

Answer on Question #66775 – Math – Statistics and Probability

Question

The regression equation of y on x and that of x on y are $8x - 10y + 66 = 0$ and $40x - 18y = 214$ respectively, and the variance of x is 9.

(i) Find σ_y .

Solution

$$8x - 10y + 66 = 0 \rightarrow y = \frac{4}{5}x + \frac{33}{5} \rightarrow b_{yx} = \frac{4}{5} = 0.8.$$

$$40x - 18y = 214 \rightarrow x = \frac{9}{20}y + \frac{107}{20} \rightarrow b_{xy} = \frac{9}{20} = 0.45.$$

$$b_{yx} = r \frac{\sigma_y}{\sigma_x}, b_{xy} = r \frac{\sigma_x}{\sigma_y} \text{ so } b_{yx}b_{xy} = r^2 \rightarrow$$

$$\rightarrow r = \sqrt{b_{yx}b_{xy}} = \sqrt{0.8 * 0.45} = 0.6.$$

$$\text{Thus, } \sigma_y = rb_{yx}\sigma_x = 0.6 * 0.8 * \sqrt{9} = 1.44.$$

Answer: 1.44.