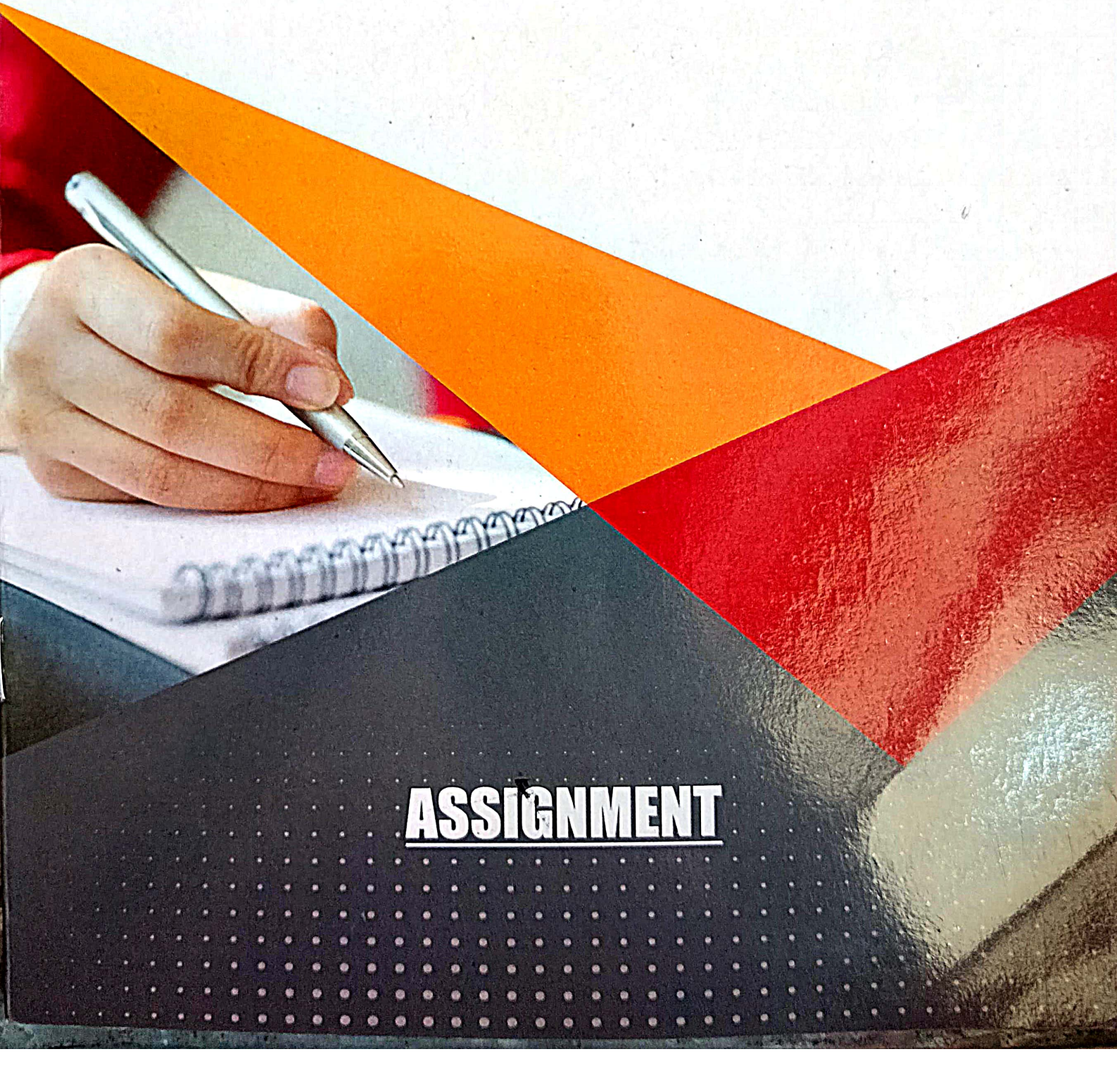




R.K.

GROUP OF COLLEGE

Behind Kalwar Police Station, Kalwar, Jaipur (Raj.)



ASSIGNMENT

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B.A. / B.Sc. / B.Com.

