal cost function for producing  $x$  units is  $y = 23 + 16x - 3x^2$  and the total cost for producing 1 unit is 40. Obtain the total cost function and the average cost function.