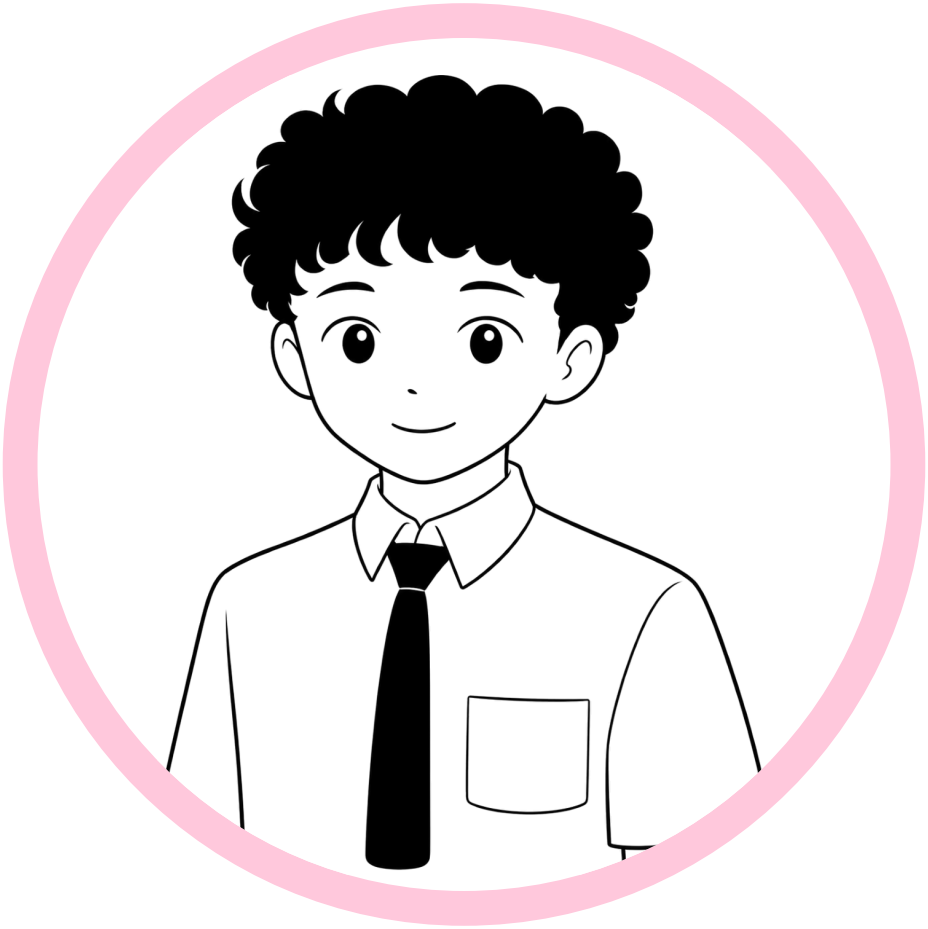
AQA A-LEVEL PSYCHOLOGY · 7182

PSYCHOLOGY



EXAM QUESTION PACK

3.2.3 CORRELATIONS

SCORE	PERCENTAGE
/172	%

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Q1.

Read the text below and then answer the questions that follow.

Two researchers obtained a sample of ten people whose ages ranged from 20-years-old to 60-years-old.

Each participant was asked to take part in a discussion of social care issues. This included discussion about who should pay for social care for elderly people and how to deal with people struggling with mental health problems. A confederate of the researchers was given a script to follow in which a series of discussion points was written for the confederate to introduce.

Each participant then came into a room individually and the discussion with the confederate took place. The maximum time allowed for a discussion was 30 minutes.

The researchers observed the discussions between the confederate and participants and rated the active engagement of the participants in the discussion. The ratings were between 1, (not at all interested) and 20, (extremely interested.) The researchers believed that the rating provided a measurement of the participants' attitudes towards social care issues.

