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(11.1)

x	y	xy	x^2	y^2
11.8	10.4	122.72	139.24	108.16
12.5	16.5	206.25	156.25	272.25
15.7	22.9	359.53	246.49	524.45
19.2	26.6	510.72	368.64	707.56
21.9	33.8	740.22	479.65	1142.44
23.3	42.8	997.24	542.89	1831.84
$\Sigma x = 104.4$	$\Sigma y = 153$	$\Sigma xy = 2936.68$	$\Sigma x^2 = 1933.12$	$\Sigma y^2 = 4586.66$

a) $SS(x) = \Sigma x^2 - \frac{(\Sigma x)^2}{n}$

$= 1033^{12} - \frac{(104.4)^2}{6}$

$= 116.56$

$SS(y) = \Sigma y^2 - \frac{(\Sigma y)^2}{n} = 4586.66 - \frac{(153)^2}{6}$

$= 685.16$

$SP(xy) = \Sigma xy - \frac{\Sigma x \Sigma y}{n}$

$= 2936.68 - \frac{104.4 \times 153}{6}$

$= 274.48$

$r = \frac{SP(xy)}{\sqrt{116.56 \times 685.16}} = 0.9712$

The variables (x) inflation rate and (y) lending rate are strongly positively connected.

(b) we need to test,

$H_0: \rho = 0$ vs. $H_1: \rho \neq 0$

test statistic $t = \frac{r\sqrt{n-2}}{\sqrt{1-r^2}} = \frac{0.9212\times\sqrt{6-2}}{\sqrt{1-(0.9212)^2}}$

$= 8.152$

since $|t| > t_{n-2} = t_4 = 2.776$, so H_0 is rejected. we can conclude that lending rate increases significially with the increase of inflation rate. (Ans)

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(c) From the solution of 'o'

$SS(x) = 116.56$

$SS(y) = 685.16$

$SP(xy) = 274.48$

Now, $b = \frac{SP(xy)}{SS(x)} = \frac{274.48}{116.56}$

$\Rightarrow 2.355$

$a = \bar{y} - b\bar{x} = \frac{\Sigma y}{n} - bx \cdot \frac{\Sigma x}{n}$

$= \frac{153}{6} - (2.355) \times \frac{104.4}{6}$

$\Rightarrow a = -15.477$

So, fitted line ; $\hat{y} = a + bn$

$\Rightarrow \hat{y} = -15.477 + 2.355$

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(d) If $x = 25.5$

then $\hat{y} = -15.477 + 2.355 \times (25.5)$

$= 44.58$ (Ans)

(e) We need to test $H_0 : \beta = 0$ vs

Test statistic; $t = \frac{b}{\sqrt{\frac{s^2}{SS(x)}}}$ $H_1 : \beta \neq 0$

$= \frac{2.355}{\sqrt{\frac{9.69}{116.56}}} = 8.168$

Here, $s^2 = \frac{SS(y) - b\,SP(xy)}{n-2}$

$= \frac{685.16 - 2.355 \times (274.48)}{6-2}$

$= 9.69$

Since $|t| > t_{n-2} = t_4 = 2.776$, H_0 is rejected. The regression is significant (Ans)