Name	Maaz Ahmad
Id No	13913
Paper	Biostatistics.
depament	BS MLT

Calculate the Corelaction Co-Effective X and Y

Price X	demond Y	$x-\bar{x}$	$y-\bar{y}$	$(x-\bar{x})(y-\bar{y})$	$(x-\bar{x})^2$	$(y-\bar{y})^2$
3	25	-4.6	7.8	-35.88	-21.16	60.84
4	24	-3.6	6.8	-24.88	-12.96	46.24
5	20	-2.6	2.8	-7.28	-6.76	7.84
6	20	-1.6	2.8	-4.48	-2.56	7.84
7	19	-0.6	1.8	-1.08	-0.36	3.24
8	17	-1.6	-2.0	-0.32	2.56	-0.04
9	16	3.6	-1.2	-3.12	6.76	-1.44
10	13	4.6	-4.2	-15.12	12.16	-17.64
11	10	6.6	-7.2	-33.12	21.16	-51.84
13	8	7.6	-9.2	-60.72	4.56	
$\bar{x}=7.8$	$\bar{y}=17.2$			$\Sigma=176.64$	$\Sigma=42.4$	$\Sigma=29.6$

$$\gamma = \frac{\Sigma(x-\bar{x})(y-\bar{y})}{\sqrt{\Sigma(x-\bar{x})^2(y-\bar{y})^2}}$$

putting the value in formula

$$\gamma = \frac{176.64}{\sqrt{42.4 \times 29.6}} = \frac{176.64}{\sqrt{1255}}$$

$$\gamma = \frac{176.64}{\sqrt{1255.04}} = \frac{176.64}{35.42}$$

$$\gamma = \frac{176.64}{35.42}$$

$$\boxed{\gamma = 4.99}$$

Q1(b) Partial) Determine the Equation of the least Square Regressio lines of y X and X on y

x	y	x^2	y^2	xy
20	5	400	25	100
11	15	121	225	165
15	14	225	196	210
10	17	100	284	170
17	8	289	164	136
18	9	324	81	162
12	12	441	144	252
25	16	265	256	400
28	8	784	324	504
165	124	3309	1604	2099

Regression line y on X

$$b = \frac{n\Sigma xy - \Sigma x \Sigma y}{n\Sigma x^2 - (\Sigma x)^2}$$

$$b = \frac{9(2099) - (165)(124)}{9(3309) - (165)^2}$$

$$b = \frac{18891}{29781} - \frac{20460}{27225}$$

$$b = -\frac{1569}{2556}$$

$$\boxed{b = -0.6}$$

$$a = \frac{\Sigma y - b\Sigma x}{n}$$

$$a = \frac{124 - (0.6)(165)}{9}$$

$$= \frac{124 - (99)}{9}$$

$$a = 24.7$$

Hence the Required Regression lines is given by

$$a = \frac{165 - 210.8}{9}$$

$$a = \frac{45.8}{9}$$

$$a = -5.1$$

Hence the Required Regression lines is given by

$$\hat{X} = a + by$$

$$\hat{X} = 5.1 + 1.7y.$$

Q2(b) part(b) Find the predicted ~~Volume~~ Value of y for $x = 90$ 11, 15, 25, 28 and

x for $y = 5, 15, 9, 12, 16$ 18

$$\hat{y} = 24.7 - 0.6x$$

$$\hat{x} = -5.1 + 1.74$$

x	y	$\hat{y}=24.7-0.6x$	$\hat{x}=-5.1+1.7y$
20	5	12.7	3.4
11	15	18.1	20.4
15	9	15.7	10.2
25	12	9.7	15.3
28	16	7.9	22.1
	18		25.5

This is need Predicated Value

Q No 2

PART (A) Lets Us Regard the tossing of a Coins as an Expirment. then We Observed that

(i) Each Toss of a Coin (i.e Each of the trils) has two Possible out come head and tails.

(ii) The Probility of a head is $P = \frac{1}{2}$ and Remain Same For Successive Tosses.

(iii) The Successive tosses of a coins are Independent, and.

(iv) The Coins is toss 5 Time.

There fore the r.V, X Which denotes the number of head has a bionomial Probility distrubation With $P = 1/2$ and $n=5$. The Possible Value of X are 0, 1, 2, 3, 4 and 5 Hence.

$$P = (P=0) = \binom{5}{0}\left(\frac{1}{2}\right)^0\left(\frac{1}{2}\right)^5 =$$

$$1 \times \left(\frac{1}{2}\right)^5 = \frac{1}{32}$$

$$P_1 = P(X=1)\binom{5}{1}\left(\frac{1}{2}\right)^1\left(\frac{1}{2}\right)^{5-1} =$$

$$5 \times \left(\frac{1}{2}\right)^5 = \frac{5}{32}$$

$P = P(x=2) = \binom{5}{2}\left(\frac{1}{2}\right)^2\left(\frac{1}{2}\right)^{5-2} =$

$10 \times \left(\frac{1}{2}\right) = \frac{10}{32}$

$P = P(x=3)\binom{5}{3}\left(\frac{1}{2}\right)^3\left(\frac{1}{2}\right)^{5-3}$

$= 10 \times \left(\frac{1}{2}\right)^5 = \frac{10}{32}$

$P(4 \text{ head}) = P(X=4)\binom{5}{4}\left(\frac{1}{2}\right)^4\left(\frac{1}{2}\right)^{5-4}$

