Name: Khan, Md. Shamim Masud        Section: O

ID: 18-36264-1

## 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 | 524.41 |
| 19.2 | 26.6 | 510.72 | 368.64 | 707.56 |
| 21.9 | 33.8 | 740.22 | 479.61 | 1142.44 |
| 23.3 | 42.8 | 997.24 | 542.89 | 1831.84 |

$\sum x = 104.4$   $\sum y = 153$   $\sum xy = 2936.68$   $\sum x^2 = 1933.12$   $\sum y^2 =$

## Compute Correlation Coefficient

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

$$= 1933.12 - \frac{(104.4)^2}{6}$$

$$= 116.56$$

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

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

$$= 4586.66 - \frac{(153)^2}{6}$$

$$= 2936.68 - \frac{(104.9 \times 153)}{6}$$

$$= 685.16$$

$$= 274.48$$

$$\therefore r = \frac{SP(xy)}{\sqrt{SS(x) \, SS(y)}} = \frac{274.48}{\sqrt{116.56 \times 685.16}} = .98$$

∴ The correlation between variable $(x)$ and $(y)$ is strongly positive.

③ Performing hypothesis test

$$H_0 \; P = 0 \qquad \text{against} \qquad H_A : P \neq 0$$

$$t = \frac{r\sqrt{n-2}}{\sqrt{1-r^2}} \sim t_{n-2}$$

$$= \frac{.98\sqrt{6-2}}{\sqrt{1-(0.98)^2}}$$

$$= 9.84$$

$|t| > t_{(n-2)} = 4$ ; thus $H_0$ is rejected.

© Fitting regression line of $y$ on $x$

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

$$= \frac{153}{6} - b\frac{104.4}{6} \quad \text{——} \textcircled{1}$$

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

$$= 2.36$$

From (i) $\Rightarrow$

$$a = \frac{153}{6} - (2.36)\frac{104.4}{6}$$

$$= -15.564$$

Fitted line: $\hat{y} = -15.564 + 2.36x$

d Lending rate when the inflation rate will be $25.5$

If $x = 25.5$, then $g = -15.564 + (2.$

$$= 44.616 \text{ (ans)}$$

(e) we need to test $H_0: \beta = 0$ vs $H_1: \beta \neq 0$

test static:

$$|t| = \frac{b}{\sqrt{\frac{S^v}{SS(x)}}}$$

$$S^2 = \frac{SS(y) - b\,SP(xy)}{n-2} = \frac{685.16 - (2.36 \times 244.18)}{6-2}$$

$$= 523.2168$$

$$|t| = \frac{2.36}{\sqrt{\frac{523.2168}{116.56}}}$$

$$= 1.11$$

$\therefore |t| < t_4 = 2.776$, So, $H_0$ is Accepte