ASSIGNMENT WORK / MIDTERM TEST

Session 20 24... - 20 25...

Semester IInd.....

Name of Student Rimku Kumawat Father's Name Mr. Bhamwar Lal

Roll No. Enrollment No.

Year 2024-2025 Semester IInd Semester

Ques 1. निम्न समानों से समांतर माध्य, माध्यिका, बहुलक ज्ञात कीजिए?

Marks Below	80	70	60	50	40	30	20	10
No. of Students	240	190	125	95	75	60	40	20

Ques 2. निम्न समानों से विचलन गुणांक तथा प्रमाप विचलन ज्ञात कीजिए?

Temp. 'C'	-40 to -30	-30 to -20	-20 to -10	-10 to 0	0 to 10	10 to 20	20 to 30
No. of Days	10	28	30	42	65	180	10

Ques 3. निम्न समानों से प्रमाप विचलन तथा उनका गुणांक ज्ञात कीजिए?

X	5	15	25	35	45	55	65	86
F	3	7	9	23	15	8	6	4

Ques 4. निम्न सूचना के आधार पर आयु व निरक्षरता के मध्य जोड़ संबंध डेटा नहीं;

आयु (वर्षों में)	10-20	20-30	30-40	40-50	50-60	60-70	70-80
कुल जनसंख्या (100)	1200	1000	800	500	250	150	50
शिक्षित जनसंख्या (100) में	1100	925	740	470	230	140	45

Ques 5. Only the following results are available from the records of a partially destroyed laboratory :-

Variance of $x = 25$ and Regression equations.

Find out :-

- (1) Mean values of x and y
- (2) The Coefficient of determination and Correlation.
- (3) Standard Deviation y .

Solution 1 :-Calculation of Mean, Mode & Median :-

Marks	f	cf	x	dx'	fdx'
70-80	50	50	75	4	200
60-70	65	115	65	3	195
50-60	30	145	55	2	60
40-50	20	165	45	1	20
30-40	15	180	35	0	0
20-30	20	200	25	-1	-20
10-20	20	220	15	-2	-40
0-10	20	240	5	-3	-60
Total	240	-	-	+4	355

Mean :-

$$\bar{X} = A + \frac{\sum fdx'}{N} \times i$$

$$\bar{X} = 35 + 14.79$$

$$\bar{X} = 35 + \frac{355}{240} \times 10$$

$$\bar{X} = \underline{49.79 \text{ marks}}$$

$$m = \frac{n}{2}^{\text{th}} \text{ item}$$

$$\bar{X} = 35 + \frac{3550}{240}$$

$$m = \frac{240}{2}^{\text{th}} \text{ item}$$

$$m = 120^{\text{th}} \text{ item}$$

Median :-

$$M = l_1 + \frac{i}{f} (m - cf)$$

$$M = 50 + \frac{10}{30} (120 - 115)$$

$$M = 50 + \frac{10}{30} (5)$$

$$M = 50 + \frac{50}{30}$$

$$M = 50 + 1.67$$

$$M = \underline{\underline{51.67 \text{ marks}}}$$

Mode :-

Mode is 65 by observation.

$$Z = l_1 + \frac{f_1 - f_0}{2f_1 - f_0 - f_2} \times i$$

$$Z = \frac{60 + 65 - 50}{2 \times 65 - 50 - 30} \times 10$$

$$Z = \frac{60 + 15}{130 - 80} \times 10$$

$$Z = \frac{60 + 150}{50}$$

$$Z = 60 + 3$$

$$Z = \underline{\underline{63 \text{ marks}}}$$

Mean = 49.79 marks.

Mode = 63 marks

Median = 51.67 marks.

