

Problema 1

Cost (K€)	Vender (K unitat)
100	175
110	138
119	106
123	109
123	174
127	184
130	151
132	146

A1. $\bar{y} = a\bar{x} + b$, $a = \frac{SS_{xy}}{SS_x} = \frac{\sum(x-\bar{x})(y-\bar{y})}{\sum(x-\bar{x})^2}$, $b = \bar{y} - a\bar{x}$

$\bar{x} = 120.5$ $\bar{y} = 148$

$SS_x = (100 - 120.5)^2 + (110 - 120.5)^2 + (119 - 120.5)^2 + (123 - 120.5)^2 +$
 $(123 - 120.5)^2 + (127 - 120.5)^2 + (130 - 120.5)^2 + (132 - 120.5)^2$
 $SS_x = 810$

$SS_{xy} = (100 - 120.5)(175 - 148) + (110 - 120.5)(138 - 148) + (119 - 120.5)(106 - 148) + (123 - 120.5)(109 - 148) +$
 $(123 - 120.5)(174 - 148) + (127 - 120.5)(184 - 148) + (130 - 120.5)(151 - 148) + (132 - 120.5)(146 - 148)$

$SS_{xy} = -178.5$

$a = \frac{-178.5}{810} = -0.22$

$b = 148 - (-0.22) \cdot 120.5 = 174.51$

Recta de Regressió: $y = -0.22x + 174.51$

Residual = $\sum(y - \hat{y})^2 = (175 - 152.51)^2 + (138 - 150.31)^2 + (106 - 148.33)^2 + (109 - 147.45)^2 +$
 $(174 - 147.45)^2 + (184 - 146.57)^2 + (151 - 145.91)^2 + (146 - 145.47)^2 = \underline{6059.664}$

A2 $x = 150 \rightarrow y = -0.22 \cdot 150 + 174.51 = \underline{141.51}$ K unitat

A3 $y = 150 \rightarrow x = 111.41$ K €

A4 $r^2 = \frac{SS_{xy}^2}{SS_x SS_y}$

$SS_y = (175 - 148)^2 + (138 - 148)^2 + (106 - 148)^2 + (109 - 148)^2 + (174 - 148)^2 + (184 - 148)^2 +$
 $(151 - 148)^2 + (146 - 148)^2 = 6099$

$r^2 = \frac{(-178.5)^2}{810 \cdot 6099} = 0.0064$ $r = 0.08$

A5.

Cost	Vender	Rank x_i	Con Rank x_i	Rank y_i	d_{ii}	d_i^2
100	135	1	1	7	-6	36
110	138	2	2	3	-1	1
119	106	3	3	1	2	4
123	109	4	4.5	2	2.5	6.25
123	174	5	4.5	6	-1.5	2.25
127	184	6	6	8	-2	4
130	151	7	7	5	2	4
132	146	8	8	4	4	16

$$\sum d_i^2 = 73.5$$

$$r_s = 1 - \frac{6 \cdot 73.5}{8(64-1)} = 0.125$$

Correlació Pearson: 0.08

Correlació Spearman: 0.125

B1

$$r^2 = \frac{SS_{xy}^2}{SS_x SS_y}$$

Alumne	A	B	C	D	E	F
Nota CRI	55	69	93	76	100	63
Nota APC	57	94	70	66	90	85

$$\bar{x} = 76, \quad \bar{y} = 77$$

$$SS_{xy} = \sum (x - \bar{x})(y - \bar{y}) = (55-76)(57-77) + (69-76)(94-77) + \dots = 390$$

$$SS_x = \sum (x - \bar{x})^2 = (55-76)^2 + (69-76)^2 + \dots = 1524$$

$$SS_y = \sum (y - \bar{y})^2 = (57-77)^2 + (94-77)^2 + \dots = 1092$$

$$r^2 = \frac{390^2}{1524 \cdot 1092} = 0.091 \rightarrow r = 0.3$$

x_i	y_i	rank x_i	rank y_i	d_{ii}	d_i^2
55	57	1	1	0	0
69	94	3	6	-3	9
93	70	5	3	2	4
76	66	4	2	2	4
100	90	6	5	1	1
63	85	2	4	-2	4

$$\sum d_i^2 = 22$$

$$r_s = 1 - \frac{6 \cdot 22}{6 \cdot (36-1)}$$

$$r_s = 0.37$$

Correlació positiva \rightarrow Bona Nota CRI \approx Bona Nota APC

Pearson = 0.125 } Baixa Correlació \rightarrow No sempre es compleix
 Spearman = 0.37 }