

Answer on Question #62749 – Math – Statistics and Probability

Question

Q1. The data of an experiment to apply sufficient quantities of fertilizer to optimize vegetation growth (grass yield) and avoid excessive application that would lead to runoff and nutrient enrichment of a nearby lake is shown in the data below.

Determine the regression of y on x.

y- 25 - 50 - 75- 100- 125- 150- 175- 200- 225- 250.

x- 84 - 9- 90- 154- 148- 169- 206 - 244 - 212- 248.

Solution

The regression line of y on x is

$$y = a + bx$$

$$\text{Here } a = \frac{\sum Y \sum X^2 - \sum X \sum XY}{n \sum X^2 - (\sum X)^2} = \frac{1564 * 240625 - 1375 * 263100}{10 * 240625 - 1375^2} = 28.267$$

$$b = \frac{n \sum YX - \sum X \sum Y}{n \sum X^2 - (\sum X)^2} = \frac{10 * 263100 - 1375 * 1564}{10 * 240625 - 1375^2} = 0.932$$

So $y = 28.267 + 0.932x$.

Answer: $y = 28.267 + 0.932x$.

Question

Q2. The average normal temperature (oC) and the corresponding average precipitate (inches) for the months of August for seven randomly selected local government areas in plateau state are shown in the data below,

(a) compute the value of the correlation coefficient,

(b) What can you deduce about the correlation of x and y.

temp- 30 - 27 - 28 - 32 - 27- 23 - 18.

ppt- 3.4- 1.8- 3.5- 3.6- 3.7- 1.5- 0.2.

Solution

$$\text{(a) } R = \frac{n \sum YX - \sum X \sum Y}{\sqrt{n \sum X^2 - (\sum X)^2} \sqrt{n \sum Y^2 - (\sum Y)^2}} = \frac{7 * 501.8 - 185 * 17.7}{\sqrt{(7 * 5019 - 185^2)(7 * 55.99 - 17.7^2)}} = 0.891.$$

(b) There is a strong positive correlation between x and y.

Answer: (a) 0.891; **(b)** a strong positive correlation between x and y.