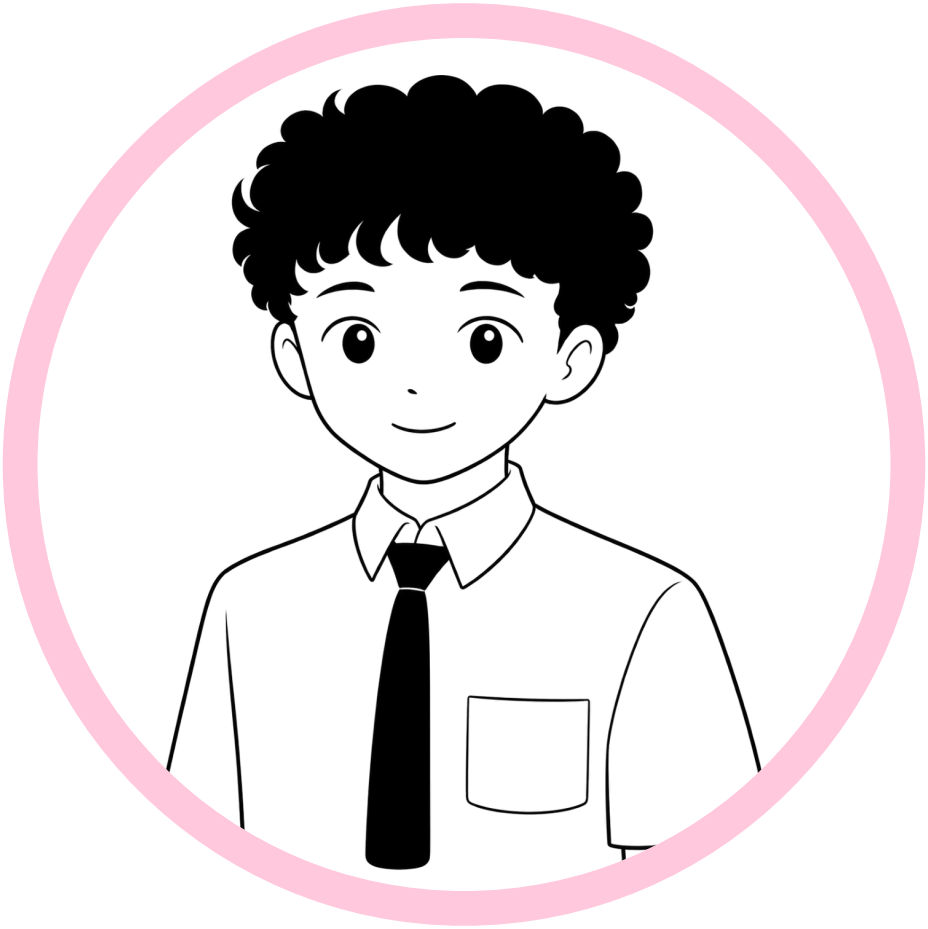
AQA A-LEVEL PSYCHOLOGY · 7182

PSYCHOLOGY



EXAM QUESTION PACK

3.2.3.3 INFERENTIAL TESTING

SCORE	PERCENTAGE
/470	%

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Q1.

A researcher carried out an overt observation study of social learning. For one week the helping behaviour of children in a playgroup was recorded. All the children then saw a short film in which a child was praised for tidying up toys. For the following week the helping behaviour of the same children in the playgroup was recorded.

(a) Which of the following statements is the best description of an overt observation study?

Shade **one** box only.

A The researcher becomes a member of the group whose behaviour is being observed. ⬭

B The researcher uses a structured procedure in which behaviour is watched and recorded. ⬭

C The researcher watches and records behaviour in the setting it would normally occur. ⬭

D The researcher watches and records behaviour of a group that knows it is being observed. ⬭

(1)

(b) Briefly discuss **one** way in which a covert observation of children might be more beneficial than an overt observation.

