Interpreting Pearson's and Spearman's coefficients

Grade 8 | Higher | 5 questions, 20 marks

GCSE Statistics topic practice

Name: _____ **Date:** _____ **Score:** _____ / 20

1 Ama collects data on 12 days at a beach cafe. She calculates Pearson's product moment correlation coefficient (PMCC) for three pairs of variables.

Variables	PMCC
Hours of sunshine and ice cream sales	0.92
Rainfall and ice cream sales	−0.71
Wind speed and ice cream sales	−0.08

a. Interpret the value 0.92 in context. (1)

b. Interpret the value −0.08 in context. (1)

c. Ama's brother works out the PMCC for temperature and ice cream sales. His answer is 1.3. Explain why his answer must be wrong. (1)

(3 marks)

2 Three judges, A, B and C, each rank the same 8 cakes in a baking competition. Spearman's rank correlation coefficient for judges A and B is 0.86. Spearman's rank correlation coefficient for judges A and C is −0.9

a. Interpret the value 0.86 in context. (1)

b. Interpret the value −0.9 in context. (1)

c. Is Spearman's rank correlation coefficient for judges B and C likely to be positive or negative? Give a reason for your answer. (2)

(4 marks)

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3 The scatter diagram shows the age, in years, and the value, in thousands of pounds, of 8 cars of the same model.

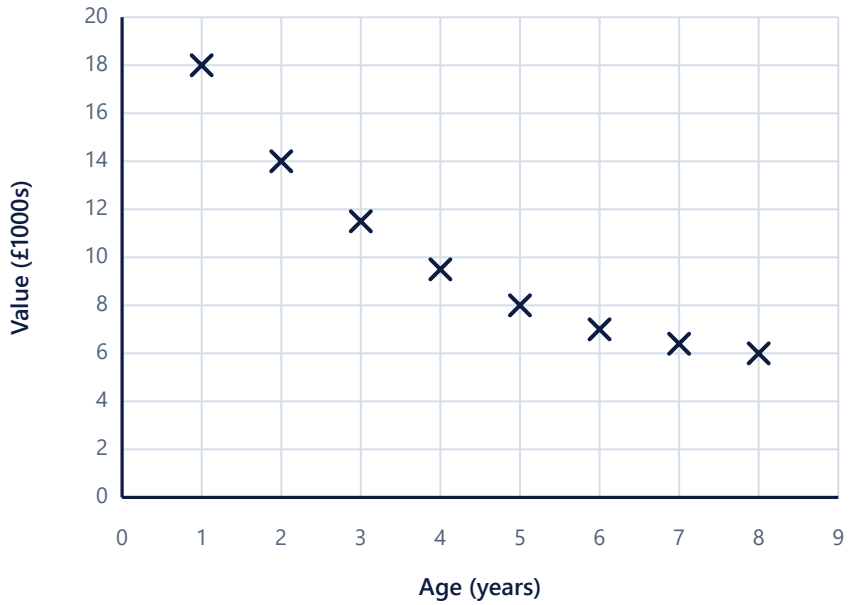
For these data, Spearman's rank correlation coefficient is −1 and Pearson's product moment correlation coefficient is −0.95

a. Explain what Spearman's rank correlation coefficient of −1 shows about these cars. (1)

b. Interpret the value of Pearson's product moment correlation coefficient. (1)

c. Use the scatter diagram to explain why Pearson's coefficient is not exactly −1 (1)

d. For the same 8 cars, Spearman's rank correlation coefficient between age and number of seats is 0.06. Interpret this value. (1)



(4 marks)

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4 The scatter diagram shows the distance from the railway station, in km, and the price, in thousands of pounds, of 9 flats in a town.

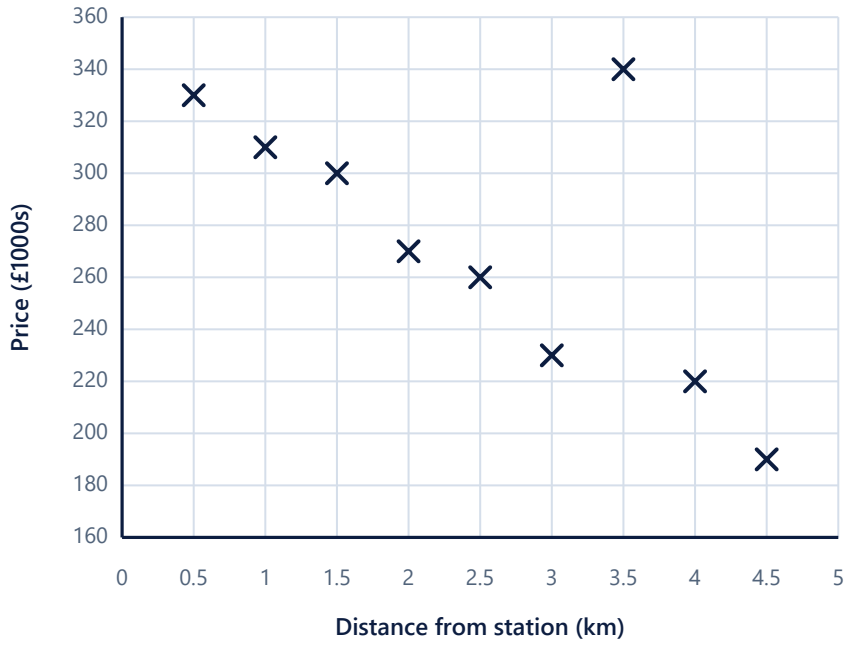
Pearson's product moment correlation coefficient for all 9 flats is −0.69. When one of the flats is left out, the coefficient for the other 8 flats is −0.99

a. On the scatter diagram, draw a ring around the flat that was left out. (1)

b. Interpret the value −0.99 in context. (1)

c. Explain why leaving out this one flat changes the coefficient so much. (1)

d. Give one reason why this flat should not simply be ignored. (1)



(4 marks)

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5 A researcher records the number of takeaway shops and the number of GP surgeries in each of 10 towns. For these data, Pearson's product moment correlation coefficient is 0.89

a. Interpret the value 0.89 in context. (1)

b. A newspaper headline says, "Opening more takeaways makes a town need more doctors." Comment on this headline. (2)

c. For the same data, Spearman's rank correlation coefficient is 0.98. Explain what it suggests about the relationship that Spearman's coefficient is closer to 1 than Pearson's coefficient. (2)

(5 marks)

End of questions | Total 20 marks

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