Name : UDHAYARAJAN J.
Class : MCA A - I
Sub : Computational Statics.
Rollno : 2202561.
Date : 28-11-2025
Type : Unit - 3 Assignment

Q1) Calculate the two regression equations of x on y and y on x from the data given below, taking deviation from actual mean of x and y.

Price	10	12	13	12	16	15
Amount	40	38	43	45	37	48

Sol:

Calculate the mean of x and y.

$$\bar{x} = \frac{\Sigma x}{n} = \frac{10+12+13+12+16+15}{6} = \frac{78}{6} = 13$$

$$\bar{y} = \frac{\Sigma y}{n} = \frac{40+38+43+45+37+48}{6} = \frac{251}{6} = 41.833$$

So the mean of x is 13 and y is 41.

calculate the deviation from means.

$$dx = x - \bar{x} \; ; \; dy = y - \bar{y}.$$

x	$dx = x - 13$	y	$dy = Y - 41.833$	$dx * dy$	dx^2	dy^2
10	3	40	-1.833	5.499	9	3.359
12	-1	38	-3.833	3.833	1	14.691
13	0	43	1.167	0	0	1.361
12	-1	45	3.167	-3.167	1	10.029
16	3	37	-4.833	-14.499	9	23.357
15	2	48	6.167	12.334	4	38.035
				4	24	90.832

Page No:
Date.

Regression of coefficient:

a) Regression of Y on X.

$$b_{yx} = \frac{\Sigma dx\,dy}{\Sigma dx^2} = \frac{4}{24} = 0.1666 \text{ //}$$

$$\Rightarrow a_{yx} = \bar{y} - b_{yx}\bar{x}$$

$$\Rightarrow a_{yx} = 41.833 - 0.1667(13)$$

$$= 41.833 - 2.167$$

$$= 39.666 \text{ //}$$

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

$$y - 41.833 = 0.1667(x - 13)$$

$$y = 0.1667(x - 13) + 41.833$$

$$y = 0.1667x - 2.167 + 41.833$$

$$y = 0.1667x + 39.666 \text{ //}$$

b) Regression of X on Y.

$$b_{xy} = \frac{\Sigma dx\,dy}{\Sigma y^2} = \frac{4}{90.832} = 0.044 \text{ //}$$

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

$$x - 13 = 0.044(y - 41.833)$$

$$x = 0.044(y - 41.833) + 13$$

$$x = 0.044y - 1.840 + 13$$

$$x = 0.044y + 11.159 \text{ //}$$

Q2) Obtain regression equation of y on x and estimate y when x = 55 from the following

x	35	40	50	38	60	65	50
y	50	38	60	55	70	60	48

Sol:

Calculate the means.

$$\bar{x} = \frac{35 + 40 + 50 + 38 + 60 + 65 + 50}{7} = \frac{338}{7}$$

$$= 48.29 //$$

$$\bar{y} = \frac{50 + 38 + 60 + 55 + 70 + 60 + 48}{7} = \frac{381}{7} = 54.43 //$$

Compute deviations from mean.

$$dx = x - \bar{x} \; ; \; dy = y - \bar{y}$$

x	dx	y	dy	dx*dy	dx^2
35	-13.29	50	-4.43	58.86	176.72
40	-8.29	38	-16.43	136.21	68.73
50	1.71	60	5.57	9.52	2.93
38	-10.29	55	0.57	-5.87	105.88
60	11.71	70	15.57	182.47	137.15
65	16.71	60	5.57	92.94	278.24
50	1.71	48	-6.43	-10.98	2.93
				463.15	772.58

Regression of coefficient.

Regression of Y on X.

$$b_{yx} = \frac{\Sigma dxdy}{\Sigma dx^2}$$

$$= \frac{462.15}{772.58}$$

$$= 0.5599 //$$

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

$$y - 54.43 = 0.599(x - 48.29)$$

$$y = 0.599x - 28.92 + 54.43$$

$$y = 0.599x + 25.51 //$$

Estimate y when $x = 55$.

$$y = 0.599(55) + 25.51$$

$$y = 32.94 + 25.51$$

$$y = 58.45 //$$

Q3). From the data given below. Find (a). Two regression equations, (b). The coefficient of correlation between marks in Economic and statics.

Mark in Economics	25	28	35	32	31	36	29	38	34	32
Mark in statics	43	46	49	41	36	32	31	30	33	39

Sol:

Calculate the Mean.

$$\bar{x} = \frac{25 + 28 + 35 + 32 + 31 + 36 + 29 + 38 + 34 + 32}{10}$$

$$= \frac{320}{10}$$

$$= 32 //$$

$$\bar{y} = \frac{43+46+49+41+36+32+31+30+33+29}{10}$$

$$= \frac{380}{10}$$

$$= 38 //$$

compute deviation from mean.

$$dx = x - \bar{x} \; ; \; dy = y - \bar{y}$$

x	dx	y	dy	dx*dy	dx^2	dy^2
25	-7	43	5	-35	49	25
28	-4	46	8	-32	16	64
35	3	49	11	33	9	121
32	0	41	3	0	0	9
31	-1	36	-2	2	1	4
36	4	32	-6	-24	16	36
29	-3	31	-7	21	9	49
38	6	30	-8	-48	36	64
34	2	33	-5	-10	4	25
32	0	39	1	0	0	1
				-93	140	398

