Linear Correlation Coefficient

To find out the relation between two variables in a population, linear correlation formula is used. To see how the variables are connected we will use the linear correlation. Also known as “Pearson’s Correlation”, a linear correlation is denoted by r” and the value will be between -1 and 1.

The elements denote a strong relationship if the product is 1. Similarly, if the coefficient comes close to -1, it has a negative relation. If the Linear coefficient is zero means there is no relation between the data given.



Where “n” is the number of observations, “xi” and “yi “are the variables.

**Also Check:**[Correlation Coefficient Formulas](https://byjus.com/correlation-coefficient-formula/)

Solved Examples

**Question 1:**Calculate the linear correlation coefficient for the following data. X = 4, 8 ,12, 16 and Y = 5, 10, 15, 20.

**Solution:**

Given variables are,

X = 4, 8 ,12, 16 and Y = 5, 10, 15, 20

For finding the linear coefficient of these data, we need to first construct a table for the required values.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| X | y | x2 | y2 | XY |
| 4 | 5 | 16 | 25 | 20 |
| 8 | 10 | 64 | 100 | 80 |
| 12 | 15 | 144 | 225 | 180 |
| 16 | 20 | 256 | 400 | 320 |
| Σ x = 40 | Σ y =50 | 480 | 750 | 600 |

According to the formula of linear correlation we have,

r(xy)=(4×600)−(40×50)4(480)−402√4(750)−502√

r(xy)=2400−20001920−1600√3000−2500√

r(xy)=400320√500√

r(xy)=40017.89×22.36

r(xy)=400400=1

Therefore, r(xy) = 1