

Model Question Paper
Interpolation and Fitting a Straight Line - Part II

12th Standard

Business Maths

Reg.No. :

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I. Answer all the questions.

II. Use blue pen only.

III. Question number 15 is compulsory.

Time : 01:30:00 Hrs

Total Marks : 85

Part-A

5 x 1 = 5

- 1) The normal equations for estimating a and b so that the line $y = ax + b$ may be the line of best fit are
 (a) $a\sum x_i^2 + b\sum x_i = \sum x_i y_i$ and $a\sum x_i + nb = \sum y_i$ (b) $a\sum x_i + b\sum x_i^2 = \sum x_i y_i$ and $a\sum x_i^2 + nb = \sum y_i$
 (c) $a\sum x_i + nb = \sum x_i y_i$ and $a\sum x_i^2 + b\sum x_i = \sum y_i$ (d) $a\sum x_i^2 + nb = \sum x_i y_i$ and $a\sum x_i + b\sum x_i = \sum y_i$
- 2) In a line of best fit $y = 5.8(x - 1994) + 41.6$ the value of y when $x = 1997$ is
 (a) 50 (b) 54 (c) 59 (d) 60
- 3) Five data relating to x and y are to be fit in a straight line. It is found that $\sum x = 0$ and $\sum y = 15$. Then the y-intercept of the line of best fit is,
 (a) 1 (b) 2 (c) 3 (d) 4
- 4) The normal equations of fitting a straight line $y = ax + b$ are $10a + 5b = 15$ and $30a + 10b = 43$. The slope of the line of best fit is
 (a) 1.2 (b) 1.3 (c) 13 (d) 12
- 5) The normal equations obtained in fitting a straight line $y = ax + b$ by the method of least squares over n points (x, y) are $4a + b = 4$ and $\sum xy = 120a + 24b$. Then n =
 (a) 30 (b) 5 (c) 6 (d) 4

Part-B

5 x 6 = 30

- 6) Using Gregory-Newton's formula, find y when $x = 145$ given that

x :	140	150	160	170	180
y :	46	66	81	93	101
- 7) If $f(0) = 5, f(1) = 6, f(3) = 50, f(4) = 105$, find $f(2)$ by using Lagrange's formula
- 8) Define a scatter diagram.
- 9) (a) State the principle of least squares.
- 10) Fit the line of best fit if $\sum x = 75, \sum Y = 115, \sum x^2 = 1375, \sum XY = 1875$, and $n = 6$

Part-C

5 x 10 = 50

- 11) From the following data find $y(25)$ by using Lagrange's formula

x :	20	30	40	50
y :	512	439	346	243
- 12) Apply Lagrange's formula to find y when $x = 5$ given that

x :	1	2	3	4	7
y :	2	4	8	16	128
- 13) A group of 5 students took tests before and after training and obtained the following scores.

Scores before training	3	4	4	6	8
Scores after training	4	5	6	8	10

Find by the method of least squares the straight line of best fit

- 14) Fit a straight line to the data given below. Also estimate the value y at $x = 3.5$

x :	0	1	2	3	4
y :	1	1.8	3.3	4.5	6.3
- 15) a) By the method of least squares find the best fitting straight line to the data given below:

x :	100	120	140	160	180	200
y :	0.45	0.55	0.60	0.70	0.80	0.85

(OR)

- b) Find by the method of least squares, the line of best fit for the following data.

Depth of water applied(in cm) x:	0	12	24	36	48
Average yield (tons / acre) y :	35	55	65	80	90
