

PRACTICE LESSON 4.2

EXERCISE 1

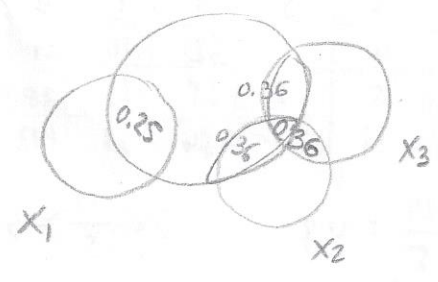
$$r_{23}^2 = 0.6^2 = 0.36$$

$$r_{41}^2 = 0.5^2 = 0.25$$

$$r_{42}^2 = 0.6^2 = 0.36$$

$$r_{43}^2 = 0.6^2 = 0.36$$

$$R_{Y,123}^2 = 0.84^2 = 0.705$$



(a) 1° — $R_{Y,1}^2 = 0.25$

2° — $R_{Y(2,1)}^2 = 0.36$

3° — $R_{Y(3,21)}^2 = R_{Y,123}^2 - R_{Y,1}^2 - R_{Y(2,1)}^2 = 0.705 - 0.25 - 0.36 = 0.095$

(b) 1° — $R_{Y,3}^2 = 0.36$

2° — $R_{Y(2,3)}^2 = ? \rightarrow R_{Y,123}^2 = R_{Y,3}^2 + R_{Y(2,3)}^2 + R_{Y(1,23)}^2$

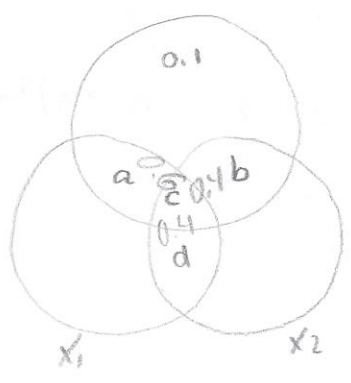
3° — $R_{Y(1,23)}^2 = 0.25 \quad 0.705 = 0.36 + R_{Y(2,3)}^2 + 0.25$

$$0.705 = 0.61 + R_{Y(2,3)}^2$$

$$0.705 - 0.61 = R_{Y(2,3)}^2$$

$$0.095 = R_{Y(2,3)}^2$$

EXERCISE 2



$$a + c + b = 0.9$$

$$a + c = 0.6$$

$$b = 0.9 - 0.6 = 0.3$$

$$b + c = 0.4$$

$$a = 0.9 - 0.4 = 0.5$$

$$c = 0.1$$

$$c + d = 0.4$$

$$d = 0.4 - 0.1 = 0.3$$

EXERCISE 3

SUMA CUADRADOS MODELO SIMPLE (X₁)

y	x ₁	x ₂	XY	X ²	Y ²
1	1	3	1	1	1
4	2	3	8	4	16
6	3	5	18	9	36
8	4	7	32	16	64
5	5	5	25	25	25
Σ	24	15	84	55	142

$$\bar{y} = \frac{24}{5} = 4.8 \quad \bar{x} = \frac{15}{5} = 3$$

$$S_y = \sqrt{\frac{\sum Y^2}{N} - \bar{y}^2} = \sqrt{\frac{142}{5} - 4.8^2} = \sqrt{28.4 - 23.04} = \sqrt{5.36} = 2.31$$

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

$$\hat{y} = 1.2 + 1.2x$$

$$S_{\text{exp}} = \sum (\hat{y} - \bar{y})^2 = (2.4 - 4.8)^2 + (3.6 - 4.8)^2 + (4.8 - 4.8)^2 + (6 - 4.8)^2 + (7.2 - 4.8)^2 = 5.76 + 1.44 + 0 + 1.44 + 5.76 = \boxed{14.4}$$

$$\hat{a} = \bar{y} - b\bar{x} = 4.8 - 1.2 \cdot 3 = 1.2 - 2.62 = 1.17$$

$$b = r_{xy} \cdot \frac{S_y}{S_x} = 0.74 \cdot \frac{2.31}{1.41} = 1.21$$

$$r_{xy} = \frac{\frac{\sum XY}{N} - \bar{x}\bar{y}}{S_x S_y} = \frac{\frac{84}{5} - 3 \cdot 4.8}{1.41 \cdot 2.31} = \frac{16.8 - 14.4}{3.26} = \frac{2.4}{3.26} = 0.74$$

$$S_x = \sqrt{\frac{\sum X^2}{N} - \bar{x}^2} = \sqrt{\frac{55}{5} - 3^2} = \sqrt{11 - 9} = \sqrt{2} = 1.41$$

$$\hat{y}_1 = 1.2 + 1.2 \cdot 1 = 2.4$$

$$\hat{y}_2 = 1.2 + 1.2 \cdot 2 = 3.6$$

$$\hat{y}_3 = 1.2 + 1.2 \cdot 3 = 4.8 + 3$$

$$\hat{y}_4 = 1.2 + 1.2 \cdot 4 = 6$$

$$\hat{y}_5 = 1.2 + 1.2 \cdot 5 = 7.2$$

SUMA CUADRADOS MODELO MÚLTIPLE

$$\hat{y} = -1.55 + 0.2x_1 + 1.25x_2$$

$$\hat{y}_1 = -1.55 + 0.2 \cdot 1 + 1.25 \cdot 3 = 2.4$$

$$\hat{y}_2 = -1.55 + 0.2 \cdot 4 + 1.25 \cdot 3 = 2.6$$

$$\hat{y}_3 = -1.55 + 0.2 \cdot 3 + 1.25 \cdot 5 = 5.3$$

$$\hat{y}_4 = -1.55 + 0.2 \cdot 4 + 1.25 \cdot 7 = 8$$

$$\hat{y}_5 = -1.55 + 0.2 \cdot 5 + 1.25 \cdot 5 = 5.7$$

$$S_{\text{exp}} = \sum (\hat{y} - \bar{y})^2 = (2.4 - 4.8)^2 + (2.6 - 4.8)^2 + (5.3 - 4.8)^2 + (8 - 4.8)^2 + (5.7 - 4.8)^2 = \boxed{21.9}$$

$$21.9 - 14.4 = 7.5$$

EXERCISE 4

$$SS_T = \text{REG} + \text{RES} = 2478.245 + 13.803.917 = 16282.162$$

$$R^2_{y1} = \frac{SS_{\text{exp}}}{SS_T} = \frac{2478.245}{16282.162} = 0.152$$

$$R^2_{y(\hat{2}.1)} = R^2_{y.12} - R^2_{y1} = 0.686 - 0.152 = 0.534$$

$$R^2_{y.12} = \frac{11172.645}{16282.162} = 0.686$$

$$R^2_{y(3.12)} = R^2_{y.123} - R^2_{y.12} = 0.71 - 0.686 = 0.024$$

$$R^2_{y.123} = \frac{11561.958}{16282.162} = 0.71$$