$= 5 \times \left(\frac{1}{2}\right)^5 = \frac{5}{32}$ and

$P(5 \text{ head}) = P(x=5) = \binom{5}{5}\left(\frac{1}{2}\right)^5$

$= 1 \times \left(\frac{1}{2}\right) = \frac{1}{32}$

These Probalities can also be obtained by EXpinding the Bionomial

$\left(\frac{1}{2} + \frac{1}{2}\right)^5$ then binomals probility distrubation For the number of head obtained in 5 tosses of a fair coins is

x	0	1	2	3	4	5
$f(x)$	$\frac{1}{32}$	$\frac{5}{32}$	$\frac{10}{32}$	$\frac{10}{32}$	$\frac{5}{32}$	$\frac{1}{32}$

2 b)

Total game = 10

probility of Wining = 2/3

i) If A at least win Four game.

$$P(x \geq 24) = 1 - \sum_{x=20}^{n} \binom{10}{x} \left(\frac{2}{3}\right)^{x} \left(\frac{1}{3}\right)^{10-x}$$

$$= 1 - \left[\left(\frac{1}{3}\right)^{10} + 10\left(\frac{2}{3}\right)\left(\frac{1}{3}\right)^{9} + 45\left(\frac{2}{3}\right)^{2}\left(\frac{1}{3}\right)^{2} + 120\left(\frac{2}{3}\right)^{3}\left(\frac{1}{3}\right)^{7}\right]$$

$$= 1(0.000016 + 10\left(\frac{2}{3}\right)\left(\frac{1}{96813}\right) + 45\left(\frac{4}{9}\right)\left(\frac{1}{6561}\right) + 12\left(\frac{8}{27}\right)\left(\frac{1}{218}\right)$$

$$= 1 - (0.000016 + 0.0000338 + 0.00304 + 0.00162)$$

0.9949

ii) $P(x=4)\binom{10}{4}\left(\frac{2}{3}\right)^{4}\left(\frac{1}{3}\right)^{6}$

$$\frac{10}{64}\left(\frac{16}{81}\frac{1}{729}\right)$$

$$\frac{16}{726}\left(\frac{1}{729}\right)$$

$P = \frac{1120}{19683}$ $\boxed{0.056}$

(iii) ~~P(11)~~
(P = 11)
Hence the totel games are Equal to 10 so the probility of games Exectly Equal to Eleven is zero

(iv) $P(x \geq 6)\ (1 - \sum x < 6)$

$$= 1 - \left[\sum_{x=0}^{9} \binom{10}{3} \left(\frac{2}{3}\right) \left(\frac{1}{3}\right)^{10-x}\right]$$

$$= 1 - \left[\left(\frac{1}{3}\right)^{10} + \left(10\,\frac{2}{3}\right)^{9} + \binom{10}{2}\left(\frac{2}{3}\right)^{2}\right.$$
$$\left(\frac{1}{2}\right)^{8} + \binom{10}{3}\left(\frac{2}{3}\right)^{3}\left(\frac{1}{3}\right)^{7} + \binom{10}{4}$$
$$\left(\frac{2}{3}\right)^{4}\left(\frac{1}{3}\right)^{6}\binom{10}{5}\left(\frac{2}{5}\right)^{5}\binom{10}{6}\left(\frac{2}{8}\right)^{6}\left(\frac{1}{6}\right)^{4}$$

$$P(x \geq 6) = 1 - \left[\frac{1}{59049} + 10\left(\frac{2}{4}\right)\left(\frac{1}{19683}\right) + 45\right.$$
$$\left(\frac{4}{9}\right)\left(\frac{1}{6561}\right) + 120\left(\frac{8}{27}\left(\frac{1}{2189}\right)\right) + 210\left(\frac{16}{81}\right)$$
$$\frac{1}{789} + 252\left(\frac{32}{243}\right)\left(\frac{1}{243}\right) + 210\left(\frac{64}{729}\right)\left(\frac{7}{81}\right)$$

$$P(x \geq 6) = 1 - [0.0000169 + 0.000338 + 0.003801 + 0.0162 + 0.0569 + 1.65 + 0.2276]$$

$P x \geq 6 = 1 - 0.405$

$\boxed{P x \geq 6 = 0.55}$

3 (A)

2	6	1	5	4	3	3	8	10	1
4	3	3	0	5	2	1	4	10	3
5	3	3	6	3	3	2	2	7	4
1	2	2	4	4	4	6	8	10	7
7	6	6	5	3	2	3	9	2	2

UnGroup Freaquncy distrubation

No of Child	Tally Mark	Freaquncy
0	I	1
1	IIII	4
2	~~IIII~~ III	8
3	~~IIII~~ III	11
4	~~IIII~~ III	8
5	~~IIII~~ I	5
6	IIII	4
7	III	3
8	II	2
9	I	1
10	III	3

Q(a) Frequency distribution For Group data

Q2b)

Frequency Class Interval	Class Boundry	Tally Mark	Frequency
		𝍸 𝍸 III	13
0-2	0-2.5	𝍸, 𝍸, 𝍸, IIII	19
2-4	2.5-4.5	𝍸, IIII	9
4-6	4.5-6.5	𝍸	5
6-8	6.5-8.5	𝍸	5
8-10	8.5-10.5	IIII	4