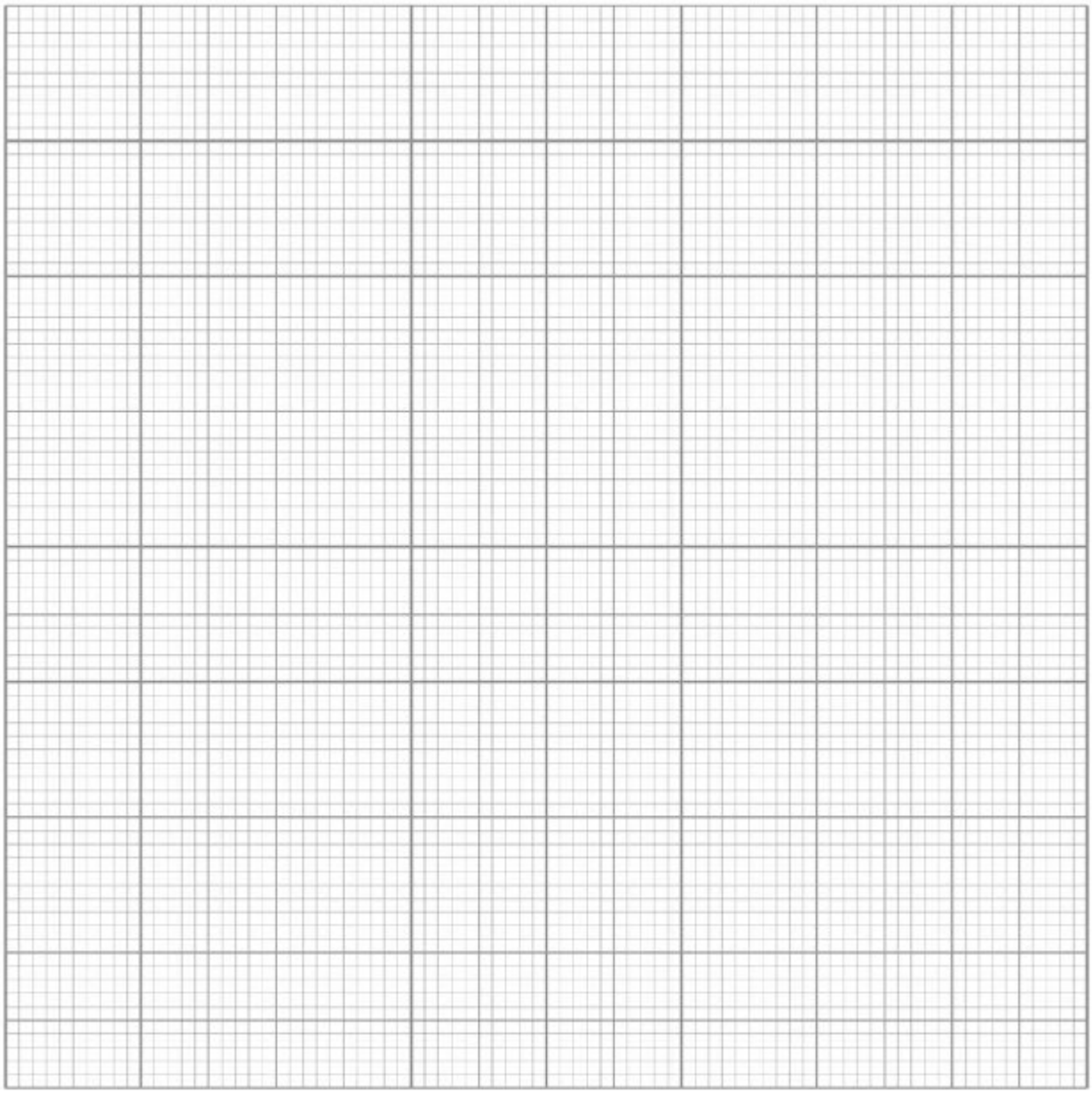
The following data were obtained in the study:

The relationship between age and attitude to social care.

Age of participant	Attitude to social care issues rating
21	5
23	3
34	8
36	12
40	10
47	13
52	17
53	15
58	18
60	20

(a) Use the graph paper below to sketch a display of the data given in the table above. You do not need to give your display a title.

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(3)

(b) What does the display you have drawn in your answer in part (a) suggest about the relationship between age and attitude to social care issues? Explain your answer.

_____

_____

_____

_____

(2)

(c) The researchers rated the active engagement of the participants in the discussion on social care. They used this rating as a measure of each participant's attitude to social care issues.

Briefly explain how investigator effects might have occurred in this study.

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(2)

(d) Outline how the researchers could have avoided investigator effects having an impact on the study.

(2)

The researchers thought it might be interesting to investigate further the attitudes of the participants in the study. They decided to interview each participant. The researchers devised a questionnaire in order to collect the data they required. The questionnaire included both open and closed questions.

(e) Briefly discuss the benefits for the researchers of using **both** closed **and** open questions on their questionnaire about attitudes to social care.

(4)

(f) Write **one** question that you think the researchers might have put on their questionnaire. Explain which type of question you have written and why you think this would be a suitable question for this study.

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(3)

The researchers have obtained both qualitative and quantitative data in the observations and interviews they have conducted.

(g) Identify the qualitative and quantitative data collected in this study. Explain your answer.

(4)

(h) Explain how the researchers should have addressed **two** ethical issues in the investigation.

