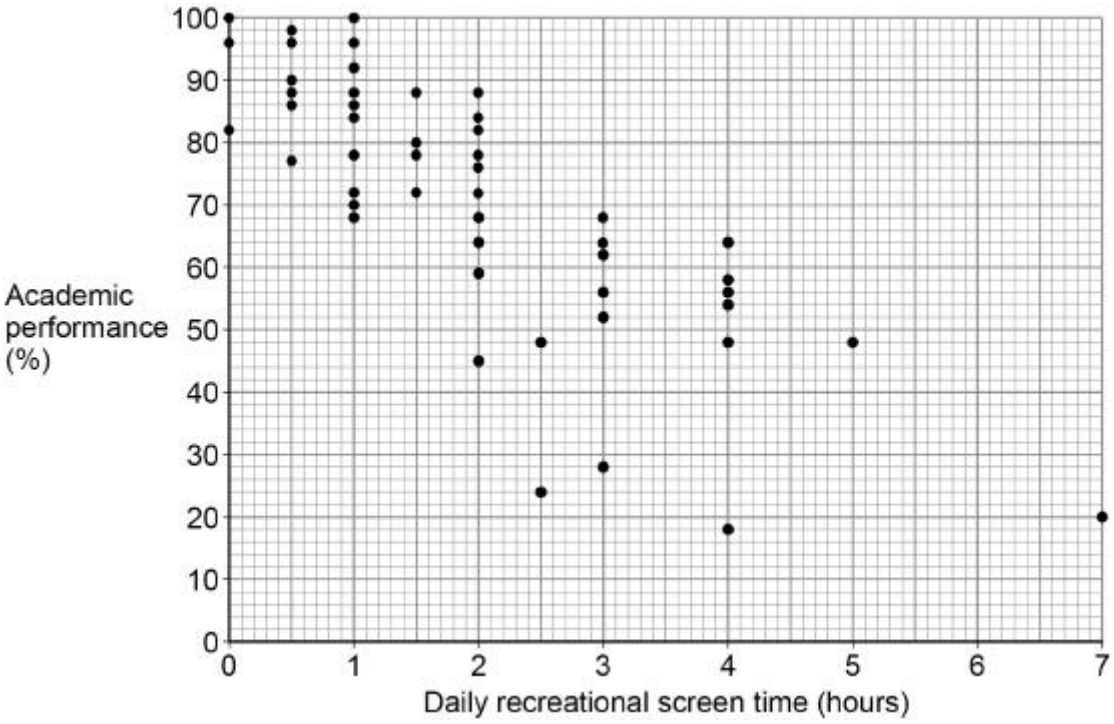
Q1.

A study into the relationship between recreational screen time and academic achievement was conducted. Students were asked to self-report the number of hours spent watching TV, playing on their mobile phones or video games (daily recreational screen time) and their end-of-year test performances (academic performance).

The results of the study are shown in the diagram below.

The relationship between daily recreational screen time and academic performance



(a) In which section(s) of a scientific report would you expect to find reference to the results/findings of the investigation?

Shade **one** circle only.

A The abstract and the results sections only ⬭

B The abstract, the discussion and the results sections only ⬭

C The results and the discussion sections only ⬭

D The results section only ⬭

(1)

(b) Which of the following correlation co-efficients best describes the data represented in the graph above?

Shade **one** circle only.

A –0.80 ⬭

B –0.25 ⬭

C +0.25 ⬭

D +0.80 ⬭

(1)

(c) Identify the type of graph shown in the figure above and explain why this is an appropriate graph to use for the data collected.

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(3)

(d) Explain why it would not be appropriate for the researchers to conclude that increased recreational screen time reduces academic performance.

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(2)

(Total 7 marks)

Q2.

A researcher investigated whether there was a correlation between the number of hours slept and how well rested students felt.

The researcher randomly selected 18 participants from first-year students at a university.

On the day of the study, each student participant was asked, 'How many hours did you sleep last night?' They then had to rate on a scale of 1 to 5 how well rested they felt.

The researcher hypothesised that there would be a positive correlation between the two co-variables.

(a) Outline **one** reason why it was appropriate to conduct a correlation rather than an experiment in this case.

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(2)

(b) Describe how the researcher could have used random sampling to obtain the students for this study.

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(3)

The researcher used Spearman's rho statistical test to analyse the data from this study.

(c) Explain why Spearman's rho was a suitable test for this study. Refer to the description of the study in your answer.

(4)

The researcher chose to use the 5% level of significance and the calculated correlation coefficient for the Spearman's rho test was 0.395

Critical values of rho

Level of significance for a one-tailed test	0.05	0.025
Level of significance for a two-tailed test	0.10	0.05
N = 16	0.429	0.503
17	0.414	0.485
18	0.401	0.472
19	0.391	0.460
20	0.380	0.447

The calculated value of rho must be greater than or equal to the critical value to be significant.

(d) Identify the appropriate critical value from the table above. Explain your choice.

(4)

(e) Explain whether the researcher's hypothesis should be accepted. Refer to the critical value identified in **part (d)** in your answer.

(2)

(f) Explain why the researcher decided to use the 5% level of significance rather than the 1% level in this study.

(2)

When the researcher compared the calculated and critical values of rho, he began to wonder if he might have made a Type II error.

(g) Explain what is meant by a Type II error in the context of this study.

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(2)

(Total 19 marks)

Q3.

Researchers discovered a strong positive correlation between the number of therapy sessions attended by people with obsessive-compulsive disorder and their well-being ratings.

Explain why it would not be appropriate to conclude that therapy increases well-being ratings.

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(Total 2 marks)