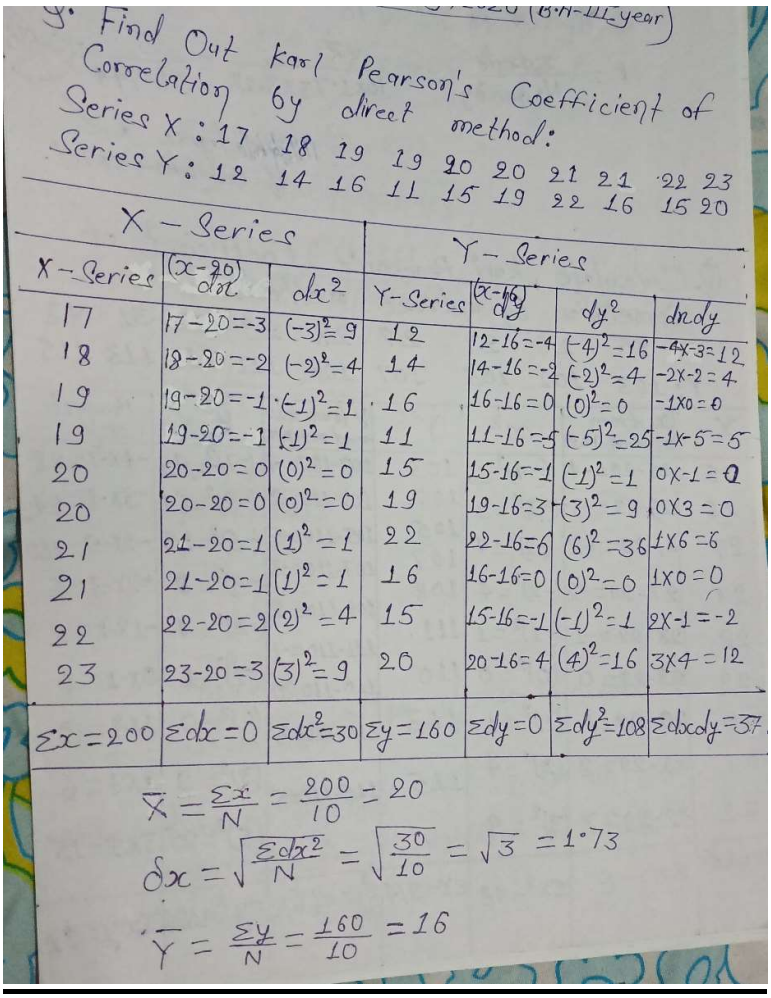
Pinky Rani
Assistant Professor (Guest Faculty)
Department of Economics
Maharaja College
Veer Kunwar Singh University, Ara
Class: B.A. Economics (Part-3)
Paper: 07
Topic- Coefficient of Correlation by Direct method
Date: 20-02-2024



9. Find Out karl Pearson's Coefficient of Correlation by direct method:

Series X : 17 18 19 19 20 20 21 21 22 23

Series Y : 12 14 16 11 15 19 22 16 15 20

X-Series	X − Series $(x-20)$ dx	dx^2	Y-Series	Y − Series $(y-16)$ dy	dy^2	$dx\,dy$
17	17−20=−3	$(-3)^2=9$	12	12−16=−4	$(-4)^2=16$	−4×−3=12
18	18−20=−2	$(-2)^2=4$	14	14−16=−2	$(-2)^2=4$	−2×−2=4
19	19−20=−1	$(-1)^2=1$	16	16−16=0	$(0)^2=0$	−1×0=0
19	19−20=−1	$(-1)^2=1$	11	11−16=−5	$(-5)^2=25$	−1×−5=5
20	20−20=0	$(0)^2=0$	15	15−16=−1	$(-1)^2=1$	0×−1=0
20	20−20=0	$(0)^2=0$	19	19−16=3	$(3)^2=9$	0×3=0
21	21−20=1	$(1)^2=1$	22	22−16=6	$(6)^2=36$	1×6=6
21	21−20=1	$(1)^2=1$	16	16−16=0	$(0)^2=0$	1×0=0
22	22−20=2	$(2)^2=4$	15	15−16=−1	$(-1)^2=1$	2×−1=−2
23	23−20=3	$(3)^2=9$	20	20−16=4	$(4)^2=16$	3×4=12
$\Sigma x=200$	$\Sigma dx=0$	$\Sigma dx^2=30$	$\Sigma y=160$	$\Sigma dy=0$	$\Sigma dy^2=108$	$\Sigma dx\,dy=37$

$$\bar{X}=\frac{\Sigma x}{N}=\frac{200}{10}=20$$

$$\delta x=\sqrt{\frac{\Sigma dx^2}{N}}=\sqrt{\frac{30}{10}}=\sqrt{3}=1.73$$

$$\bar{Y}=\frac{\Sigma y}{N}=\frac{160}{10}=16$$

$$\delta y = \sqrt{\frac{\Sigma dy^2}{N}} = \sqrt{\frac{108}{10}} = \sqrt{10.8} = 3.28$$

$$r = \frac{\Sigma dx dy}{N \cdot \delta x \cdot \delta y} = \frac{37}{10 \times 1.73 \times 3.28} = \frac{37}{56.744} = 0.652$$

Moderate degree of Correlations exist.