(4)

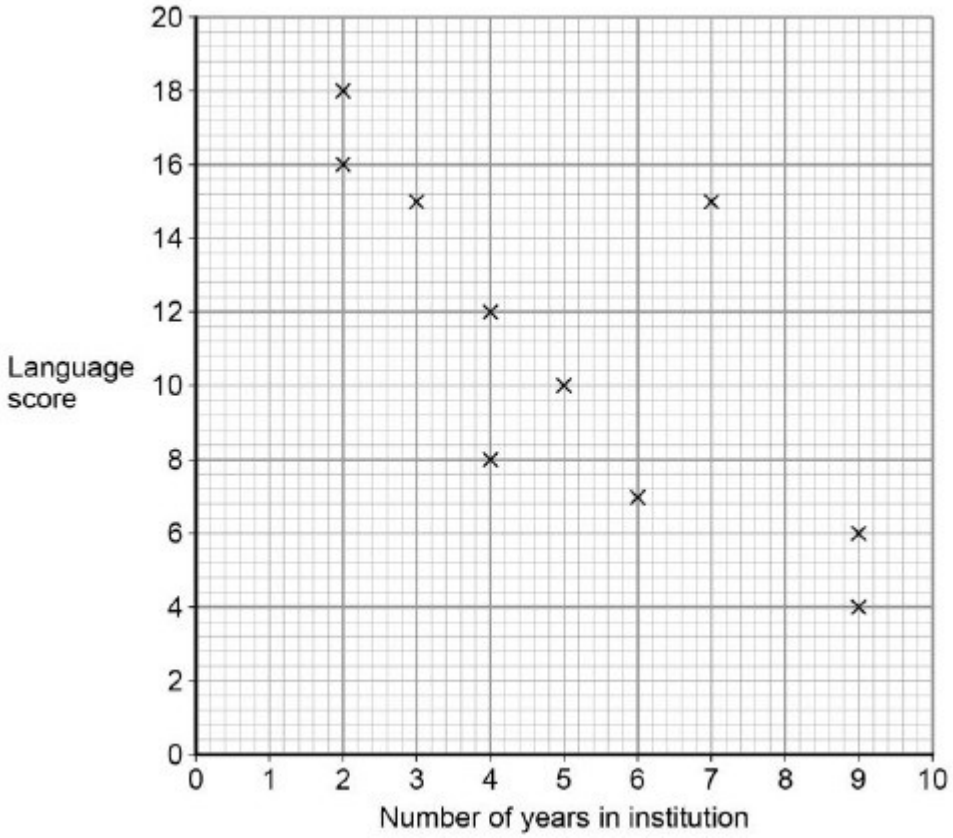
(Total 24 marks)

Q2.

A psychologist thinks that there may be a link between language ability and institutionalisation. She tests the language skills of 8-year-old institutionalised children. A high score on the test indicates good language ability and a low score on the test indicates poor language ability. She also records the number of years that each child has been institutionalised. The findings are shown in the figure below.

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The relationship between time spent in institution and language score



(a) Which research method is the psychologist using in this study? Explain your answer.

_____

_____

_____

_____

(2)

(b) Identify the type of graphical display in the figure. Shade **one** box only.

A Histogram ⬭

B Bar graph ⬭

C Line graph ⬭

D Scattergram ⬭

(1)

(c) How many children took part in the study?

_____

_____

(1)

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(d) What does the pattern of data in the figure suggest about language ability and institutionalisation?

_____

_____

_____

_____

(2)

(e) Calculate the range for the language scores. Show your workings.

_____

_____

_____

_____

(2)

Q3.

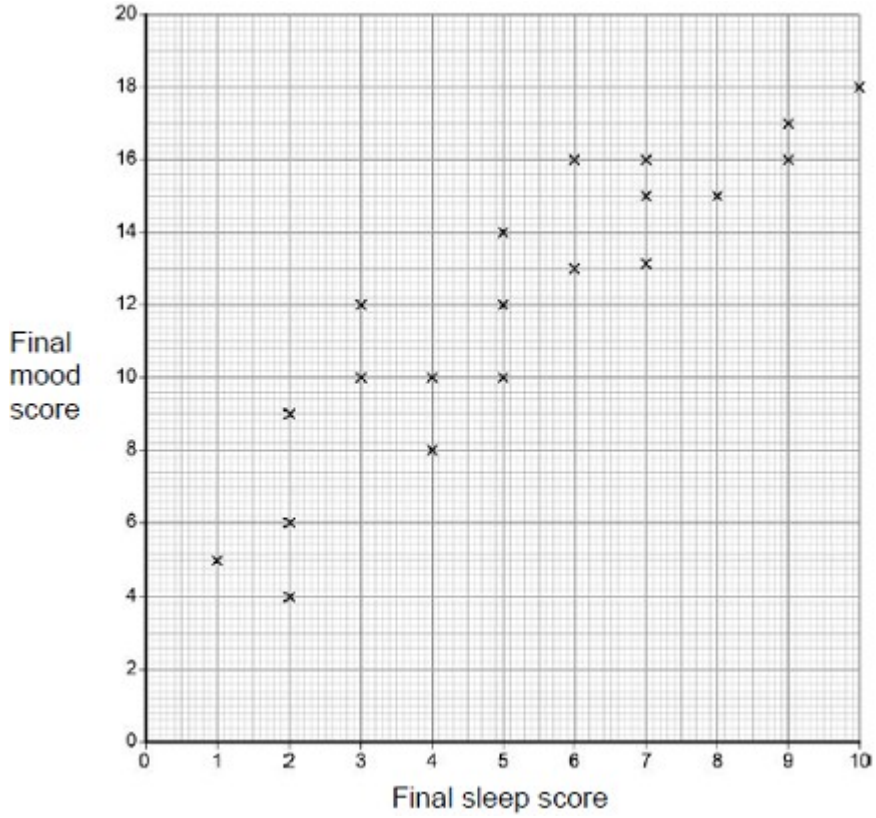
Read the item and then answer the questions that follow.