_____

_____

_____

_____

_____

_____

(3)

(c) At the end of the observation study the researcher used a sign test to see if the behaviour of the children was more helpful, less helpful or the same after seeing the film than it was before they had seen the film.

Explain why the researcher decided the sign test would be an appropriate statistical test to use on the data from this study.

_____

_____

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_____

_____

_____

(4)

(Total 8 marks)

Q2.

A researcher studying depression wanted to see whether or not there was a relationship between level of self-esteem and negative schema score. She constructed two questionnaires and asked ten people who had been diagnosed with depression to complete them.

One questionnaire measured the participant's level of self-esteem. A low score (out of 50) indicated low self-esteem.

The other questionnaire measured whether the participant showed evidence of negative schema. A low score (out of 50) indicated evidence of negative schema. The two sets of results for each participant are shown in the table below.

Table 1 - Self-esteem score and negative schema score for each patient

Participant	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Self-esteem score	8	9	9	11	13	17	18	18	20	22
Negative schema score	11	15	13	18	12	14	20	16	17	19

(a) Is negative schema score best described as measuring a cognitive, emotional or behavioural characteristic of depression? Shade **one** box only.

A Cognitive ⬭

B Emotional ⬭

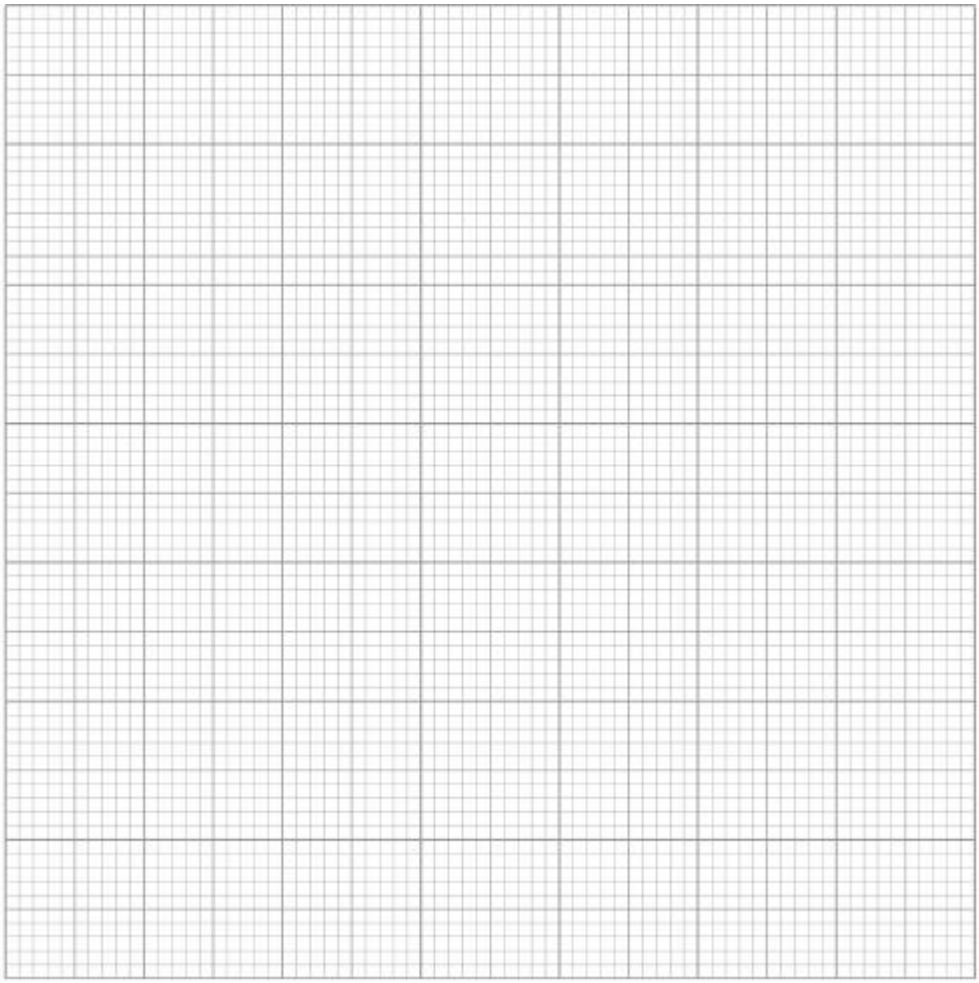
C Behavioural ⬭

(1)

(b) Draw a suitable graphical display to represent the data in **Table 1**. Label your graph appropriately.

