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BBS 1st Year

Business Statistics – 2082

Model Question with a Handsome understanding solution

TRIBHUVAN UNIVERSITY

B.B.S. 4 Yrs. Prog. / I Year / MGMT — Full Marks: 100

MGT 202 : Business Statistics (Regular) — Time: 3 hrs.

Candidates are required to give their answers in their own words as far as practicable.
The figures in the margin indicate full marks.

Group "A"

Brief Answer Questions [10×2=20]
Attempt ALL questions.

1. State any two principle objectives of classification.
2. If mean = 25, mode = 28 and standard deviation = 5, find coefficient of skaewness.
3. If the third quartile and median are 30 and 22 respectively. Find the first quartile, assuming the distribution to be symmetrical.
4. If the quartiles coefficient of skewness is 0.6, quartile deviation is 5 and the third quartile is 28, find the median of the distribution.
5. Given the following Regression equations,
   $4X - 5Y + 33 = 0$; $20X - 9Y - 107 = 0$.
   Find the mean values of X and Y.
6. Evaluate $|A| = \begin{vmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{vmatrix}$
7. A card is drawn at random from a pack of cards, what is the probability of getting (a) a black card and (b) a king.
8. Find the simple aggregative price index number from the following data of 2015 taking 2014 as base year when current year quantity is taken as weight.

Commodities	2014 Price	2015 Price
A	5	8
B	4	6
C	10	12
D	7	5

(1)

9. Find the transpose of matrix A where $A = \begin{vmatrix} 1 & -2 \\ 4 & 3 \end{vmatrix}$.
10. The year of origin of the following trend line equation of production (in tonne's) is 2017.
    $y = 40 + 1.5x$. Estimate the production for the year 2033.

Group "B"

Descriptive Answer Questions [5×10=50]
Attempt any FIVE questions.

11. (i) The coefficient of rank correlation of marks obtained by 10 students, in Statistics and Account was found to be 0.5. It was later discovered that the difference in ranks in the two subjects obtained by one student was wrongly taken as 3 instead of 7. Find the correct coefficient of rank correlation.

    (ii) An analysis of the monthly wages paid to workers in the firm A and B belonging to the same industry given the following results.

	Firm A	Firm B
No. of workers	500	600
Average monthly wage (Rs).	480	475
Variance of distribution of wage (Rs).	400	625

    (a) Which firm pays larger wage bill?

    (b) In which firm is there greater variability in individual wages?

12. Calculate percentile coefficient of kurtosis for the following data:

Expenditure (Rs. '00)	10-19	20-29	30-39	40-49	50-59	60-69	70-79
No. of Families	35	32	45	58	43	17	10

(2) P.T.O.

13. The following table gives information on ages and cholesterol levels for a random sample of 10 men. Develop the regression line of cholesterol level on age.

Age	58	69	43	39	63	52	47	31	74	36
Cholesterol level	189	235	193	177	154	191	213	165	198	181

Predict the cholesterol level of a 60 - year -old man.

14. An inquiry into the budget of middle class families in a certain city gave the following information.

Expenses	Food	Fuel	Clothing	Rent	Miscellaneous
	35%	10%	20%	15%	20%
price in 2015	145	23	65	30	40
Price in 2016	150	25	75	30	45

What is the cost of living index number of 2016 as compared with that 2015. If an employee's salary of Rs. 20,000 per month is raised to Rs. 21,000 in 2016, is it adequate? If not, what should be the increment in salary in 2016?

15. Solve the following problem graphically:

Minimize the cost $Z = Rs.\ 20x + Rs.30y$

Subject to constraints: $3x + 5y \geq 45$

$2x + y \geq 20$

and $x, y \geq 0$ non -negative condition

16. Solve the following equations by using matrix or determent method

$3x+2y+5z = 10$

$2x - 3y + 7z = 9$

$x + y + z = 5$

Group "C"

Analytical Answer Questions [2×15=30]
Attempt any TWO questions.

17. The manager of Flower shop promises its customers delivery within four hours on all flower orders. All flowers are purchased on the previous day and delivered to parker by 8.0 AM in the next morning. The daily demand for roses is as follows:

Dozens of roses	70	80	90	100
Probability	0.1	0.2	0.4	0.3

The manager purchase roses for Rs. 10 per dozen and sells them for Rs. 30. All unsold roses are donated to a local hospital. Construct the pay-off table. Also, find : EMV, EPPI and EVPI.