Twenty depressed patients were treated using cognitive behavioural therapy. Over the course of the six-week treatment, each patient's mood was monitored every week using a self-report mood scale (where a score of 20 = extremely positive mood and a score of 0 = extremely negative mood). Each week they also completed a quality of sleep questionnaire which was scored from 10 = excellent sleep to 0 = very poor sleep.

At the end of the study the researchers correlated each patient's final mood score with his or her final sleep score. The results are shown in the graph below.

Scattergram to show the relationship between final mood scores and final sleep scores for 20 patients at the end of therapy

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(a) Outline the type of relationship shown in the graph above and suggest why it would not be appropriate for the researchers to conclude that better sleep improves mood.

(2)

(b) Outline **one** way in which the researchers should have dealt with ethical issues in this study.

(2)

(c) The sleep questionnaire used by the researchers had not been checked to see whether or not it was a reliable measure of sleep quality.

Explain how this study could be modified by checking the sleep questionnaire for test-retest reliability.

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(4)
(Total 8 marks)

Q4.

Read the item and then answer the questions that follow.

Researchers were interested in the spatial awareness skills of motorists. They decided to investigate a possible relationship between different aspects of spatial awareness. Motorists who had between ten and twelve years of driving experience and held a clean driving licence with no penalty points were asked to complete two sets of tasks.

Set 1: To follow a series of instructions and using a map, to identify various locations correctly. This provided a map reading score for each motorist with a maximum score of 20.

Set 2: To complete a series of practical driving tasks accurately. This involved tasks such as driving between cones, driving within lines and parking inside designated spaces. Each motorist was observed completing the **Set 2** tasks by a single trained observer who rated each performance by giving the driver a rating out of 10.

The following results were obtained.

The map reading scores and driver ratings of motorists

Participant driver	Map reading score	Driver rating
1	17	9
2	8	4
3	15	7
4	12	6
5	3	2
6	4	4
7	6	8
8	14	6

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9	19	10

(a) Should the hypothesis be directional? Explain your answer.

(2)

(b) Write a suitable hypothesis for this investigation.

(3)

(c) Identify a suitable graphical display for the data in the table and briefly explain why this display would be appropriate.

(2)

(d) Using the data in the table, comment on the relationship between the map reading scores and the driver rating scores of the participants.

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(3)

(e) Briefly outline **one** problem of using a single trained observer to rate the participants' driving skills in the practical task. Briefly discuss how this data collection method could be modified to improve the reliability of the data collected.

(6)

(f) The researchers decided to analyse the data using a Spearman's rho test. Explain why this is a suitable choice of test for this investigation.

(3)

Table of critical values for a Spearman's rho test

Level of significance for a two-tailed test			
0.10	**0.05**	**0.02**	**0.01**
Level of significance for a two-tailed test			

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	0.05	0.025	0.01	0.005
N= 8	0.643	0.738	0.833	0.881
9	0.600	0.700	0.783	0.833
10	0.564	0.648	0.745	0.794

Calculated r_s must EQUAL or EXCEED the critical value for significance at the level shown.

(g) After analysis of the data the researchers obtained a calculated value of **r_s= 0.808.**

Using the information in the table above, what conclusion can the researchers draw about the relationship between the map reading and driving skills of the motorists? Explain your answer.

(4)

(Total 23 marks)

Q5.

A student teacher was interested in the relationship between empathy (consideration and feelings for others) and the time spent reading fiction. She decided to investigate whether or not such a relationship was present in children.

