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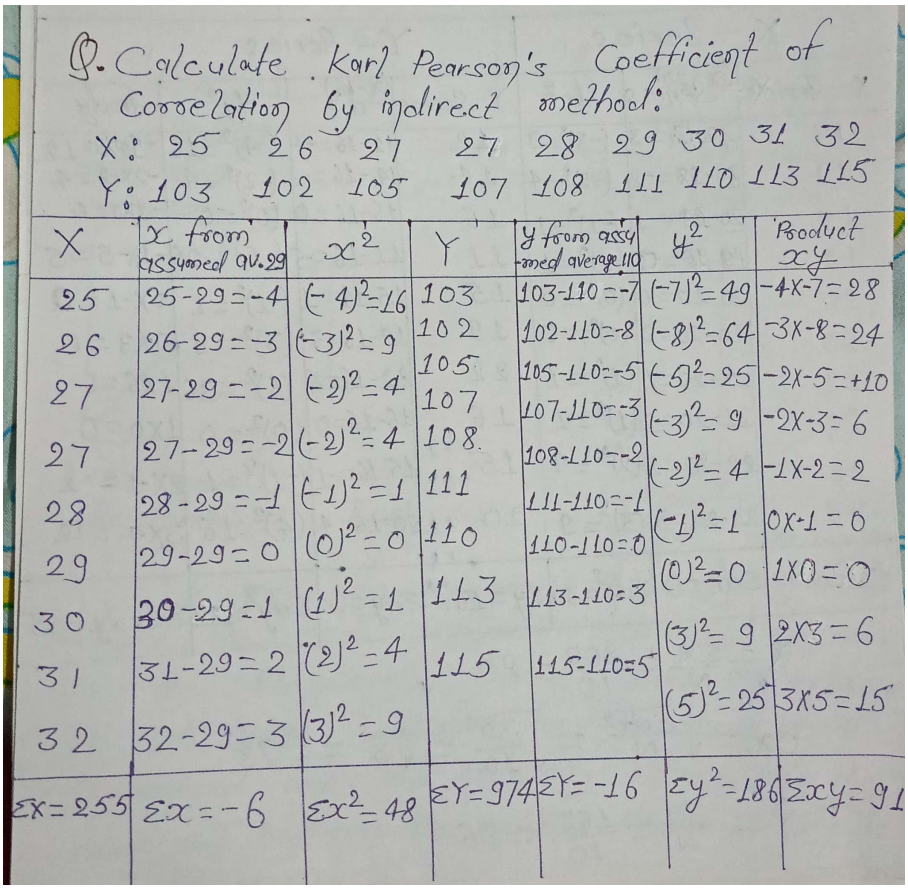
Class: B.A. Economics (Part-3)
Paper: 07
Topic- Coefficient of Correlation by Indirect method



Q. Calculate Karl Pearson's Coefficient of Correlation by indirect method:

X: 25 26 27 27 28 29 30 31 32

Y: 103 102 105 107 108 111 110 113 115

X	x from assumed av. 29	x^2	Y	y from assumed average 110	y^2	Product xy
25	25-29 = -4	$(-4)^2$ = 16	103	103-110 = -7	$(-7)^2$ = 49	-4×-7 = 28
26	26-29 = -3	$(-3)^2$ = 9	102	102-110 = -8	$(-8)^2$ = 64	-3×-8 = 24
27	27-29 = -2	$(-2)^2$ = 4	105	105-110 = -5	$(-5)^2$ = 25	-2×-5 = +10
27	27-29 = -2	$(-2)^2$ = 4	107	107-110 = -3	$(-3)^2$ = 9	-2×-3 = 6
28	28-29 = -1	$(-1)^2$ = 1	108	108-110 = -2	$(-2)^2$ = 4	-1×-2 = 2
29	29-29 = 0	$(0)^2$ = 0	111	111-110 = -1	$(-1)^2$ = 1	0×-1 = 0
30	30-29 = 1	$(1)^2$ = 1	110	110-110 = 0	$(0)^2$ = 0	1×0 = 0
31	31-29 = 2	$(2)^2$ = 4	113	113-110 = 3	$(3)^2$ = 9	2×3 = 6
32	32-29 = 3	$(3)^2$ = 9	115	115-110 = 5	$(5)^2$ = 25	3×5 = 15
ΣX = 255	Σx = -6	Σx^2 = 48	ΣY = 974	ΣY = -16	Σy^2 = 186	Σxy = 91

$$\bar{X} = \frac{\Sigma x}{n} = \frac{255}{9} = 28.33$$ assumed average 29

$$\bar{Y} = \frac{\Sigma y}{n} = \frac{974}{9} = 108.22$$ assumed average 110

$$r = \frac{\Sigma xy \cdot n - (\Sigma x \cdot \Sigma y)}{\sqrt{[\Sigma x^2 \cdot n - (\Sigma x)^2][\Sigma y^2 \cdot n - (\Sigma y)^2]}}$$

$$r = \frac{91 \times 9 - (-6 \times -16)}{\sqrt{[48 \times 9 - (-6)^2][186 \times 9 - (-16)^2]}}$$

$$r = \frac{819 - 96}{\sqrt{[432 - 36][1674 - 256]}}$$

$$r = \frac{723}{\sqrt{396 \times 1418}}$$

$$r = \frac{723}{\sqrt{561528}}$$

$$r = \frac{723}{749.35}$$

$$r = 0.9648$$ → High degree of Correlation exist.

Note: Direct method is based on true mean. Indirect method is based on assumed mean.