Name : Md. Altabur Rahman

ID : 20-42107-1

Assignment

11.1

x	y	Σxy	Σx^2	Σy^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	524.91
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	1831.34
$\Sigma x = 104.4$	$\Sigma y = 153$	$\Sigma xy = 2936.68$	$\Sigma x^2 = 1933.12$	$\Sigma y^2 = 4586.66$

(a) $$SS(x) = \Sigma x^2 - \frac{(\Sigma x)^2}{6}$$

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

$$= 116.56$$

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

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

$$= 685.15$$

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

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

$$= 279.98$$

$$r = \frac{SP(xy)}{\sqrt{SS(x) \times SS(y)}}$$

$$= \frac{279.98}{\sqrt{116.56 \times 685.15}}$$

$$= 0.9713$$

(b) $H_0 : \rho = 0 \quad vs \quad H_1 : \rho \neq 0$

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

$$= \frac{0.97\sqrt{6-2}}{\sqrt{1-(6.97)^2}}$$

$$= 8.162 > t_4$$

(c) $$b = \frac{sp(xy)}{ss(x)}$$

$$= \frac{274.98}{116.56}$$

$$= 2.35$$

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

$$= \frac{153}{6} - 2.35 \times \frac{104.9}{6}$$

$$= -15.4797$$

$$\hat{y} = a + bx$$

$$= -15.4797 + 2.35x$$

(d) if $x = 25.5$;

$$y = -15.47 + (2.35 \times 25.5)$$

$$= 44.479$$

(e) $H_0 : B = 0 \quad vs H_1 : B_1 \neq 0$

$$s^2 = \frac{ss(y) - b(sp(xy))}{n-2}$$

$$= \frac{685.16 - 2.35(274.48)}{9}$$

$$= 9.7$$

$$t = \frac{b}{\sqrt{\frac{s^2}{ss(x)}}}$$

$$= \frac{2.35}{\sqrt{9.7/116.36}}$$

$$= 8.16 > t_4$$

Regression is significent.