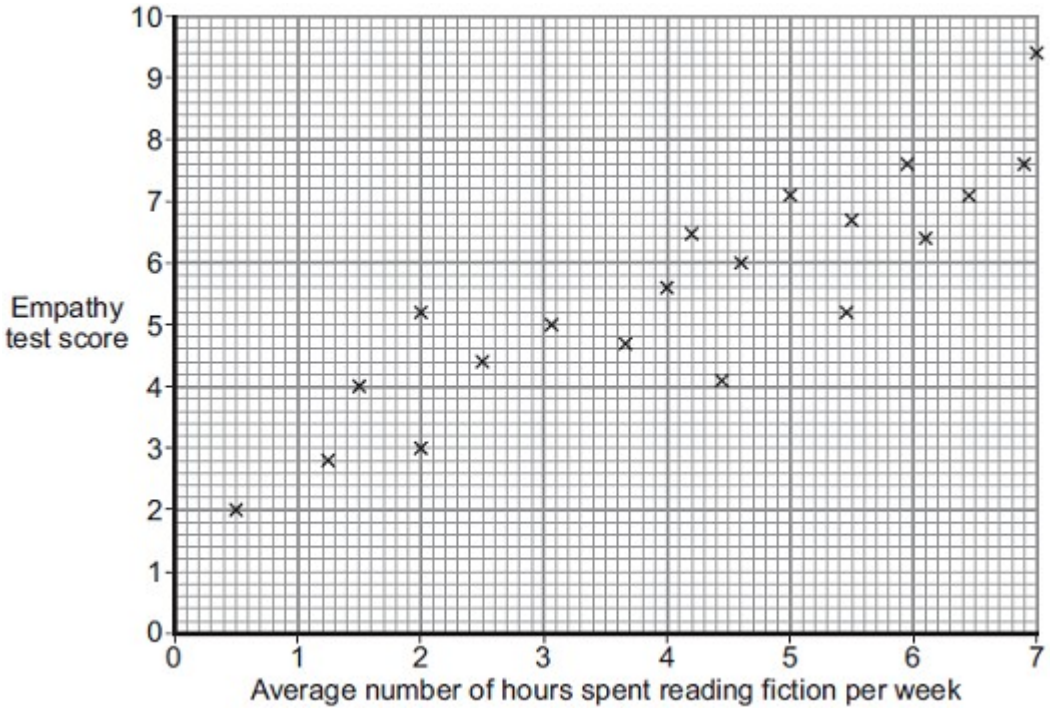
The student teacher designed her own questionnaire to measure empathy in 8-year-old children. The higher the score achieved, the greater the empathy. Twenty children, all from one school, took part. Each child completed the questionnaire individually.

The student teacher designed another questionnaire to measure 'time spent reading fiction'. Each child was given this questionnaire to take home and complete with his or her parents over a four-week period. 'Time spent reading fiction' included the time spent by parents reading to the child as well as the time the child spent reading independently. Using the responses to this questionnaire, the student teacher calculated how much time per week, on average, each child spent reading fiction.

The data obtained are shown in the graph below.

Scattergram of children's scores on a test of empathy and the average number of hours spent reading fiction per week.

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(a) Outline the relationship between empathy and the average number of hours spent reading fiction per week shown in the graph above.

(1)

(b) Name an appropriate test to determine whether or not there is a significant relationship between the two variables in the graph above. Justify your answer with reference to levels of measurement.

(2)

The student teacher decided to use a two-tailed test.

(c) Outline **one** way in which the student teacher could have assessed the validity of the empathy questionnaire.

(2)

(d) Apart from the issue of validity, identify and briefly explain **one** methodological limitation of the study.

(2)

(e) Explain why it was appropriate for the student teacher to use a correlation study rather than an experiment.

(3)

(f) The student teacher noticed that some students on her course commented that they were better able to recall information if they could read the information rather than listen to it in lectures.

Design an experiment to test the following hypothesis:

'People who are given written information will recall more than people who hear information in spoken form.'

In your answer, you should refer to the following and justify your design decisions:

- the variables to be considered

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- the experimental design to be used
- the sample
- relevant materials
- an outline of the proposed procedure.

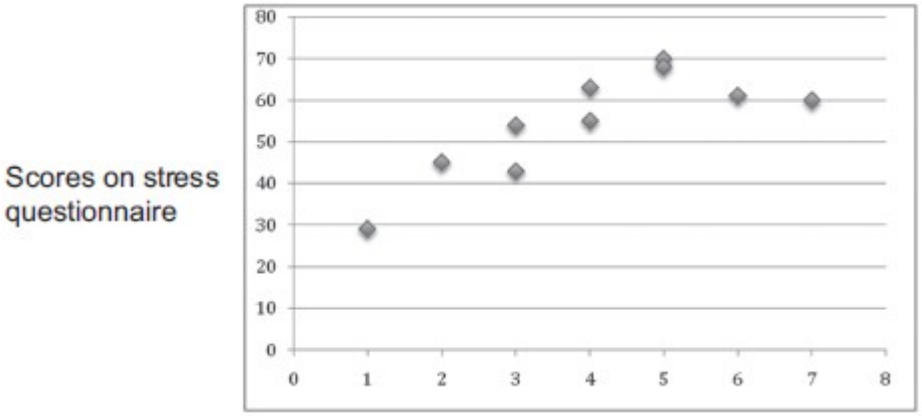
(8)

(Total 18 marks)

Q6.

