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Q2) Find the correlation between x and y.

Table:-

x	3	4	5	6	7	8	9	10	11	[illegible]
y	25	24	20	20	19	17	16	13	10	8

x	y	u	v	u^2	v^2	uv
3	25	-4	18	16	324	-72
4	24	-3	17	9	289	-51
5	20	-2	13	4	169	-26
6	20	-1	13	1	169	-13
7	19	0	12	0	144	0
8	17	1	10	1	100	10
9	16	2	9	4	49	18
10	13	3	6	9	36	18
11	10	4	3	16	9	12
13	8	6	1	64	1	6
76	172	6	102	124	1290	-98

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Let us change the origin
of x and Y

so $u = X - A$

and $v = Y - B$

We know that $N = 10$

then $\frac{N}{2} = \frac{10}{2} = 5$

so our origin is 5

Let $A = 7$

and $B = 7$

then $u = X - 7$

and $v = Y - 7$

By formula we know that

$$\gamma = \frac{\Sigma UV - \frac{1}{N}\Sigma u \Sigma v}{\sqrt{\left\{\Sigma u^2 - \frac{1}{N}(\Sigma u)^2\right\}\left\{\Sigma v^2 - \frac{1}{N}(\Sigma v)^2\right\}}}$$

$$\gamma = \frac{-98 - \frac{1}{10}(6)(102)}{\sqrt{\left\{(124) - \frac{1}{10}(6)^2\right\}\left\{1290 - \frac{1}{10}(-98)\right\}}}$$

$\gamma = -0.40243$ Ans

Q1 (b)

Table:-

x	20	11	15	10	17	18	21	25	28
Y	5	5	14	17	8	9	12	16	18

x	Y	x^2	Y^2	xY
20	5	400	25	100
11	5	121	25	55
15	14	225	196	210
10	17	100	289	170
17	8	289	64	136
18	9	324	81	162
21	12	441	144	252
25	16	625	256	400
28	18	784	324	504
165	104	3309	1404	1989

→ Regression Y on X

$$\Sigma Y = aN + b\Sigma X$$

and $\Sigma XY = a\Sigma X + b\Sigma X^2$

so putting the values in above equation.

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$104 = 9a + 165b \rightarrow (i)$

$1989 = 165a + 3309b \rightarrow (ii)$

and

Regression X on Y

$\Sigma X = aN + b\Sigma Y$

$\Sigma XY = a\Sigma Y + b\Sigma Y^2$

$104 = 9a + 165b$

$1989 = 165a +$

$165 = 9a + 104b \rightarrow (iii)$

$1989 = 104a + 1404b \rightarrow (iv)$

13.5 × with eq(iii)

$165 \times 13.5 = 13.5 \times 9a + 1404b$

$2227.5 = 121.5a + 1404b \rightarrow (v)$

Sub (v) From eq (iv)

~~2227.5 = 104a + 1404b~~

$2227.5 = 121.5a + 1404b$

$1989 = 104a + 1404b$

$238.5 = 17.5a$

$$a = \frac{2383}{17.5}$$

$$a = 13.62$$

Now: To find: b :

$$165 = 9a + 104b$$

$$165 = 9(13.62) + 104b$$

$$165 = 122.58 + 104b$$

$$165 - 122.58 = 104b$$

$$\frac{42.42}{104} = \frac{104b}{104}$$

$$b = 0.407$$

equation of line.

$$y = a + bx$$

$$y = 13.62 + 0.407x$$

$$x = a + by$$

Fromeal of regression.

$$r = \sqrt{byx \cdot bxy}$$

$$r = \sqrt{0.407 \times 0.397}$$

$$r = 0.40198$$

Q 3

(a)

a) Construct the ungrouped Frequency distribution of these data.

b) Construct the grouped fequency distribution of these data.

a) For ungrouped Fequency D.

Data	Tally	Fequency = F
0	/	1
1	////	4
2	//// /////	9
3	///////////	11
4	////////	8
5	/////	5
6	////	4
7	///	3
8	//	2
9	/	1
10	///	3
		51

b) For grouped frequence distrubution.

Data	Frequence
0 - 1	5
2 - 3	19
4 - 5	13
6 - 7	7
8 - 9	8
10 - 11	3
	51

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Q 2 (a):-

Ans:

We have to given that a Fair coin is tossed 5 Time so $n = 5$.

But accordingly the ~~con~~ coin conditions we have different expirement.

1st condition is

i) Each toss has two possiblities it is head or tail.

2) We can denote the possibility of head by $p = 1/2$

3) The coin is tossed give five Time.

Let us x denoted by no of ~~Suc~~ scucesses then by using of binomial distrubution.

So $p = \frac{1}{2}$ and $n = 5$ possible values are x 0, 1, 2, 3, 4, and 5.

by formula

$$P = \sum_{K=0}^{n} \binom{n}{K} p^{n} q^{n-K}$$

By formula:- 10

$$P = \sum_{k=0}^{n} \binom{n}{k} p^n q^{n-k}.$$

So for **n=0** then we have

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

$$P = 1 \cdot 1 \cdot \frac{1}{2^5} \quad \because \binom{5}{0} = 1 \text{ and } \left(\frac{1}{2}\right)^0 = 1$$

$$\boxed{P = \frac{1}{32}}$$

Now for **n = 1** then we have.

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

$$= 5\left(\frac{1}{2}\right)\left(\frac{1}{2}\right)^4$$

$$= 5\left(\frac{1}{2}\right)\left(\frac{1}{16}\right)$$

$$\boxed{P = \frac{5}{32}}$$

Now For **n=2**

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

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

Pge = 14

$P = 10\left(\frac{1}{4}\right)\left(\frac{1}{8}\right)$

$P = \frac{10}{32} \; \frac{5}{16}$

$P = \frac{5}{16}$ But $P\left(10/32\right)$

$P = 10/32$

Now for $x = 3$ then we have

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

$P = 10\left(\frac{1}{8}\right)\left(\frac{1}{4}\right)$

$P = \frac{10}{32}$

Now for $x=4$ then we have

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

$= 5\left(\frac{1}{16}\right)\left(\frac{1}{2}\right)$

$= 5/32$

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Now for $n = 5$

$$p = P(n=5) = \binom{5}{4}\left(\frac{1}{2}\right)^5\left(\frac{1}{2}\right)^0$$

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

$$p = \frac{1}{32}$$

Therefore Make a table

n	0	1	2	3	4	5
$f(n)$	$1/32$	$5/32$	$10/32$	$10/32$	$5/32$	$1/32$