18. Below are given the annual production of sugar (in thousand tons) of a factory

Year	2011	2012	2013	2014	2015	2016	2017
Production	77	88	94	85	91	98	90

i. Fit a straight by the method of least square
ii. Obtain the trend values
iii. Plot the given figures on a graph and show the trend line
iv. What is the monthly increase in production?
v. Estimate production of sugar for the year 2020.

19. Construct a frequency table for the following data regarding annual profit, in lakhs of rupees in 50 firms taking 25 - 34, 35 - 44 etc. as class intervals.

28	35	61	29	36	48	59	67	69	50
48	40	49	42	41	37	51	62	63	33
31	32	35	40	38	39	60	51	54	56
69	46	42	38	61	59	58	44	39	57
38	44	45	45	47	38	44	47	47	64

i. Find the number of firms having profit between Rs. 37 lakhs and Rs. 58 lakhs.
ii. Profit above which 10% of the firm will have their profits.
iii. Middle 50% profit group.

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Solutions:

Q.N 1

Here are **two principal objectives of classification**:

1. **To Simplify and Organize Data**
   Classification helps to group similar items together, making complex data easier to understand and analyze.
2. **To Enable Comparison and Analysis**
   By classifying data into categories, it becomes easier to compare different groups and make meaningful conclusions.

Q.N 2 solution

Given, mean ($\bar{x}$) = 25

Mode (Mo) = 28

standard deviation (S.D) = 5

coefficient of skewness = ?

Now,

$$Sk(kP) = \frac{\bar{x} - Mo}{\sigma} = \frac{25-28}{5} = -0.5$$

$\therefore$ since Sk (kP) = -0.5 < 0, Negative skewed.

Q.N.3 Given.

Third quarter (Q_3) = 30

Meadia (Md) = 22

first quarter (Q_1) = ?

Assuming the distribution to be symmetrical.

$$Sk(B) = 0$$

$$\frac{Q_3 + Q_1 - 2Md}{Q_3 - Q_1} = 0$$

or, $30 + Q_1 - 2 \times 22 = 0$

or $30 + Q_1 - 44 = 0$

or $-14 + Q_1 = 0$

or $Q_1 = 14$

$\therefore$ first quarter (Q_1) = 14 Ans

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How to pass Business Statistics in BBS 1st Year: Easy methods

CHAPTER

1. Introduction – 2 Marks

2. Classification and Presentation of Data – 2 th

3. Measures of Central Tendency – 2,10 or 15

4. Measures of Dispersion – 2,10 or 15

5. Skewness, Kurtosis, and Moments – 10,15 alternative

6. Simple Correlation and Regression Analysis – 15 fix

7. Analysis of Time Series - 10

8. Index Numbers - 10

9. Probability - 5

10. Sampling and Estimation – theory 2

11. Quantitative Analysis- 2,10 or 15

12. Linear Programming Problem - 10

13. Determinant - 5

14. Matrix – 10

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Main pass easy chapters are:

3. Measures of Central Tendency – 2,10 or 15

4. Measures of Dispersion – 2,10 or 15

6. Simple Correlation and Regression Analysis – 15 fix

8. Index Numbers - 10

12. Linear Programming Problem - 10

13. Determinant - 5

14. Matrix – 10

7. Analysis of Time Series - 10

3. If the third quartile and median are 30 and 22 respectively. Find the first quartile, assuming the distribution to be symmetrical.
4. If the quartiles coefficient of skewness is 0.6, quartile deviation is 5 and the third quartile is 28, find the median of the distribution.
5. Given the following Regression equations,
   $4X - 5Y + 33 = 0$; $20X - 9Y - 107 = 0$.
   Find the mean values of X and Y.
6. Evaluate $|A| = \begin{vmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{vmatrix}$
7. A card is drawn at random from a pack of cards, what is the probability of getting (a) a black card and (b) a king.
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Commodities	2014	2015
	Price	Price
A	5	8
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C	10	12
D	7	5

$P_{01} = \frac{\Sigma P_1}{\Sigma P_0} \times 100$

Q.N.4 Sol:

Quartile coefficient of skewness, $Sk(B) = 0.6$

Quartile Deviation $(Q.D) = 5$

Median $(Md) = ?$ / Third quartile $(Q_3) = 28$

Now,

$$Q.D = \frac{Q_3 - Q_1}{2}$$

$$\text{or, } 5 = \frac{28 - Q_1}{2}$$

$$\text{or } 10 = 28 - Q_1$$

$$\text{or } 10 - 28 = -Q$$

$$\therefore 18 = Q_1$$

$$\therefore Q_1 = 18$$

$$Sk(B) = \frac{Q_3 + Q_1 - 2Md}{Q_3 - Q_1}$$

$$\text{or, } 0.6 = \frac{28 + 18 - 2 \times Md}{28 - 18}$$

$$\text{or } 0.6 = \frac{46 - 2Md}{10}$$

$$\text{or } 6 = 46 - 2Md$$

$$\text{or } 6 - 46 = -2Md$$

$$\text{or } -40 = -2Md$$

$$\therefore Md = 20 \text{ Ans//}$$

Q.N.5 Sol:

Given,

Regression equations are:

$4x - 5y + 33 = 0$ ——— eq: (i)

$20x - 9y - 107 = 0$ ——— eq: (ii)

For the regression equation $\bar{x}, \bar{y}$

$$4\bar{x} - 5\bar{y} + 33 = 0 \quad]\times 5$$

$$20\bar{x} - 9\bar{y} - 107 = 0$$

Then,

$$+20\bar{x} - 25\bar{y} + 165 = 0$$

$$-20\bar{x} + 9\bar{y} + 107 = 0$$

$$-16\bar{y} + 272 = 0$$

$$\text{or } 16\bar{y} = 272$$

$$\therefore \bar{y} = 272/16$$

$$\therefore \bar{y} = 17$$

putting value of $\bar{y}$ in eq: (i)

$$4\bar{x} - 5\bar{y} + 33 = 0$$

$$\text{or } 4\bar{x} - 5 \times 17 + 33 = 0$$

$$\text{or } 4\bar{x} = 52$$

$$\therefore \bar{x} = 13 \text{ Ans//}$$

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Q.N.6 Given,

$$|A| = \begin{vmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{vmatrix}$$

$$= 1\begin{vmatrix} 5 & 6 \\ 8 & 9 \end{vmatrix} - 2\begin{vmatrix} 4 & 6 \\ 7 & 9 \end{vmatrix} + 3\begin{vmatrix} 4 & 5 \\ 7 & 8 \end{vmatrix}$$

$$= 1(45-48) - 2(36-42) + 3(32-35)$$

$$= -3 + 12 - 9$$

$$= |A| = 0 \quad \text{Ans}$$

Q.N.7

Sol:

Exhaustive cases, Total no. of card (n) = 52 cards

(a) Probability to getting black card (m) = 13 + 13 => 26 cards

$$\therefore \text{Pro. of black card} = \frac{m}{n} = \frac{26}{52} = \frac{1}{2}$$

(b) Probability to getting a king card (m) = 4 cards (kings)

$$\text{Pro. of king card} = \frac{m}{n} = \frac{4}{52}$$

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9. Find the transpose of matrix A where $A = \begin{vmatrix} 1 & -2 \\ 4 & 3 \end{vmatrix}$.

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$y = 40 + 1.5x$. Estimate the production for the year 2033.

Group "B"

Descriptive Answer Questions [5×10=50]
Attempt any FIVE questions.

11. (i) The coefficient of rank correlation of marks obtained by 10 students, in Statistics and Account was found to be 0.5. It was later discovered that the difference in ranks in the two subjects obtained by one student was wrongly taken as 3 instead of 7. Find the correct coefficient of rank correlation.

(ii) An analysis of the monthly wages paid to workers in the firm A and B belonging to the same industry given the following results.

	Firm A	Firm B
No. of workers	500	600
Average monthly wage (Rs).	480	475
Variance of distribution of wage (Rs).	400	625

(a) Which firm pays larger wage bill?

(b) In which firm is there greater variability in individual wages?

Co.11

Given.

$A = \begin{bmatrix} 1 & -2 \\ 4 & 3 \end{bmatrix}$ Transpose matrix

$A^T = \begin{bmatrix} 1 & 4 \\ -2 & 3 \end{bmatrix}$ Ans

Q.N.10 Given, Trend line equation

$Y = 40 + 1.5X$ → origin 2017

$X = t - 2017$

$Y = 40 + 1.5 \times 16$

$= 64$ tonnes//

for the year 2033.