Solution :-

Calculation of Standard Deviation and Coefficient of Variation :-

Temp. 'C'	f	x	dx'	d ² x'	fdx'	fd ² x'
-40 to -30	10	-35	-4	16	-40	160
-30 to -20	28	-25	-3	9	-84	252
-20 to -10	30	-15	-2	4	-60	120
-10 to 0	42	-5	-1	1	-42	42
0 to 10	65	+5	0	0	0	0
10 to 20	180	+15	1	1	180	180
20 to 30	10	+25	2	4	20	40
Total	365	-	-7	-	-26	794

$$\bar{X} = A + \frac{\sum f dx'}{N} \times i$$

$$\bar{X} = 5 - 0.71$$

$$\bar{X} = 5 + \frac{(-26)}{365} \times 10$$

$$\bar{X} = \underline{\underline{4.29 \text{ Temp.}}}$$

$$\bar{X} = 5 + \frac{(-260)}{365}$$

$$\bar{X} = 5 + (-0.71)$$

Calculation of Standard Deviation (σ) :-

$$\sigma = \frac{1}{N} \sqrt{\sum f d^2 x'^2 \cdot N - (\sum f d x')^2}$$

$$\sigma = \frac{10}{365} \sqrt{794 \times 365 - (-26)^2}$$

$$\sigma = \frac{10}{365} \sqrt{289810 - 676}$$

$$\sigma = \frac{10}{365} \sqrt{289134}$$

$$\sigma = \frac{10}{365} \times 537.712$$

$$\sigma = \frac{5377.12}{365}$$

$$\sigma = \underline{\underline{14.732}}$$

Calculation of Coefficient of Variation (C.V.) :-

$$C.V. = \frac{\sigma}{\bar{x}} \times 100$$

$$C.V. = \frac{14.732}{4.29} \times 100$$

$$C.V. = \frac{1473.2}{4.29}$$

$$C.V. = \underline{\underline{343.40}}$$

$$\bar{x} = 4.29 \text{ Temp.}$$

$$S.D. (\sigma) = 14.732$$

$$C.V. = 343.40$$

Solution 3 :-

Calculation of Standard Deviation and its Coefficient :-

X	f	dx	d ² x	fdx	fd ² x
5	3	-30	900	-90	2700
15	7	-20	400	-140	2800
25	9	-10	100	-90	900
35	23	0	0	0	0
45	15	10	100	150	1500
55	8	20	400	160	3200
65	6	30	900	180	5400
86	4	40	1600	160	6400
Total	75	-	-	330	22900

$$\bar{X} = A + \frac{\sum fdx}{N}$$

$$\bar{X} = 35 + \frac{330}{75}$$

$$\bar{X} = 35 + 4.4$$

$$\bar{X} = \underline{\underline{39.4}}$$

$$\sigma = \sqrt{\frac{\sum fd^2x}{N} - \left(\frac{\sum fdx}{N}\right)^2}$$

$$\sigma = \sqrt{\frac{22900}{75} - \left(\frac{330}{75}\right)^2}$$

$$\sigma = \sqrt{\frac{22900}{75} - \frac{108900}{5625}}$$

$$\sigma = \sqrt{305.33 - 19.36}$$

$$\sigma = \sqrt{285.97}$$

$$\sigma = \underline{\underline{16.91}}$$

Coefficient of Standard Deviation = $\frac{\sigma}{\bar{x}}$

$$C \text{ of } \sigma = \frac{16.91}{39.4}$$

$$C \text{ of } \sigma = \underline{\underline{0.43}}$$

$$\sigma = 16.91$$

$$C \text{ of } \sigma = 0.43$$

$$\bar{x} = 39.4$$

Solution 4 :-

Calculation of Coefficient of Correlation :-

Age in years	X	dx	d ² x	Y	dy	d ² y	dx dy
10 - 20	15	-20	400	83	23	529	-460
20 - 30	25	-10	100	75	15	225	-150
30 - 40	35	0	0	75	15	225	0
40 - 50	45	10	100	60	0	0	0
50 - 60	55	20	400	80	20	400	400
60 - 70	65	30	900	67	7	49	210
70 - 80	75	40	1600	100	40	1600	1600
Total	-	70	3500	-	120	3028	1600

$$r = \frac{\sum dx dy \cdot N - (\sum dx) (\sum dy)}{\sqrt{[\sum d^2 x \cdot N - (\sum dx)^2] [\sum d^2 y \cdot N - (\sum dy)^2]}}$$

