

Problems on Correlation and Regression

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1. If the equations of two regression lines obtained in a correlation analysis are $3x + 12y = 19$ and $9x + 3y = 46$, determine which one of these is the regression equation of y on x and which one is the regression equation of x on y . Justify your answer. Find the means, correlation coefficient and ratio of the variances of x and y .

2. A researcher collected data on savings and investments of 16 households. Savings data had a mean of Rs. 6565, variance of 250. Mean investment was Rs.4525 and variance was 520. If the correlation coefficient between savings and investment was 0.67, obtain the estimated value of savings corresponding to an investment amount of Rs.9000. Also find the estimated value of investment corresponding to the savings of Rs.5600.

3. Two variables X and Y take the following values:

X	-3	-1	1	3
Y	9	1	1	9

Find the correlation coefficient. Interpret your answer.

4. Prove that $\text{Cov}(a,b)=0$, where a and b are real constants.

5. Prove that $\text{Cov}(X,c)=0$ or $\text{Cov}(c,Y)=0$, c being a real constant.