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शक्तिउत्थानआश्रमलखीसरायबिहार

Class 11 commerce Sub. ECO/B Date 11.02.2021

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Correlation

Question 14:

Measure the height of your classmates. Ask them the height of their benchmate. Calculate the correlation coefficient of these two variables. Interpret the result.

ANSWER:

Height of Classmate X	Height of Benchmate Y
67	65
56	66
65	57
68	67
72	68
72	69
69	70
71	72

X	Y	XY	X^2	Y^2
67	65	4355	4489	4225
56	66	3696	3136	4356
65	57	3705	4225	3249
68	67	4556	4624	4489
72	68	4896	5184	4624
72	69	4968	5184	4761
69	70	4830	4761	4900
71	72	5112	5041	5184
$\sum X = 540$	$\sum Y = 534$	$\sum XY = 36118$	$\sum X^2 = 36644$	$\sum Y^2 = 35788$

$$\begin{aligned}
 r &= \frac{\sum XY - \frac{(\sum X)(\sum Y)}{N}}{\sqrt{\sum X^2 - \frac{(\sum X)^2}{N}} \sqrt{\sum Y^2 - \frac{(\sum Y)^2}{N}}} \\
 &= \frac{36118 - \frac{540 \times 534}{8}}{\sqrt{36644 - \frac{(540)^2}{8}} \sqrt{35788 - \frac{(534)^2}{8}}} \\
 &= \frac{36118 - 36045}{\sqrt{36644 - 36450} \sqrt{35788 - 35644.5}} \\
 &= \frac{73}{\sqrt{194} \sqrt{143.5}} \\
 &= \frac{73}{13.93 \times 11.98} \\
 &= \frac{73}{166.88} \\
 &= 0.44
 \end{aligned}$$
