

Exercises:

8.	x_i	2	3	5	1	8	4	2	1	1	2
	y_i	25	25	20	30	16	10	2	1	1	1

The estimate regression equation is $\hat{y} = \underbrace{30.33}_{b_0} - \underbrace{1.88x}_{b_1}$.

a. compute SSE, SSR, SST:

$$SSR = b_1^2(n-1) s_x^2 = (-1.88)^2(5-1)(7.7) = 108.86$$

$$SST = (n-1) s_y^2 = 4(28.7) = 114.8$$

$$SSE = SST - SSR = 5.94$$

b. compute the coefficient of determination r^2 .

$$r^2 = (r_{xy})^2 = (-0.97\dots)^2 = 0.945 \text{ OR } r^2 = \frac{SSR}{SST} = 0.945$$

c. compute the sample correlation coefficient.

$$r_{xy} = -0.97 \quad \text{By calculator}$$

$$\begin{aligned} \text{or } r_{xy} &= (\text{sign } b_1) \sqrt{r^2} \\ &= -\sqrt{0.945} \\ &= -0.97\dots \end{aligned}$$

$$9. \quad x_i : \quad 2 \quad 4 \quad 5 \quad 7 \quad 8$$

$$y_i : \quad 2 \quad 3 \quad 2 \quad 6 \quad 4$$

$$\rightarrow \hat{y} = \underbrace{0.75}_{b_0} + \underbrace{0.51}_{b_1} X$$

$$\rightarrow SSR = b_1^2 (n-1) \underbrace{S_x^2}_{5.7} = 5.93028$$

$$\rightarrow SST = (n-1) S_y^2 = 4(2.8) = 11.2$$

$$\rightarrow SSE = SST - SSR = 5.26972$$

$$\rightarrow r_{xy} = 0.726$$

$$\rightarrow r^2 = 0.527$$

b.

نصف 9 به ازای هر یک از متغیرهای مستقل 2 خط است

12.

speed :	18	15	16	17	22	16	24	18	20
price :	61.35	70.13	77.39	82.93	92.34	99.52	119.10	121.64	133.53

a. develop the estimated regression equation ... ?

$$\hat{y} = b_0 + b_1 X$$

$$= 22.341 + 3.885 X$$

b. compute r^2 :

$$r^2 = (r_{xy})^2 = (0.502\dots)^2 = 0.252 \rightarrow \text{percentag} \approx 25$$

c. what is the sample correlation ?

$$r_{xy} = 0.502 \quad \text{it reflects a weak linear relationship.}$$

Done