Research has shown that there is a relationship between stress and illness.
The figure below shows the number of days off work through illness in a year and scores on a stress questionnaire, where a high score indicates more stress.

Relationship between days off work in a year through illness and stress scores



What does the figure above tell you about the relationship between stress and illness?

_____

_____

_____

_____

Extra space _____

_____

(Total 2 marks)

Q7.

Outline **one** strength and **one** weakness of using correlations in stress research.

_____

_____

_____

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Extra space _____

(Total 4 marks)

Q8.

Some studies have suggested that there may be a relationship between intelligence and happiness. To investigate this claim, a psychologist used a standardised test to measure intelligence in a sample of 30 children aged 11 years, who were chosen from a local secondary school. He also asked the children to complete a self-report questionnaire designed to measure happiness. The score from the intelligence test was correlated with the score from the happiness questionnaire. The psychologist used a Spearman's rho test to analyse the data. He found that the correlation between intelligence and happiness at age 11 was +0.42.

(a) Write an operationalised non-directional hypothesis for this study.

(2)

(b) Identify an alternative method which could have been used to collect data about happiness in this study. Explain why this method might be better than using a questionnaire.

(4)

(c) A Spearman's rho test was used to analyse the data. Give **two** reasons why this test was used.

(2)

Extract from table of critical values from Spearman's rho(r_s) test

N (number of participants)	**Level of significance for a two-tailed test**	
	0.10	**0.05**
	Level of significance for a one-tailed test	
	0.05	**0.025**
29	0.312	0.368
30	0.306	0.362

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31	0.301	0.356

Calculated r_s must equal or exceed the table (critical) value for significance at the level shown.

(d) The psychologist used a non-directional hypothesis. Using the table above, state whether or not the correlation between intelligence and happiness at age 11 (+0.42) was significant. Explain your answer.

(3)

(e) Five years later, the same young people were asked to complete the intelligence test and the happiness questionnaire for a second time. This time the correlation was –0.29.

With reference to **both** correlation scores, outline what these findings seem to show about the link between intelligence and happiness.

(4)

(Total 15 marks)

Q9.

A maths teacher wondered whether there was a relationship between mathematical ability and musical ability. She decided to test this out on the GCSE students in the school. From 210 students, she randomly selected 10 and gave each of them two tests. She used part of a GCSE exam paper to test their mathematical ability. The higher the mark, the better the mathematical ability. She could not find a musical ability test so she devised her own. She asked each student to sing a song of their choice. She then rated their performance on a scale of 1–10, where 1 is completely tuneless and 10 is in perfect tune.

(a) Suggest a suitable non-directional hypothesis for this study.

(3)

(b) Why might the measure of musical ability used by the teacher lack validity?

(3)

(c) Explain how the teacher could have checked the reliability of the mathematical ability test.

(3)

(d) Explain why the teacher chose to use a random sample in this study.

The results of the study are given in the table below.

Mathematical ability test scores and musical ability ratings for 10 students

Student	Mathematical ability test score	Musical ability rating
1	10	10
2	2	9
3	9	3
4	6	6

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5	3	9
6	10	2
7	2	1
8	1	8
9	8	4
10	4	7

(2)

(e) In your answer book, sketch a graph to show the data in the table above. Give the graph an appropriate title and label the axes.

(3)

(f) Discuss what the data in the table above and the graph that you have sketched seem to show about the relationship between mathematical ability and musical ability.

(3)

(g) The teacher noticed that most of the students who were rated highly on musical ability were left-handed. The teacher is aware that her previous definition of musical ability lacked validity.

Design a study to test whether there is a difference in the musical ability of left-handed students and right-handed students. You have access to a sixth form of 200 students.

You should:

- identify the design that you would use
- explain an appropriate sampling method and justify your choice
- describe the procedure that you would use, including details of how you would assess musical ability
- write a suitable debrief for these participants.

(10)

(h) In your answer book, draw a table to show how you would record your results. Identify an appropriate statistical test to analyse the data that you would collect. Justify your choice.