Title: _____

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(4)

The researcher analysed the data in **Table 1** using a Spearman's rho statistical test.

(c) With reference to level of measurement, explain why Spearman's rho is an appropriate statistical test for this data.

_____

_____

_____

_____

(2)

(d) Estimate the correlation coefficient most likely to result from analysis of the data in **Table 1**. Shade **one** box only.

The correlation coefficient would be approximately

+0.95 ⬭

+0.70 ⬭

+0.30 ⬭

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+0.15 ⬭

(1)
(Total 8 marks)

Q3.

A psychologist decided to conduct an experiment to investigate the effect of watching horror films before going to bed.

A volunteer sample of 50 university students consented to take part in the experiment.

The 50 students were randomly split into two groups. **Group 1** watched a horror film before going to bed each night for the first week then a romantic comedy before going to bed each night for the second week. **Group 2** watched the romantic comedy in the first week and the horror film in the second week.

When the students woke up each morning, each student received a text message that asked if they had had a nightmare during the night. They could respond 'yes' or 'no'.

(a) Write a brief consent form that would have been suitable for use in this experiment.

The consent form should:

- include some detail of what participants might expect to happen
- refer to ethical issues
- be in an appropriate format / style.

(6)

(b) The psychologist proposed a directional hypothesis.

Write a directional hypothesis for this experiment.

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(3)

(c) The psychologist used a repeated measures design in this experiment.

Explain why it was important to use a repeated measures design in this case.

(2)

(d) The psychologist used counterbalancing in this experiment.

Explain why it was appropriate to use counterbalancing in this experiment.

(2)

(e) Explain how the psychologist could have randomly split the sample of 50 students into the two groups.

(3)

The psychologist collated the responses of all the participants over the two-week period and calculated the mean and standard deviation for each condition.

Mean number of nightmares reported and the standard deviation for each condition

	Mean number of nightmares in 7 days	**Standard deviation**
Horror films	2.18	1.48

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Romantic comedies	0.30	0.61

(f) What do the mean **and** standard deviation values in the table above suggest about the effect of the type of film watched on the occurrence of nightmares? Justify your answer.

(4)

(g) The psychologist found that the difference in the number of nightmares reported in the two conditions was significant at $p<0.05$.

Explain what is meant by 'significant at $p<0.05$' in the context of this experiment.

(2)

(h) The psychologist was concerned about the validity of the experiment.

Suggest **one** possible modification to the design of the experiment and explain how this might improve validity.

(3)

(Total 25 marks)

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Q4.

In an experiment, researchers arranged for participants to complete a very personal and embarrassing questionnaire in a room with other people. Each participant was tested individually. The other people were confederates of the experimenter.

In condition 1: the confederates completed the questionnaire.

In condition 2: the confederates refused to complete the questionnaire and asked to leave the experiment.

The researchers tested 15 participants in condition 1, and 15 different participants in condition 2.

The researchers recorded the number of participants who completed the questionnaire in each condition.

(a) Identify the type of data in this experiment. Explain your answer.

(2)

(b) Using your knowledge of social influence, explain the likely outcome of this experiment.

(3)

(c) For this study, the researchers had to use different participants in each condition and this could have affected the results.

Outline **one** way in which the researchers could have addressed this issue.

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(4)

(d) In order to analyse the difference in the number of participants who completed the questionnaire in each condition, the researchers used a chi-squared test.

