



CORRELATION

Formula

- 1) Calculate the correlation coefficient for the following heights (in inches) of fathers (X) and their sons (Y):

X	65	66	67	67	68	69	70	72
Y	67	68	65	68	72	72	69	71

- 2) A computer while calculating correlation coefficient between two variables X and Y from 25 pairs of observations obtained the following results:
 $n=25, \Sigma X=125, \Sigma X^2=650, \Sigma Y=100, \Sigma Y^2=460, \Sigma XY=508$
It was, however, later discovered at the time of checking that he had copied down two pairs as

X	Y
6	14
8	6

while the correct values were

X	Y
8	12
6	8

Obtain the correct values of correlation coefficient.



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CORRELATION COEFFICIENT OF BIVARIATE FREQUENCY DISTRIBUTION

- 1) The following table gives, according to age, the frequency of marks obtained by 100 students in an intelligence test. Calculate the correlation coefficient.

Age in yrs->	18	19	20	21
Marks				
10 - 20	4	2	2	-
20 - 30	5	4	6	4
30 - 40	6	8	10	11
40 - 50	4	4	6	8
50 - 60	-	2	4	4
60 - 70	-	2	3	1



RANK CORRELATION/SPEARMAN'S RANK CORRELATION COEFFICIENT

- 1) The ranks of same 16 students in Mathematics and Physics are as follows.
(1,1), (2,10), (3,3), (4,4), (5,5), (6,7), (7,2), (8,6), (9,8), (10,11), (11,15), (12,9), (13,14),
(14,12), (15,16), (16,13)

calculate the rank correlation coefficient for proficiencies of this group in Mathematics and Physics.

- 2) Ten competitors in a musical test were ranked by three judges A, B and C in the following order:

Ranks by A: 1 6 5 10 3 2 4 9 7 8

Ranks by B: 3 5 8 4 7 10 2 1 6 9

Ranks by C: 6 4 9 8 1 2 3 10 5 7

Using rank correlation method, discuss which pair of judges has the nearest approach to common liking in music.

- 3) Obtain the rank correlation coefficient of the following data:

X: 68 64 75 50 64 80 75 40 55 64

Y: 62 58 68 45 81 60 68 48 50 70



REGRESSION

Formula

1) Obtain the equations of two lines of regression for the following data. Also obtain the estimate for X for Y=70

X	65	66	67	67	68	69	70	72
Y	67	68	65	68	72	72	69	71

2) In a partially destroyed laboratory, records of an analysis of correlation data, the following results only are legible

Variance of X = 9. Regression equations: $8X - 10Y + 66 = 0$, $40X - 18Y = 214$

What are (i) the mean values of X and Y
(ii) the correlation coefficient between X and Y
(iii) the standard deviation of Y?

3) Find the most likely price in Mumbai corresponding to the price of Rs.70 at Kolkata from the following:

	Kolkata	Mumbai
Average Price	65	67
Standard deviation	2.5	3.5

Correlation Coefficient between the prices of commodities in the two cities is 0.8.

4) Can $Y = 5 + 2.8X$ and $X = 3 - 0.5Y$ be the estimated regression equations of Y on X and X on Y respectively? Explain your answer with suitable theoretical arguments.

5) The following results were obtained from two samples:

Sample	variables	Size	A.M.	S.D.	r
1	X	40	20	2.5	0.65
"	Y		15	1.7	
2	X	60	25	2.8	0.72
"	Y		17	2.0	

Find the correlation coefficient for the combined sample of 100.