Regression coefficient.

a) Regression of y on x

$$b_{yx} = \frac{\Sigma dx\,dy}{dx^2} = \frac{-93}{140} = -0.664 //$$

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

$$y - 38 = -0.664(x - \bar{x})$$

$$y = -0.664x + 21.248 + 38$$

$$y = 59.248 - 0.664x //$$

b) Regression of X on Y.

$$b_{xy} = \frac{\Sigma dx dy}{\Sigma dy^2}$$

$$= \frac{-93}{398} = -0.233 //$$

$$X - \bar{X} = b_{xy}(Y - \bar{Y})$$

$$X - 32 = -0.233(Y - 38)$$

$$X = -0.233Y + 8.854 + 32$$

$$X = 40.854 - 0.233Y //$$

Coefficient of correlation.

$$r = \frac{\Sigma dx dy}{\sqrt{\Sigma dx^2 \cdot \Sigma dy^2}}$$

$$= \frac{-93}{\sqrt{140 \times 398}}$$

$$= \frac{-93}{236.05} = -0.393 //$$

---

(24) The Height (in cm) of a group of fathers and sons are given below.

Height of father (X)	158	166	163	165	167	170	167	172	177	181
Height of son (Y)	163	158	167	170	160	180	170	175	172	175

problem:

Estimate the height of son when heigh of father is 164 cm.

X is 164 then what is Y ?

Calculate the mean.

$$\bar{x} = \frac{158+166+163+165+167+170+167+172+177+181}{10}$$

$$= \frac{1686}{10}$$

$$= 168.6 //$$

$$\bar{y} = \frac{163+158+167+170+160+180+170+175+172+175}{10}$$

$$= \frac{1690}{10}$$

$$= 169 //$$

Compute deviation from mean.

$dx = x - \bar{x}$; $dy = dy - \bar{y}$.

x.	dx.	y	dy.	dx * dy.	dx^2.
158	-10.6	163	-6	63.6	112.36
166	-2.6	158	-11	28.6	6.76
163	-5.6	167	-2	11.2	31.36
165	-3.6	170	1	-3.6	12.96
167	-1.6	160	-9	14.4	2.56
170	1.4	180	11	15.4	1.96
167	-1.6	170	1	-1.6	2.56
172	3.4	175	6	20.4	11.56
177	8.4	172	3	25.2	70.56
181	12.4	175	6	74.4	153.76
				248	406.4

Regression of coefficient.

Regression of y on x.

$$b_{yx} = \frac{\Sigma dx dy}{dx^2}$$

$$= \frac{248}{406.4}$$

$$= 0.610 //$$

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

$$y - 169 = 0.610(x - 168.6)$$

$$y = 0.610x - 102.846 + 169$$

$$y = 0.610x + 66.154 //$$

Estimate son's height when father's heigh.
$x = 164$.

$$y = 0.610(164) + 66.154$$

$$y = 166.19 //$$

Q5) The following data give the height in inches (x) and the weight in lb (y) of a random sample of 10 students from a large group of student of age 17 years:

x	61	68	68	64	65	70	63	68	64	67
y	112	123	130	115	110	125	100	113	116	125

Estimate weight of the student of a height 69 inch.

problem:

Height is (x),
weight is (y).

when the height is 69 what is the weight?
(i.e). $x = 69$; $y = ?$

Calculate the mean x and y.

$$\bar{x} = \frac{61 + 68 + 68 + 64 + 65 + 70 + 63 + 62 + 64 + 67}{10}$$

$$= \frac{652}{10}$$

$$= 65.2 //$$

$$\bar{y} = \frac{112 + 123 + 130 + 115 + 110 + 125 + 100 + 113 + 116 + 125}{10}$$

$$= \frac{1169}{10}$$

$$= 116.9 //$$

Compute deviation from mean.

$dx = x - \bar{x}$; $dy = y - \bar{y}$.

x	dx	y	dy	dx * dy	dx^2
61	-4.2	112	-4.9	20.58	17.64
68	2.8	123	6.1	17.08	7.84
68	2.8	130	13.1	36.68	7.84
64	-1.2	115	-1.9	2.28	1.44
65	-0.2	110	-6.9	1.38	0.04
70	4.8	125	8.1	38.88	23.04
63	-2.2	100	-16.9	37.18	4.84
62	-3.2	113	-3.9	12.48	10.24
64	-1.2	116	-0.9	1.08	1.44
67	1.8	125	8.1	14.58	3.24
				182.2	77.6

Page No:
Date:

Regression coefficient.

Regression of y on x.

$$b_{yx} = \frac{\Sigma dx\,dy}{dx^2}$$

$$= \frac{182.2}{77.6}$$

$$= 2.347 //$$

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

$$y - 116.9 = 2.347(x - 65.2)$$

$$y = 2.347x - 153.02 + 116.9$$

$$y = 2.347x - 36.12 //$$

Estimate weigh of the student of a height 69 inch.

$$x = 69$$

$$y = 2.347(69) - 36.12$$

$$y = 161.94 - 36.12$$

$$y = 125.82 //$$