Apart from reference to the level of measurement, give **two** reasons why the researchers used the chi-squared test.

(2)

(e) The calculated value of chi-squared in the experiment described above is **3.97**

Critical values for the chi-squared test

Level of significance				
df	0.1	0.05	0.02	0.01
1	2.71	3.84	5.41	6.64

The calculated value of chi-squared should be equal to or greater than the critical value to be statistically significant.

With reference to the critical values in **the table** above, explain whether or not the calculated value of chi-squared is significant at the 5% level.

(2)
(Total 13 marks)

Q5.

A psychologist wanted to test whether listening to music improves running performance.

The psychologist conducted a study using 10 volunteers from a local gym. The psychologist used a repeated measures design. Half of the participants were assigned to condition A (without music) and half to condition B (with music).

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All participants were asked to run 400 metres as fast as they could on a treadmill in the psychology department. All participants were given standardised instructions. All participants wore headphones in both conditions. The psychologist recorded their running times in seconds. The participants returned to the psychology department the following week and repeated the test in the other condition.

(a) Identify the type of experiment used in this study. Shade **one** box only.

A Laboratory ⬭

B Natural ⬭

C Quasi ⬭

D Research ⬭

(1)

(b) Identify the operationalised dependent variable in this study.

_____

_____

_____

_____

(2)

(c) The results of the study are given in **Table 1** below.

Table 1: Mean number of seconds taken to complete the 400m run and the standard deviation for both conditions

	Condition A (without music)	**Condition B** (with music)
Mean 400m time (s)	123	117
Standard deviation	9.97	14.5

Explain why a histogram would **not** be an appropriate way of displaying the means shown in **Table 1**.

_____

_____

_____

_____

(2)

(d) Name a more appropriate graph to display the means shown in **Table 1**. Suggest appropriate X (horizontal) and Y (vertical) axis labels for your graph choice.

Name of graph: _____

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X axis label: _____

Y axis label: _____

(3)

(e) What do the mean and standard deviation values in **Table 1** suggest about the participants' performances with and without music? Justify your answer.

(4)

(f) Calculate the percentage decrease in the mean time it took participants to run 400 metres when listening to music. Show your workings. Give your answer to three significant figures.

(4)

(g) The researcher used a directional hypothesis and analysed the data using a related t-test. The calculated value of t where degrees of freedom (df) = 9 was 1.4377. He decided to use the 5% level of significance.

Table 2: Table of critical values of t

Level of significance	0.05	0.025

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for a one-tailed test		
Level of significance for a two-tailed test	0.10	0.05
df = 1	6.314	12.706
2	2.920	4.303
3	2.353	3.182
4	2.132	2.776
5	2.015	2.571
6	1.943	2.447
7	1.895	2.365
8	1.860	2.306
9	1.833	2.262
10	1.812	2.228

Calculated value of t must be equal to or greater than the critical value in this table for significance to be shown.

Give **three** reasons why the researcher used a related t-test in this study and, using **Table 2**, explain whether or not the results are significant.

(5)

(h) What is meant by a Type II error? Explain why psychologists normally use the 5% level of significance in their research.

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(3)

(i) Identify **one** extraneous variable that could have affected the results of this study. Suggest why it would have been important to control this extraneous variable and how it could have been controlled in this study.

(3)

(j) The report was submitted for peer review and a number of recommendations were advised.

Describe the process and purposes of peer review.

(6)

(Total 33 marks)

Q6.

Read the item and then answer the questions that follow.

Twenty primary school teachers were sent by their individual head teachers to attend a training course in classroom behaviour management run by educational psychologists at a local university. Before the training course, and again after training, the teachers were asked to say how confident they were in managing difficult classroom behaviour.

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The researchers compared the before and after answers to see how many teachers rated their confidence as ‘better’, ‘worse’, or ‘the same’ as it had been at the start of the course.