$t = 2033$

$X = 2033 - 2017$

$= 16$

Group - B

Q.N.11 (i)

Given,

Rank correlation Coefficient (r) = 0.5

No. of student (N) = 19

I wrongly take number = 3 minus-

Correct number = 7 plus

To find Correct rank Correlation = ?

Now,

Simple spearman's Rank Correlation Coefficient

$$R = 1 - \frac{6\Sigma d^2}{N(N^2-1)}$$

or. $0.5 = 1 - \frac{6\Sigma d^2}{10 \times 99}$

$\Sigma d^2 = 82.5$ incorrect

Correct $\Sigma d^2 = 82.5 + 7^2 - 3^2$

$= 122.5$

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Correct Rank correlation Coefficient is:

Correct $R = 1 - \frac{6\Sigma d^2}{N(N^2-1)}$

$= 1 - \frac{6 \times 122.5}{990}$

$= 0.2576$ Ans.

(ii) a) which firm pays large wage bill = ?

A

$\bar{X}_1 = \frac{\Sigma X_1}{N_1}$

$\therefore 480 = \frac{\Sigma X_1}{500}$

$\therefore \Sigma X_1 = Rs.240,000$

B

$\bar{X}_2 = \frac{\Sigma X_2}{N_2}$

$\therefore 475 = \frac{\Sigma X_2}{600}$

$\therefore \Sigma X_2 = Rs.285,000$

$\therefore$ Firm B pays large Bills.

b) $C.V_{1(A)} = \frac{\sigma_1}{\bar{X}_1}$

$= \frac{\sqrt{400}}{480}$

$= 4.17\%$

$C.V_{2(B)} = \frac{\sigma_2}{\bar{X}_2}$

$= \frac{\sqrt{625}}{475}$

$= 5.26\%$

Since $C.V_B > C.V_A$. B has greater variability in individual wgs.

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12. Calculate percentile coefficient of kurtosis for the following data:

Expenditure (Rs. '00)	10-19	20-29	30-39	40-49	50-59	60-69	70-79
No. of Families	35	32	45	58	43	17	10

(2) P.T.O.

sol^n

Formula for whole:

Percentile coefficient of kurtosis:

$$K = \frac{Q_3 - Q_1}{2(P_{90} - P_{10})}$$

Box-and-whisker plot / Five-summary:

Small, large, Q_1, Q_2, Q_3

x_s Q_1 Q_2 Q_3 x_L

Q_3 - 1st step

class $Q_3 = \left(3\frac{N}{4}\right)^{th}$ item

2nd step:

$$Q_3 = l + \frac{3\frac{N}{4} - cf}{f} \times h$$

Q_1 = 1st step:

class $Q_1 = \left(\frac{N}{4}\right)^{th}$ item

2nd step:

$$Q_1 = l + \frac{\frac{N}{4} - cf}{f} \times h$$

P_{90} = 1st step:

class $P_{90} = \left(\frac{90}{100}N\right)^{th}$ item

2nd step:

$$P_{90} = l + \frac{\frac{90}{100}N - cf}{f} \times h$$

P_{10} = 1st step:

Same as P_{90}

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$$K = \frac{Q_3 - Q_1}{2(P_{90} - P_{10})}$$

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Expenditure	x	f	c.f
10 - 19	9.5 - 19.5	35	35
19 - 29	18.5 - 29.5	32	67
30 - 39	29.5 - 39.5	45	112
40 - 49	39.5 - 49.5	58	170
50 - 59	49.5 - 59.5	43	213
60 - 69	59.5 - 69.5	17	230
70 - 79	69.5 - 79.5	10	240
		$\Sigma f = N = 240$	

Q_3 = 3rd step:

class interval $Q_3 = \left(\frac{3N}{4}\right)^{th}$ item

$= \left(\frac{3 \times 240}{4}\right)^{th}$ item

$= 180^{th}$ item

$\therefore$ class interval = 49.5 - 59.5

Actual $Q_3 = l + \frac{\frac{3N}{4} - c.f}{f} \times h$

$= 49.5 + \frac{180 - 170}{43} \times 10$

$= Rs.\ 51.8256$ (in 00)

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13. The following table gives information on ages and cholesterol levels for a random sample of 10 men. Develop the regression line of cholesterol level on age.

Age X	58	69	43	39	63	52	47	31	74	36
Cholesterol level Y	189	235	193	177	154	191	213	165	198	181

Predict the cholesterol level of a 60 - year -old man.

