

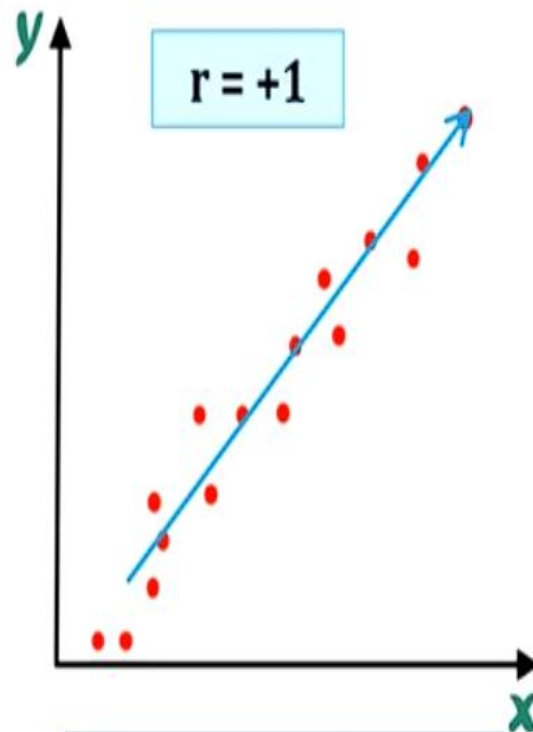
Correlation Coefficient

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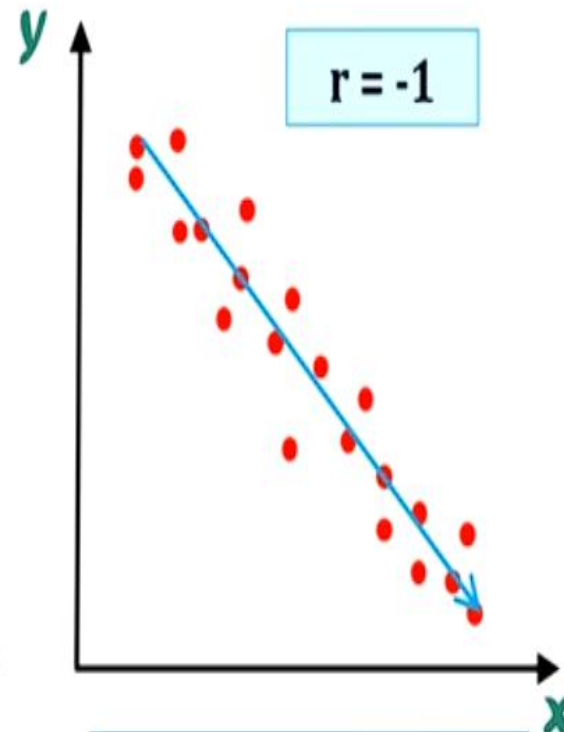
Correlation

Correlation refers to a statistical measure that determines the **relationship** between two variables. It depicts the **degree** to which two variables are correlated.

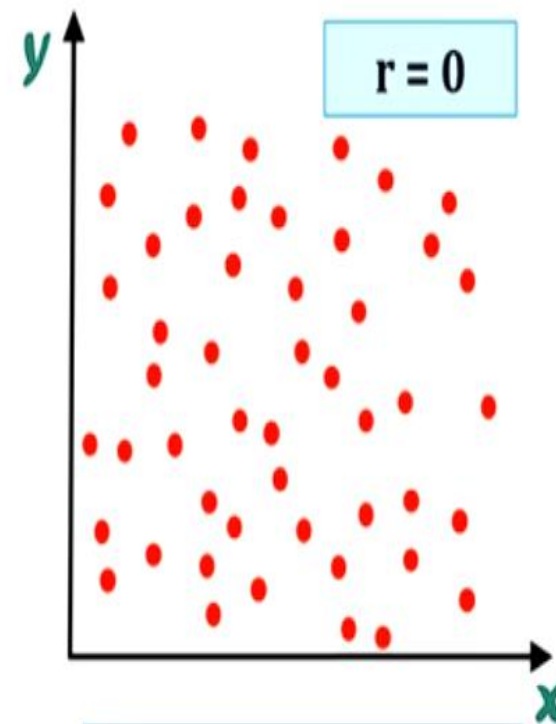
Correlation Coefficient is a statistical measure which determines how strongly the pair of variables are correlated or connected. It is denoted by **“r”** and it ranges



Positive
Correlation

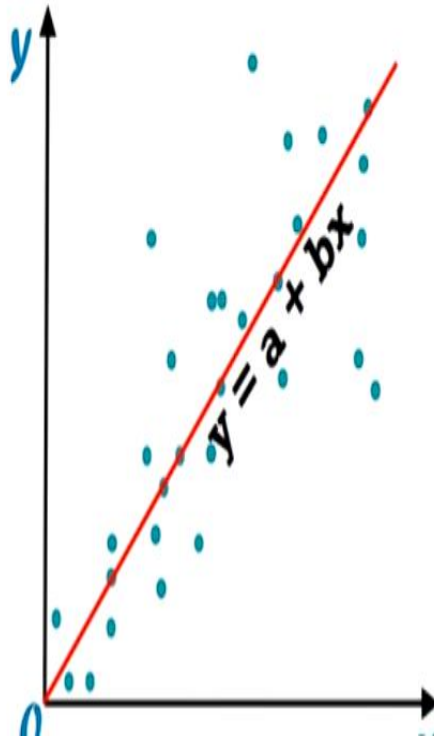


Negative
Correlation



No
Correlation

Regression



Regression implies the statistical tool used to identify the **nature of relationship** existing between a **dependent variable** and a set of **independent variables**.

8. Find the coefficient of correlation and obtain the equation of line of regression for the given data :

x	6	2	10	4	8
y	9	11	5	8	7

$$\bar{x} = \frac{\sum x}{n} = \frac{30}{5} = 6$$

$$\bar{y} = \frac{\sum y}{n} = \frac{40}{5} = 8$$

∴ Coeff. of Correlation,

$$r = \frac{\sum XY}{\sqrt{\sum X^2 \sum Y^2}}$$

$$X = x - \bar{x}$$

$$Y = y - \bar{y}$$

x	y	X = x - 6	Y = y - 8	X ²	Y ²	XY
6	9	0	1	0	1	0
2	11	-4	3	16	9	-12
10	5	4	-3	16	9	-12
4	8	-2	0	4	0	0
8	7	2	-1	4	1	-2
Total				40	20	-26

$$= \frac{-26}{\sqrt{40 \times 20}}$$

$$r = -0.919$$

Equation of Regression line y on x ,

$$(y - \bar{y}) = \frac{\sum XY}{\sum X^2} (x - \bar{x})$$

$$(y - 8) = \frac{-26}{40} (x - 6)$$

$$(y - 8) = -0.65(x - 6)$$

$$y - 8 = -0.65x + 3.9$$

$$\boxed{y = -0.65x + 11.9}$$

Equation of Regression Line x on y ,

$$(x - \bar{x}) = \frac{\sum XY}{\sum Y^2} (y - \bar{y})$$

$$(x - 6) = \frac{-26}{20} (y - 8)$$

$$(x - 6) = -1.3(y - 8)$$

$$x - 6 = -1.3y + 10.4$$

$$\boxed{x = -1.3y + 16.4}$$

x	y	$X=x-6$	$Y=y-8$	X^2	Y^2	XY
6	9	0	1	0	1	0
2	11	-4	3	16	9	-12
10	5	4	-3	16	9	-12
4	8	-2	0	4	0	0
8	7	2	-1	4	1	-2
Total				40	20	-26