

Correlation  
 dependent  $\rightarrow$  Independent

$y_i = a + b x_i \rightarrow$  Regn equation

Intercept

Regn coefficient

Rp. 34  $x_{12} = 3.4$

$$a = \bar{y} - \hat{b} \bar{x}$$

$$\hat{b} = \frac{\sum x_i y_i - \frac{\sum x_i \sum y_i}{n}}{\sum x_i^2 - \frac{(\sum x_i)^2}{n}}$$

Regn coefficient; Represent the amount of change in  $y_i$  (dependent variable) per unit change in  $x_i$  (independent variable)

$$-\infty \leq b \leq \infty$$

$$\begin{cases} x_i = a + b y_i \rightarrow (i) \\ \hat{a} = \bar{x} - \hat{b} \bar{y} \\ \hat{b} = \frac{\sum x_i y_i - \frac{\sum x_i \sum y_i}{n}}{\sum y_i^2 - \frac{(\sum y_i)^2}{n}} \end{cases}$$

Variable & Relation  
 Simple corce / simple regn  
 multiple corce / multiple regn

Multiple choice part

Partial correlation

Select one of the constant  
relation 20 and 10 P.

Correlation and Regn

Symmetric Not symmetric

Demand Supply

50 45  
60 52  
65 60  
20 65  
55 51  
57 53

Question:

(i) If demand is 85 then what  
will be the supply

(ii) If supply is 67 then what was the demand

# मातृ-मातृ संबंध (or) dependent

$$y_i = a + bx_i \quad \text{--- (i)}$$

$$x_i = a + by_i \quad \text{--- (ii)}$$

$$\Rightarrow \bar{a} = \bar{y} - b\bar{x}$$

$$\bar{b} = \frac{\sum x_i y_i - \frac{\sum x_i \sum y_i}{n}}{\sum x_i^2 - \frac{(\sum x_i)^2}{n}}$$

$$\Rightarrow \bar{a} = \bar{x} - \bar{b}\bar{y}$$

$$\bar{b} = \frac{\sum x_i y_i - \frac{(\sum y_i)^2}{n}}{\sum y_i^2 - \frac{(\sum y_i)^2}{n}}$$



| Demand<br>$x_i$ | Supply<br>$y_i$ | $x_i^2$          | $y_i^2$          | $x_i y_i$          |
|-----------------|-----------------|------------------|------------------|--------------------|
| 50              | 45              | 2500             | 2025             | 2250               |
| 60              | 52              | 3600             | 2704             | 3120               |
| 85              | 60              | 4225             | 3600             | 3900               |
| 70              | 65              | 4900             | 4225             | 4550               |
| 55              | 51              | 3025             | 2601             | 2805               |
| 57              | 53              | 3249             | 2809             | 3021               |
| —               | —               | $\Sigma x_i^2 =$ | $\Sigma y_i^2 =$ | $\Sigma x_i y_i =$ |
| $\Sigma x_i =$  | $\Sigma y_i =$  | 21400            | 17064            | 10646              |
| 337             | 326             |                  |                  |                    |

$$b = \frac{\Sigma x_i y_i - \frac{\Sigma x_i \Sigma y_i}{n}}{\Sigma x_i - \frac{(\Sigma x_i)^2}{n}}$$

$$= \frac{10646 - \frac{352 \times 326}{6}}{337 - \frac{(357)^2}{6}}$$

$$= -0.01$$

$$\bar{a} = \frac{\sum y_i}{n} - b \cdot \frac{\sum x_i}{n}$$

$$= \frac{326}{6} - (-0.01) \cdot \frac{357}{6}$$

$$= 54.03$$

$$y_i = a + bx_i$$

$$y_i = 54.03 + (-0.01) x_i$$

$$= 54.03 - 0.01(85)$$

$$= 54.08$$