The regression eq^n line of cholestrol level (Y) on age (x) is

$$Y - \bar{Y} = b_{yx}(x - \bar{x})$$

Sol^n let Age $= x$, cholesterol level $= y$

X	Y	x^2	XY
58	189	3364	10,962
69	235	4761	16,215
43	193	1849	8,299
39	177	1521	6903
63	154	3969	9702
52	191	2704	9932
47	213	2209	10,011
31	165	961	5115
74	198	5476	14652
36	181	1296	6516
$\Sigma X = 512$	$\Sigma Y = 1896$	$\Sigma x^2 = 28,110$	$\Sigma XY = 98,307$

we know that

$$\frac{\Sigma X}{N} = \frac{512}{10} = 51.2$$

$$\frac{\Sigma Y}{N} = \frac{1896}{10} = 189.6$$

$$b_{yx} = \frac{N\Sigma XY - \Sigma X \cdot \Sigma Y}{N\Sigma x^2 - (\Sigma X)^2}$$

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The regression equation cholestrol level y on age x

$$b_{yx} = \frac{N\Sigma xy - \Sigma x \cdot \Sigma y}{N\Sigma x^2 - (\Sigma x)^2}$$

$$= \frac{10 \times 98307 - 512 \times 1896}{10 \times 28110 - (512)^2}$$

$$= \frac{12318}{18956}$$

$$= 0.65$$

$$\therefore b_{yx} = 0.65$$

The regression line of Y on x is

$$y - \bar{y} = b_{yx}(x - \bar{x})$$

$$\Rightarrow y - 189.6 = 0.65(x - 51.2)$$

$$\Rightarrow y - 189.6 = 0.65x - 33.28$$

$$\Rightarrow y = 0.65x - 33.28 + 189.6$$

$$\Rightarrow y = 0.65x + 156.32$$

$$\therefore \hat{y} = 156.32 + 0.65x$$

Prediction of cholestrol level. $x = 60$

$$\hat{y} = 156.32 + 0.65 \times 60$$

$$= 195.32 \text{ Ans//}$$

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14. An inquiry into the budget of middle class families in a certain city gave the following information.

Expenses	Food	Fuel	Clothing	Rent	Miscellaneous
	35%	10%	20%	15%	20% ← weight
price in 2015	145	23	65	30	40
Price in 2016	150	25	75	30	45

What is the cost of living index number of 2016 as compared with that 2015. If an employee's salary of Rs. 20,000 per month is raised to Rs. 21,000 in 2016, is it adequate? If not, what should be the increment in salary in 2016?

$$C.L.I = \frac{\Sigma WP}{\Sigma W} \qquad P = \frac{P_1}{P_0} \times 100$$

Items	Expenses(W)	P_0	P_1	$P = \frac{P_1}{P_0} \times 100$	WP
Food	35%	145	150	103.45	3120.75
fuel	10%	23	25	108.70	1087
Clothing	20%	65	75	115.38	2307.60
Rent	15%	30	30	100	1500
misc.	20%	40	45	112.50	2250
	$\Sigma W = 100$				$\Sigma WP = 10,765.35$

cost of living Index (C.L.I.N) $= \frac{\Sigma WP}{\Sigma W}$

$= \frac{10,765.35}{100}$

$= 107.6535$

This indicated that cost of living index 2016 increased $(107.6535 - 100)\% = 7.65\%$ as compared to 2015.

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Again,

Salary of Employee in 2015 = Rs. 20,000

Required salary of the employee is 2016 - Same living standard as that of.

2015 = 20,000 + 7.65% of 20,000

= Rs. 21,530

But Actual salary of employee in 2016 = Rs. 21,000

Since, Actual Salary is less than the required salary in 2016, increment in salary is not adequate.

Required increment in salary in 2016.

= 21530 - 21,000

= Rs. 530.

