Spearman's rank correlation coefficient

Grade 7 | Higher | 5 questions, 21 marks

GCSE Statistics topic practice

Name: _____ **Date:** _____ **Score:** _____ **/ 21**

1 Seven football teams are ranked by their position in the league and by their average home attendance.

For these seven teams, $\Sigma d^2 = 14$, where d is the difference between the two ranks for a team.

a. Calculate Spearman's rank correlation coefficient. (2)

b. Interpret your answer to part (a) in context. (1)

(3 marks)

2 Two judges, Judge X and Judge Y, each rank eight cakes at a village show. Rank 1 is the best cake.

Cake	A	B	C	D	E	F	G	H
Judge X	1	2	3	4	5	6	7	8
Judge Y	3	1	2	6	4	8	5	7

a. Calculate Spearman's rank correlation coefficient for these ranks. Give your answer correct to 3 decimal places. (3)

b. Interpret your answer to part (a) in context. (1)

(4 marks)

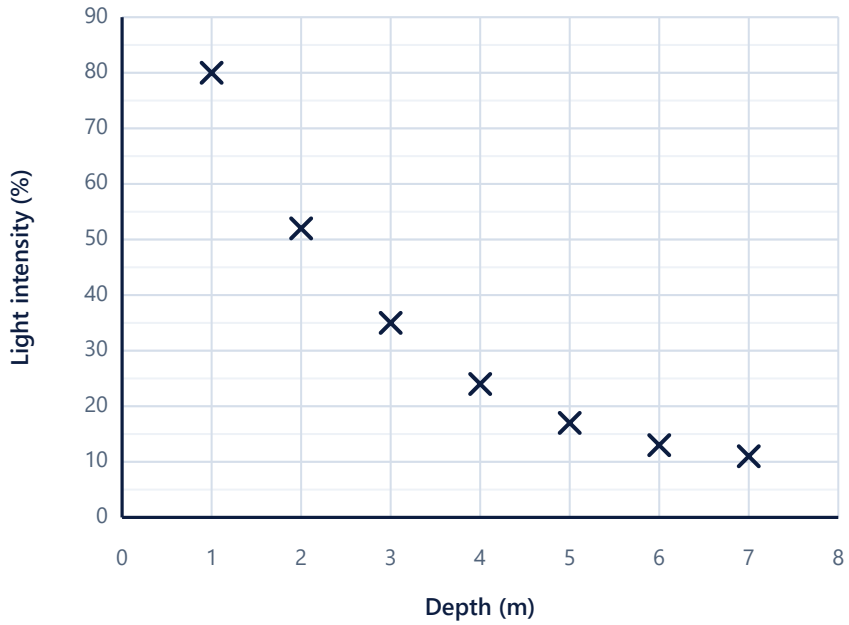
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3 A diver measures the light intensity, as a percentage of the light at the surface, at seven depths in a lake. The scatter diagram shows her results.

a. Write down the value of Spearman's rank correlation coefficient for these data. Give a reason for your answer. (2)

b. Explain why Pearson's product moment correlation coefficient for these data is not −1. (1)

c. The diver takes one more reading. At a depth of 8 m the light intensity is 12%. Explain why Spearman's rank correlation coefficient for all eight readings is not −1. (1)



(4 marks)

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4 The table shows the weekly screen time, in hours, and the mark in a test for each of six students.

Student	A	B	C	D	E	F
Screen time (hours)	12	5	20	8	15	3
Test mark	55	72	40	70	61	80
Screen time rank						
Test mark rank						

a. Complete the table by ranking the screen times and the test marks. Use rank 1 for the highest value. (2)

b. Calculate Spearman's rank correlation coefficient. Give your answer correct to 3 decimal places. (2)

c. Interpret your answer to part (b) in context. (1)

(5 marks)

5 A manager and her deputy each rank the 10 applicants for a job. Spearman's rank correlation coefficient for their two sets of ranks is 0.6

a. Work out the value of Σd^2 for the two sets of ranks. (3)

b. The manager and the deputy both ranked applicant J in 10th place. Applicant J then withdraws, so the ranks of the other 9 applicants do not change. Calculate Spearman's rank correlation coefficient for the 9 remaining applicants. (2)

(5 marks)

End of questions | Total 21 marks

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