DPP-9 Maths-IV Unit-3

Topic- Correlation

Q-1- Find the correlation coefficient between x and y for the following data

x	60	34	40	50	45	41	22	43
y	75	32	34	40	45	33	12	30

$n = 8$

x	y	x^2	y^2	xy
60	75	3600	5625	4500
34	32	1156	1024	1088
40	34	1600	1156	1360
50	40	2500	1600	2000
45	45	2025	2025	2025
41	33	1681	1089	1353
22	12	484	144	264
43	30	1849	900	1290
$\Sigma x = 335$	$\Sigma y = 301$	$\Sigma x^2 = 14895$	$\Sigma y^2 = 13563$	$\Sigma xy = 13880$

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

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$$r_{xy} = \frac{8 \times 13880 - 335 \times 301}{\sqrt{8 \times 14895 - 112225}\ \sqrt{8 \times 13563 - 90601}}$$

$$r_{xy} = \frac{10205}{11141.526}$$

$$\boxed{r_{xy} = 0.9159}$$

Q- Calculate the coefficient of correlation between the following ages of husband (x) and wife (y) by taking 30 and 28 as assumed mean in case of x and y respectively.

x: 24 27 28 28 29 30 32 33 35 35 40

y: 18 20 22 25 22 28 28 30 27 30 32

	x	y	$d_x = x-30 = u$	$d_y = y-28 = v$	u^2	v^2	uv
	24	18	-6	-10	36	100	60
	27	20	-3	-8	9	64	24
	28	22	-2	-6	4	36	12
	28	25	-2	-3	4	9	6
	29	22	-1	-6	1	36	6
A	30	28	0	0	0	0	0
	32	28	2	0	4	0	0
	33	30	3	2	9	4	6
	35	27	5	-1	25	1	-5
	35	30	5	2	25	4	10
	40	32	10	4	100	16	40
Σ			$\Sigma u = 11$	$\Sigma v = -26$	$\Sigma u^2 = 217$	$\Sigma v^2 = 270$	$\Sigma uv = 159$

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$$r_{xy} = \frac{n\Sigma uv - \Sigma u \Sigma v}{\sqrt{n\Sigma u^2 - (\Sigma u)^2}\ \sqrt{n\Sigma v^2 - (\Sigma v)^2}}$$

$$r_{xy} = \frac{11 \times 159 - 11 \times (-26)}{\sqrt{11 \times 217 - 121}\ \sqrt{11 \times 270 - 676}}$$

$$r_{xy} = \frac{1749 + 286}{\sqrt{2266}\ \sqrt{2294}}$$

$$r_{xy} = \frac{2035}{47.60 \times 47.8}$$

$$r_{xy} = \frac{2035}{2279.56}$$

$$\boxed{r_{xy} = 0.8927}$$

Ans.

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