The results are shown in the table below:

	Confidence Better	Confidence Worse	Confidence Same
Number of teachers	16	2	2

(a) Which of A, B, C or D best describes this study? Shade **one** box only.

A laboratory experiment ⬭

B pilot experiment ⬭

C natural experiment ⬭

D controlled experiment ⬭

(1)

(b) What fraction of the teachers thought that their confidence was better after the course? Show your workings.

(2)

(c) What might the researchers conclude about the training course on the basis of the data in the table? Explain your answer.

(2)

(d) What is the operationalised dependent variable in this study?

(2)

(e) Which experimental design is being used in this study and why would it be an

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appropriate design in this case?

(3)

(f) The psychologists conducting the training decided to use the Sign Test to see whether there was a significant difference in confidence in managing difficult classroom behaviour before and after the course.

Give the calculated value of S in this study and explain how you arrived at this figure.

(3)

(g) Explain why statistical testing is used in psychological research.

(2)

(h) Following the training course, one of the researchers carried out an overt classroom observation of each teacher's primary school class. The researcher wanted to record the frequency of difficult classroom behaviours shown by the pupils during a normal lesson.

He identified six categories of disruptive behaviour and decided to record the frequency of each of the six behaviours during the first ten minutes and the last ten minutes of the lesson.

Suggest **two** behavioural categories that the researcher could record during his observation.

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(2)

(i) Design a tally chart/record sheet the researcher could use to record his observations.

Show your tally chart/record in the box below.

(3)

(j) Identify **one** problem that might have occurred during this observation and explain how the observation would be improved by addressing this problem.

(4)

(Total 24 marks)

Q7.

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Read the item and then answer the questions that follow.

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

Mean number of verbal errors and standard deviations for both conditions

	Condition A (believed audience of 5 listeners)	**Condition B (believed audience of 100 listeners)**
Mean	11.1	17.2
Standard deviation	1.30	3.54

(a) What conclusions might the psychologist draw from the data in **the table**? Refer to the means **and** standard deviations in your answer.

(6)

(b) Read the item and then answer the question that follows.

> The psychologist had initially intended to use the range as a measure of dispersion in this study but found that one person in **Condition A** had made an exceptionally low number of verbal errors.

Explain how using the standard deviation rather than the range in this situation, would improve the study.

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(3)

(c) Name an appropriate statistical test that could be used to analyse the number of verbal errors in **the table** above. Explain why the test you have chosen would be a suitable test in this case.

(4)

(d) The psychologist found the results were significant at $p<0.05$. What is meant by 'the results were significant at $p<0.05$'?

(2)

(e) Briefly explain **one** method the psychologist could use to check the validity of the data she collected in this study.

(2)

(Total 17 marks)

Q8.

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A researcher wanted to see whether cognitive behaviour therapy was an effective treatment for depression. Twenty depressed patients who had all recently completed a course of cognitive behaviour therapy were involved in the investigation. From their employment records, the researcher kept a record of the number of absences from work each patient had in the year following their treatment. This was compared with the number of absences from work each patient had in the year prior to their treatment.

Those patients who had fewer absences from work in the year following their treatment than in the year prior to their treatment were classified as ‘improved’ (+). Those patients who had more absences were classified as ‘deteriorated’ (-). Those patients who had the same number of absences were classified as ‘neither’ (0).

The results of the investigation are included in **Table 1** below.

Table 1

Patient	Improved	Deteriorated	Neither
1	+		
2			0
3		–	
4	+		
5	+		
6	+		
7		–	
8		–	
9			0
10	+		
11		–	
12	+		
13	+		
14	+		
15	+		
16		–	
17	+		
18	+		
19	+		

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20			0

The researcher decided to use the sign test to analyse the data.

(a) Explain **two** factors that the researcher had to take into account when deciding to use the sign test. Refer to the investigation above in your answer.

(4)

(b) Calculate the sign test value of s for the data in **Table 1**. Explain how you reached your answer.