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15. Solve the following problem graphically:

Minimize the cost $Z = \text{Rs. } 20x + \text{Rs.}30y$

Subject to constraints: $3x + 5y \geq 45$

$2x + y \geq 20$

and $x, y \geq 0$ non -negative condition

Sol^n

$Z = 20x + 30y$

subject to constraints: $3x + 5y \geq 45$

$2x + y \geq 20$

$x \geq 0, y \geq 0$

$3x + 5y = 45$ — i eq^n

$2x + y = 20$ — ii eq^n

$x = 0 \quad y = 0$ — origin

$3x + 0 = 45$

$3x = 45$

$x = 45/3$

$x = 15$

$5y = 45$

$y = 9$

For eq^n ① The boundary line passing through the point

x	0	15
y	9	0

The line passing through the point (0, 9) (15, 0)

Testing point (0, 0)

$3x + 5y \geq 45$

$\Rightarrow 3 \times 0 + 5 \times 0 \geq 45$

$\Rightarrow 0 \geq 45$ (false)

$x \geq 0$

$x = 0$ which is the equation of y-axis

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$y \geq 0$

$y = 0$ which is equation of x-axis

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and x, y ≥ 0 non -negative condition

16. Solve the following equations by using matrix or determent method

$3x+2y+5z=10$

$2x-3y+7z=9$

$x+y+z=5$

Group "C"

coff. x	coff. y	coff z	Constant term
3	2	5	10
2	-3	7	9
1	1	1	5

$$D = \begin{vmatrix} 3 & 2 & 5 \\ 2 & -3 & 7 \\ 1 & 1 & 1 \end{vmatrix}$$

$$= 3\begin{vmatrix} -3 & 7 \\ 1 & 1 \end{vmatrix} - 2\begin{vmatrix} 2 & 7 \\ 1 & 1 \end{vmatrix} + 5\begin{vmatrix} 2 & -3 \\ 1 & 1 \end{vmatrix}$$

$$x = D_1 = \begin{vmatrix} 10 & 2 & 5 \\ 9 & -3 & 7 \\ 5 & 1 & 1 \end{vmatrix}$$

$$y = D_2 = \begin{vmatrix} 3 & 10 & 5 \\ 2 & 9 & 7 \\ 1 & 5 & 1 \end{vmatrix}$$

$$z = D_3 = \begin{vmatrix} 3 & 2 & 10 \\ 2 & -3 & 9 \\ 1 & 1 & 5 \end{vmatrix}$$

$$x = \frac{D_1}{D}$$

$$y = \frac{D_2}{D}$$

$$z = \frac{D_3}{D}$$

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D = determinant formed by coefficient.

Expanding

$$3\begin{vmatrix} -3 & 7 \\ 1 & 1 \end{vmatrix} - 2\begin{vmatrix} 2 & 7 \\ 1 & 1 \end{vmatrix} + 5\begin{vmatrix} 2 & -3 \\ 1 & 1 \end{vmatrix}$$

$$= 3(-3-7) - 2(2-7) + 5(2+3)$$

$$= -30 + 10 + 25$$

$$= 5$$

$$D_1 = 10\begin{vmatrix} -3 & 7 \\ 1 & 1 \end{vmatrix} - 2\begin{vmatrix} 9 & 7 \\ 5 & 1 \end{vmatrix} + 5\begin{vmatrix} 9 & -3 \\ 5 & 1 \end{vmatrix}$$

$$= 10(-3-7) - 2(9-35) + 5(9+15)$$

$$= 72$$

$D_2 = -23$

$D_3 = -24$

$$x = \frac{D_1}{D} = \frac{72}{5}$$

$$y = \frac{D_2}{D} = \frac{-23}{5}$$

$$z = \frac{D_3}{D} = \frac{-24}{5}$$

$X = A^{-1}B$

$A^{-1} = \frac{1}{|A|}$ adjoint of A

$x + y + z = 5$

$\frac{72}{5} + \frac{-23}{5} + \frac{-24}{5} = 5$

$\frac{72-23-24}{5} = 5$

$\frac{25}{5} = 5$

$5 = 5$ proved

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18. Below are given the annual production of sugar (in thousand tons) of a factory

Year	2011	2012	2013	2014	2015	2016	2017
Production	77	88	94	85	91	98	90

i. Fit a straight by the method of least square
ii. Obtain the trend values
iii. Plot the given figures on a graph and show the trend line
iv. What is the monthly increase in production?
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19. Construct a frequency table for the following data regarding annual profit, in lakhs of rupees in 50 firms taking 25 - 34, 35 - 44 etc. as class intervals.

28	35	61	29	36	48	59	67	69	50
48	40	49	42	41	37	51	62	63	33
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69	46	42	38	61	59	58	44	39	57
38	44	45	45	47	38	44	47	47	64

i. Find the number of firms having profit between Rs. 37 lakhs and Rs. 58 lakhs.
ii. Profit above which 10% of the firm will have their profits.
iii. Middle 50% profit group.

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