$$r = \frac{1600 \times 7 - (70)(120)}{\sqrt{[3500 \times 7 - (70)^2] [3028 \times 7 - (120)^2]}}$$

$$r = \frac{11200 - 8400}{\sqrt{(24500 - 4900)(21196 - 14400)}}$$

$$r = \frac{2800}{\sqrt{19600 \times 6796}}$$

$$x_1 = \frac{2800}{11541.30}$$

$$x_1 = \underline{\underline{+0.24}}$$

(Calculation of Literate Population (LY) %:-

$$\frac{100}{1200} \times 1000 = 83.3$$

$$\frac{75}{1000} \times 1000 = 75$$

$$\frac{60}{800} \times 1000 = 75$$

$$\frac{30}{500} \times 1000 = 60$$

$$\frac{20}{250} \times 1000 = 80$$

$$\frac{10}{150} \times 1000 = 66.7$$

$$\frac{5}{50} \times 1000 = 100$$

Solution :-(11)

(i) $3x + 2y = 26 = 0$

(ii) $6x + y = 31 = 0$

$3x + 2y = 26 \rightarrow \text{eq. (1)}$

$6x + y = 31 \rightarrow \text{eq. (2)}$

eq. (2) को 2 से गुणा करने पर
 eq. (2) से Less करने पर :-

$3x + 2y = 26$

$12x + 2y = 62$

$\neq 9x = \neq 36$

$9x = 36$

$x = \frac{36}{9}$

$x = \underline{\underline{4}}$

$x = 4$ को eq. ① में Put करने पर :-

$$3(4) + 2y = 26$$

$$12 + 2y = 26$$

$$2y = 26 - 12$$

$$2y = 14$$

$$y = \frac{14}{2}$$

$$y = \underline{\underline{7}}$$

y on x :-

$$3x + 2y = 26$$

$$2y = -3x + 26$$

$$y = \frac{-3x + 26}{2}$$

$$y = -1.5x + 13$$

$$\text{Slope} = \underline{\underline{-1.5}}$$

x on y :-

$$6x + y - 31 = 0$$

$$6x + y = 31$$

$$6x = -y + 31$$

$$x = \frac{-y + 31}{6}$$

$$6$$

$$x = -0.167y + 5.17$$

$$b_{xy} = -0.167$$

(2)

(i) Coefficient of Determination :-

$$r^2 = b_{yx} \times b_{xy}$$

$$r^2 = 1.5 \times -0.167$$

$$r^2 = \underline{\underline{-0.25}}$$

(ii) Coefficient of Correlation :-

$$r = \sqrt{b_{yx} \times b_{xy}}$$

$$r = \sqrt{1.5 \times -0.167}$$

$$r = \sqrt{-0.25}$$

$$r = \underline{\underline{-0.5}}$$

(3) Calculation of σ_y

$$\sigma_y = b_{xy}$$

$$b_{xy} = r \cdot \sigma_x$$

$$-0.167 = \frac{-0.5 \times \sqrt{25}}{\sigma_y} \Rightarrow \sigma_y = 14.97$$

$$-0.167 = \frac{-0.5 \times 5}{\sigma_y}$$

$$-0.167 = \frac{-2.5}{\sigma_y} \Rightarrow \sigma_y = 14.97$$

$$\sigma_y = 14.97$$

$$\sigma_y = 15$$

$$\sigma_y = 15$$

$$\sigma_y = 15$$

Solution 6 :-Calculation of Quantiles etc.

Marks	f	cf
0 - 10	4	4
10 - 20	12	16
20 - 30	24	40
30 - 40	36	76
40 - 50	20	96
50 - 60	16	112
60 - 70	8	120
70 - 80	5	125
Total	125	

