



H09-10min Spearman's Rank Correlation: 10-minute Pack

EDEXCEL 1ST0 · Calculator allowed · about 10 minutes

Total Marks

Name: _____ Date: ____ / ____ / ____

Answer ALL questions. Show all your working.

- 1** At a village show, two judges rank 5 chutneys from 1 (best) to 5 (worst). Their rankings are shown in the table, with some of the differences d already filled in.

Chutney	Judge 1 rank	Judge 2 rank	d
Bramble	1	2	-1
Fig	2	1	1
Onion	3	3	
Plum	4	5	
Apple	5	4	1

- (a) Complete the table by finding the missing values of d for Onion and Plum. (2)
- (b) Calculate the sum of the squared differences, sum of d^2 . (1)
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- (c) Use the formula $r_s = 1 - (6 \times \text{sum of } d^2) / (n(n^2-1))$ to calculate r_s . (2)
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- (d) Interpret the value $r_s = 0.8$, referring to the strength and direction of agreement between the two judges. (1)

(Total for Question 1 is 6 marks)

- 2** At a regional bake-off, three separate pairs of judges each rank the same set of entries using different criteria. The Spearman's rank correlation coefficient is given for each pair.

Judging pair	rs
Pastry vs Presentation	0.92
Presentation vs Taste	0.15
Pastry vs Taste	-0.68

- (a) Write down which pair of criteria shows the weakest association. (1)
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- (b) Write down which pair of criteria shows the strongest association, regardless of (2)
whether it is positive or negative.
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- (c) Explain what the coefficient $r_s = -0.68$ for Pastry vs Taste tells the competition (2)
organisers.

(Total for Question 2 is 5 marks)

Mark scheme • H09-10min Spearman's Rank Correlation: 10-minute Pack

Question 1

- (a) **B1** Onion $d = 0$
- (a) **B1** Plum $d = -1$
- (a) **Answer: Onion: $d = 0$; Plum: $d = -1$**
- (b) **B1** 4 cao
- (b) **Answer: 4**
- (c) **M1** $r_s = 1 - (6 \times 4) / (5 \times 24)$, oe
- (c) **A1** 0.8 cao
- (c) **Answer: 0.8**
- (d) **B1** a strong positive agreement between the two judges' rankings oe
- (d) **Answer: A strong positive agreement - the two judges rank the chutneys in a very similar order.**

Question 2

- (a) **B1** Presentation vs Taste cao
- (a) **Answer: Presentation vs Taste**
- (b) **M1** compares the size of each coefficient ignoring sign (0.92, 0.15, 0.68)
- (b) **A1** Pastry vs Presentation cao
- (b) **Answer: Pastry vs Presentation**
- (c) **B1** identifies a fairly strong negative association: entries that rank highly for pastry tend to rank poorly for taste, and vice versa
- (c) **B1** a sensible conclusion for the organisers, e.g. good pastry technique does not reliably predict good taste, so both criteria need to be judged separately oe
- (c) **Answer: Entries that score well for pastry technique tend to score less well for taste, and vice versa; the organisers should judge and score both criteria independently rather than relying on one to predict the other.**