



F07-test Spearman's Rank Interpretation: Test Pack

EDEXCEL 1ST0 · Calculator allowed · about 20 minutes

Total Marks

Name: _____ Date: ____ / ____ / ____

Answer ALL questions. Show all your working.

- 1** At a village fete, two judges independently rank 6 cakes from 1 (best) to 6 (worst). Their rankings are shown in the table.

Cake	Judge A rank	Judge B rank
Victoria sponge	1	1
Lemon drizzle	2	2
Carrot cake	3	3
Chocolate fudge	4	5
Banana loaf	5	4
Coffee and walnut	6	6

The Spearman's rank correlation coefficient for these two sets of rankings is $r_s = 0.94$.

- (a) State whether $r_s = 0.94$ shows a positive or negative association between the two judges' rankings. (1)
- (b) Write down whether the value 0.94 is closer to 0 or closer to 1. (1)
- (c) Using the value of r_s , describe how closely the two judges agree on the order of the cakes. (2)

(Total for Question 1 is 4 marks)

- 2** Write down whether $r_s = -0.12$ is closer to 0 or closer to -1.

(Total for Question 2 is 1 mark)

- 3** Two coefficients are given: $r_s = -0.81$ for Group P and $r_s = 0.35$ for Group Q. Write down which group shows the stronger association, regardless of sign, explaining your reasoning.

(Total for Question 3 is 2 marks)

- 4** In a photography competition, Assessor A and Assessor B each score 5 entries out of 20. Assessor B gives two entries the same score.

Photo	Assessor A score	Assessor A rank	Assessor B score	Assessor B rank
1	18	1	19	1
2	14	3	15	?
3	12	4	15	?
4	16	2	13	4
5	9	5	10	5

- (a) Photo 2 and Photo 3 both scored 15 from Assessor B. Work out the rank that should be given to each of these two photos. (2)

- (b) Explain why Photo 2 and Photo 3 are given the same rank instead of one being ranked above the other. (1)

- (c) Give one reason why it would not be appropriate to simply give Photo 2 rank 2 and Photo 3 rank 3 (in either order). (1)

(Total for Question 4 is 4 marks)

- 5 At a talent show, two panels of judges independently rank the acts in three categories. The Spearman's rank correlation coefficient between the two panels is given for each category.

Category	r_s
Costume	0.88
Dance	0.45
Singing	-0.91

- (a) Write down which category shows the weakest association between the two panels. (1)

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- (b) Write down which category shows the strongest association between the two panels, regardless of whether it is positive or negative. (2)

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- (c) Explain what the coefficient for the Singing category tells the organisers about the two panels' rankings. (2)

(Total for Question 5 is 5 marks)

- 6** Three pairs of assessors each rank the same set of entries in a competition. The Spearman's rank correlation coefficient is given for each pair.

Pair	r_s
X	0.97
Y	-0.63
Z	0.08

The competition organiser wants to know which pair of assessors can be trusted to judge consistently together, and which pair actively disagree.

- (a) Write down which pair shows the strongest agreement. (1)

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- (b) Explain why pair Y should be described as disagreeing with each other, rather than simply showing a weak association. (2)

- (c) Explain why a coefficient of $r_s = 0.08$ for pair Z does not necessarily mean either assessor is bad at judging. (2)

(Total for Question 6 is 5 marks)

Mark scheme · F07-test Spearman's Rank Interpretation: Test Pack

Question 1

- (a) **B1** Positive cao
- (a) **Answer: Positive**
- (b) **B1** Closer to 1 cao
- (b) **Answer: Closer to 1**
- (c) **B1** identifies the agreement as strong/very strong
- (c) **B1** links this to rs being close to +1, e.g. the two judges ranked the cakes in almost the same order
- (c) **Answer: The judges agree strongly; rs is close to +1 so they ranked the cakes in almost the same order.**

Question 2

- **B1** Closer to 0 cao
- **Answer: Closer to 0**

Question 3

- **M1** compares the sizes of the coefficients ignoring sign, 0.81 and 0.35
- **A1** Group P cao
- **Answer: Group P**

Question 4

- (a) **M1** recognises the two tied scores would occupy positions 2 and 3, oe
- (a) **A1** 2.5 for both cao
- (a) **Answer: 2.5 (for both Photo 2 and Photo 3)**
- (b) **B1** they scored exactly the same, so there is no fair way to place one above the other oe
- (b) **Answer: They scored exactly the same, so neither can fairly be placed above the other.**
- (c) **B1** this would treat the tie unfairly/arbitrarily, making one photo look better than the other when the scores show they are equal oe
- (c) **Answer: It would arbitrarily favour one photo over the other, even though their scores show they are equally good.**

Question 5

- (a) **B1** Dance cao
- (a) **Answer: Dance**
- (b) **M1** compares the size of each coefficient ignoring sign (0.88, 0.45, 0.91)
- (b) **A1** Singing cao
- (b) **Answer: Singing**
- (c) **B1** identifies that the two panels strongly disagree (a negative association)
- (c) **B1** draws a sensible conclusion for the organisers, e.g. the panels are judging the singing acts very differently, so they may want to check the judging criteria for that category
- (c) **Answer: The two panels strongly disagree on the singing rankings; the organisers may want to review how that category is being judged.**

Question 6

- (a) **B1** X cao
- (a) **Answer: X**
- (b) **B1** rs for Y is negative, showing the two assessors' rankings run in opposite directions oe
- (b) **B1** -0.63 is a fairly large negative value (not close to 0), so this disagreement is fairly strong, not weak oe
- (b) **Answer: Y's coefficient is negative and fairly large in size, so the assessors' rankings tend to run in opposite directions - a real disagreement, not just a weak link.**
- (c) **B1** rs measures agreement between the two rankings, not the quality/ability of either assessor oe
- (c) **B1** a low rs simply means the two assessors are ranking the entries in largely different orders from each other, which is not the same as either ranking being wrong oe
- (c) **Answer: rs only measures how closely the two rankings match each other, not whether either assessor is good at judging; a low value just means their orders differ, not that one (or both) is incorrect.**