Quantile :-

$$Q_1 = \frac{n}{4}^{\text{th}} \text{ item}$$

$$Q_1 = 20 + \frac{10}{24} (15.25)$$

$$Q_1 = \frac{125}{4}^{\text{th}} \text{ item}$$

$$Q_1 = 20 + \frac{152.5}{24}$$

$$Q_1 = 31.25^{\text{th}} \text{ item}$$

$$Q_1 = I_1 + \frac{i}{f} (q_1 - cf)$$

$$Q_1 = 20 + 6.35$$

$$Q_1 = 20 + \frac{10}{24} (31.25 - 16)$$

$$Q_1 = 26.35 \text{ marks}$$

$q_3 = 3 \left(\frac{n}{4} \right)^{\text{th}} \text{ item}$	$Q_3 = 40 + \frac{10}{20} (93.75 - 76)$
$q_3 = 3 \left(12.5 \right)^{\text{th}} \text{ item}$	$Q_3 = 40 + \frac{10}{20} (17.75)$
$q_3 = 3 (31.25)^{\text{th}} \text{ item}$	$Q_3 = 40 + \frac{177.5}{20}$
$q_3 = 93.75^{\text{th}} \text{ item}$	$Q_3 = 40 + 8.875$
$Q_3 = l_1 + \frac{0}{f} (q_3 - cf)$	$Q_3 = 48.88 \text{ marks}$

Quintile :-

$q_{m2} = 2 \left(\frac{n}{5} \right)^{\text{th}} \text{ item}$	$Q_{m2} = 30 + \frac{10}{36} (50 - 40)$
$q_{m2} = 2 \left(12.5 \right)^{\text{th}} \text{ item}$	$Q_{m2} = 30 + \frac{10}{36} (10)$
$q_{m2} = 2 (25)^{\text{th}} \text{ item}$	$Q_{m2} = 30 + \frac{100}{36}$
$q_{m2} = 50^{\text{th}} \text{ item}$	$Q_{m2} = 30 + 2.78$
$Q_{m2} = l_1 + \frac{0}{f} (q_{m2} - cf)$	$Q_{m2} = 32.78 \text{ marks}$

Octile :-

Teacher's Signature.....

$$Q_3 = 3 \left(\frac{n}{8} \right)^{\text{th}} \text{ item}$$

$$Q_3 = 3 \left(\frac{125}{8} \right)^{\text{th}} \text{ item}$$

$$Q_3 = 3 (15.625)^{\text{th}} \text{ item}$$

$$Q_3 = 46.88^{\text{th}} \text{ item}$$

$$Q_3 = l_1 + \frac{f}{f} (Q_3 - cf)$$

$$Q_3 = 30 + \frac{10}{36} (46.88 - 40)$$

$$Q_3 = 30 + \frac{10}{36} (6.88)$$

$$Q_3 = 30 + \frac{68.8}{36}$$

$$Q_3 = 30 + 1.91$$

$$Q_3 = 31.91 \text{ marks}$$

Decile :-

$$d_9 = 9 \left(\frac{n}{10} \right)^{\text{th}} \text{ item}$$

$$d_9 = 9 \left(\frac{125}{10} \right)^{\text{th}} \text{ item}$$

$$d_9 = 9 (12.5)^{\text{th}} \text{ item}$$

$$dg = 112.5^{\text{th}} \text{ item}$$

$$Dg = I_1 + \frac{f}{f} (dg - cf)$$

$$Dg = 60 + \frac{10}{8} (112.5 - 112)$$

$$Dg = 60 + \frac{10}{8} (0.5)$$

$$Dg = 60 + \frac{5}{8}$$

$$Dg = 60 + 0.63$$

$$Dg = 60.63 \text{ marks.}$$

Percentile :-

$$P_{45} = 45 \left(\frac{n}{100} \right)^{\text{th}} \text{ item}$$

$$P_{45} = 30 + \frac{10}{36} (56.25 - 40)$$

$$P_{45} = 45 \left(\frac{125}{100} \right)^{\text{th}} \text{ item}$$

$$P_{45} = 30 + \frac{10}{36} (16.25)$$

$$P_{45} = 45 (1.25)^{\text{th}} \text{ item}$$

$$P_{45} = 30 + \frac{16.25}{36}$$

$$P_{45} = 56.25^{\text{th}} \text{ item}$$

$$P_{45} = 30 + 4.51$$

$$P_{45} = I_1 + \frac{f}{f} (P_{45} - cf)$$

$$P_{45} = 34.51 \text{ marks}$$