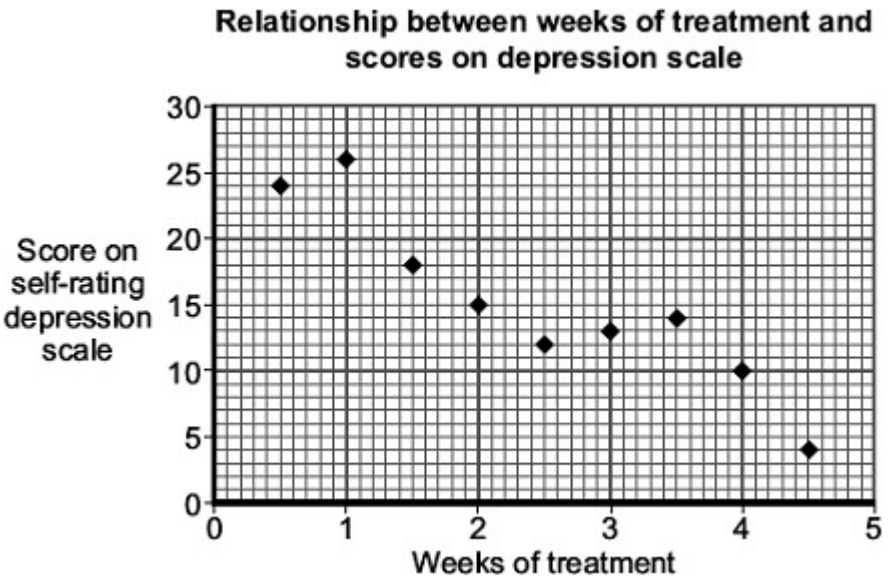
(3)

(Total 30 marks)

Q10.

The following scattergram shows the relationship between the number of weeks of treatment with ECT and the score on the Self-Rating Depression Scale (on this scale, a high score indicates depression).

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Outline what the scattergram seems to show.

_____

_____

_____

_____

_____

_____

_____

_____

(Total 4 marks)

Q11.

Two psychologists investigated the relationship between age and recall of medical advice. Previous research had shown that recall of medical advice tended to be poorer in older patients. The study was conducted at a doctor's surgery and involved a sample of 30 patients aged between 18 and 78 years. They all saw the same doctor, who made notes of the advice that she gave during the consultation.

One of the psychologists interviewed each of the patients individually, immediately after they had seen the doctor. The psychologist asked each patient a set of questions about what the doctor had said about their diagnosis and treatment. The patients' responses were recorded and then typed out. Working independently the psychologists compared each typed account with the doctor's written notes in order to rate the accuracy of the accounts on a scale of 1 – 10. A high rating indicated that the patient's recall was very accurate and a low rating indicated that the patient's recall was very inaccurate.

(a) The psychologists decided to propose a directional hypothesis. Why was a directional hypothesis appropriate in this case?

(1)

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(b) Write a suitable directional hypothesis for this investigation.

(3)

(c) The psychologists were careful to consider the issue of reliability during the study. What is meant by reliability?

(1)

(d) Explain how the psychologists might have assessed the reliability of their ratings.

(3)

(e) This study collected both qualitative and quantitative data. From the description of the study above, identify the qualitative data and the quantitative data.

The psychologists used Spearman's rho to analyse the data from their investigation. They chose to use the 0.05 level of significance. The result gave a correlation coefficient of −0.52.

(2)

(f) Give **two** reasons why the psychologists used Spearman's rho to analyse the data.

(2)

(g) Using the table below, state whether the result is significant or not significant and explain why.

(2)

Extract from a table of critical values of Spearman's rho (r_s)

Level of significance for a one-tailed test		
	0.05	0.01
Level of significance for a two-tailed test		
	0.10	0.02
N=29	0.312	0.433
30	0.306	0.425
31	0.301	0.418

Calculated r_s must equal or exceed the table (critical) value for significance at the level shown.

(h) Explain what is meant by a Type 1 error.

(2)

(i) Use the information in the table above to explain why the psychologists did not think that they had made a Type 1 error in this case.

(3)

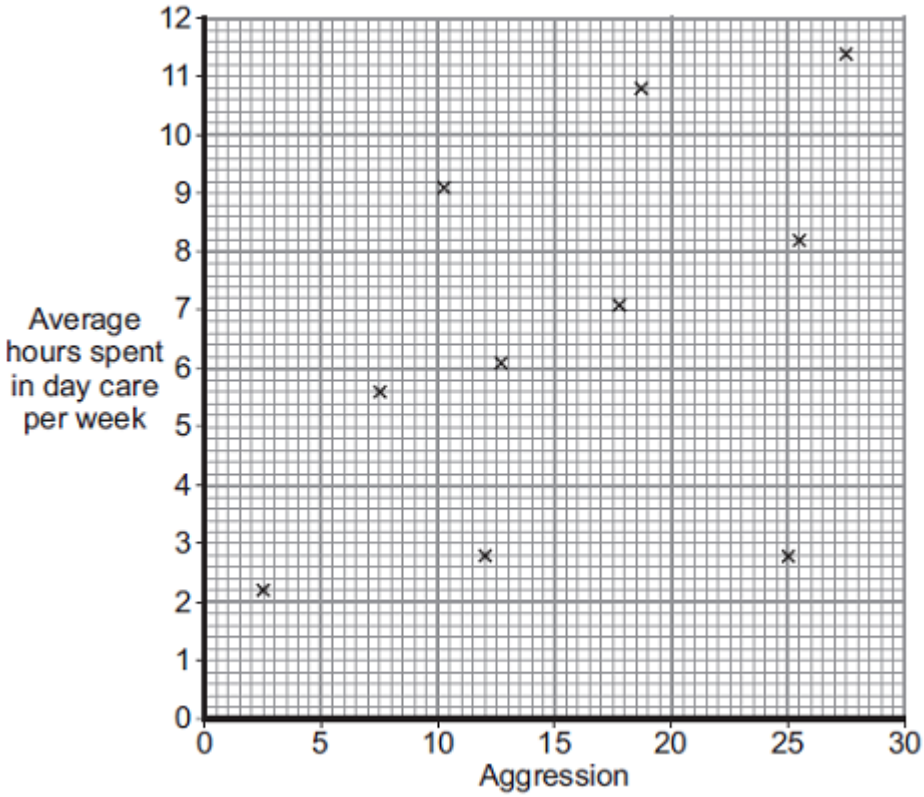
(Total 19 marks)

