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6. Two economics students, Andi and Behrouz, are studying some data relating to unemployment, x%, and increase in wages, y%, for a European country. The least squares regression line of y on x has equation

$$y = 3.684 - 0.3242x$$

and $\sum y = 23.7$ $\sum y^2 = 42.63$ $\sum x^2 = 756.81$ $n = 16$

(a) Show that $S_{yy} = 7.524\,375$

(1)

(b) Find S_{xx}

(4)

(c) Find the product moment correlation coefficient between x and y.

(3)

Behrouz claims that, assuming the model is valid, the data show that when unemployment is 2% wages increase at over 3%

(d) Explain how Behrouz could have come to this conclusion.

(1)

Andi uses the formula

$$\text{range} = \text{mean} \pm 3 \times \text{standard deviation}$$

to estimate the range of values for x.

(e) Find estimates of the minimum value and the maximum value of x in these data using Andi's formula.

(3)

(f) Comment, giving a reason, on the reliability of Behrouz's claim.

(2)

Andi suggests using the regression line with equation $y = 3.684 - 0.3242x$ to estimate unemployment when wages are increasing at 2%

(g) Comment, giving a reason, on Andi's suggestion.

(2)

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