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Q12.

Some research has suggested that there is a relationship between the time children spend in day care and their aggressive behaviour. Researchers selected a group of school children who had been in day care. They asked the children's mothers to estimate how many hours a week their children had spent in day care. They measured the same children's aggression.

Relationship between average hours spent in a day care and aggression



(a) How many children are represented in this scattergram?

_____

(1)

(b) Suggest **one** way in which the children's aggression could be measured.

_____

_____

_____

_____

(2)

(c) In the media, it was claimed that the results showed spending time in day care caused the children to become aggressive.

Explain why this claim may be untrue.

_____

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(3)

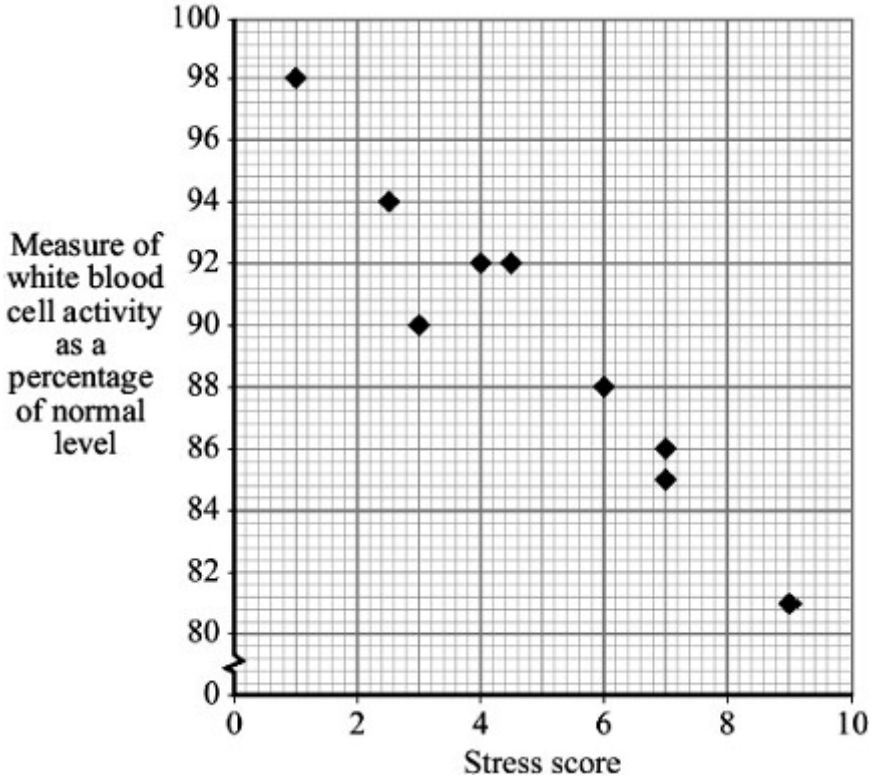
(Total 6 marks)

Q13.

One measure of the functioning of the immune system is the level of activity of white blood cells.

What does the graph below tell you about the relationship between stress and the level of activity of white blood cells?

Relationship between stress and the level of activity of white blood cells



(Total 2 marks)

Q14.

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Outline **one** strength **and one** weakness of using correlations in stress research.

Strength _____

_____

_____

_____

Weakness _____

_____

_____

_____

(Total 4 marks)

Q15.

A recent study recorded the amount of time that children spent in day care from birth to four years, and asked each child's mother to rate her child for aggression and disobedience. The study found that, as the time spent in day care went up, the mothers' rating of aggression and disobedience also went up.

(a) What kind of correlation is this research showing?

_____

_____

(1)

(b) Outline **one** strength and **one** weakness of using correlational research to investigate the effects of day care.

Strength _____

_____

_____

_____

Weakness

_____

_____

_____

_____

(4)

(Total 5 marks)

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