(2)

Table 2: Critical values for the sign test

n	0.005 (one tailed) 0.01 (two tailed)	0.01 (one tailed) 0.02 (two tailed)	0.025 (one tailed) 0.05 (two tailed)	0.05 (one tailed) 0.10 (two tailed)
16	2	2	3	4
17	2	3	4	4
18	3	3	4	5

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For significance, the value of the less frequent sign is equal to, or less than, the value of the table.

(c) With reference to the critical values in **Table 2**, explain whether or not the value of s that you calculated in response to **question (b)** is significant at the 0.05 level for a two tailed test.

(2)

(d) The investigation above is based on secondary data.

In what ways would the use of primary data have improved this investigation?

(3)

(e) Outline the implications of psychological research for the economy. Refer to the investigation above in your answer.

(5)

(Total 16 marks)

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Q9.

Read the item and then answer the questions that follow.

Following previous research indicating the social benefits of green space in urban areas, two psychology students decided to observe social behaviour in public spaces. They focused on two neighbouring towns, Greensville where most public spaces were planted with flowers and vegetables, and Brownton where most public spaces were paved with concrete.

The students compared the instances of considerate behaviours in the two towns. Considerate behaviour categories included putting litter in the bin, having a dog on a lead and riding a bike with care.

The observations were carried out in four different areas of a similar size in each town on weekdays between the hours of 4.30pm and 6.00pm. The students worked together to ensure inter-observer reliability, recording each target behaviour whenever it occurred.

(a) Should the hypothesis for this research be directional or non-directional? Explain your answer.

(2)

(b) Before the observation could begin, the students needed to operationalise the behaviour category 'riding a bike with care'.

Explain what is meant by operationalisation and suggest **two** ways in which 'riding a bike with care' could have been operationalised.

(4)

(c) The students thought that having a dog on a lead was a useful measure of considerate behaviour because it had face validity. Explain what is meant by face validity in this context.

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(3)

(d) Identify and briefly outline **two** other types of validity in psychological research.

(4)

(e) Identify the behaviour sampling method used by the students. Shade **one** box only.

A Time sampling ⬭

B Pair sampling ⬭

C Event sampling ⬭

D Target sampling ⬭

(1)

(f) Explain how inter-observer reliability could be ensured by working as a pair.

(3)

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(g) The data for considerate behaviours is shown in the **Table 1**.

Table 1

Considerate behaviours			
	Litter in bin	Dog on lead	Riding bike with care
Greensville	23	23	10
Browntonn	10	17	9

The students noted that overall more considerate behaviours occurred in Greensville than in Brownton.

Calculate the ratio of considerate behaviours observed in Greensville to considerate behaviours observed in Brownton. Show your workings and present your answer in the simplest form.

(3)

(h) The students carried out a Chi-square test on their data.

Explain why the Chi-square test was an appropriate test to use in this case.

(3)

(i) In order to interpret the results of the Chi-square test the students first needed to work out the degrees of freedom. They used the following formula.

Degrees of freedom (df) = (r–1) x (c–1)
r = number of rows and c = number of columns

Calculate the degrees of freedom for the data in **Table 1**. Show your workings.

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(2)

(j) The calculated value of Chi-square was 6.20. Referring to the **Table 2** below, state whether or not the result of the Chi-square test is significant at the 0.05 level of significance. Justify your answer.

Table 2

df	*Levels of significance for a one-tailed test*			
	0.10	**0.05**	**0.025**	**0.01**
	Levels of significance for a two-tailed test			
	0.20	**0.20**	**0.05**	**0.02**
1	1.64	2.71	3.84	5.41
2	3.22	4.60	5.99	7.82
3	4.64	6.25	7.82	9.84
4	5.99	7.78	9.49	11.67

To be significant at the level shown the calculated value of Chi Square must be equal to or greater than the critical/table value

(3)

(k) In the discussion section of their report of the investigation the students wanted to further discuss their results in relation to levels of significance.

Write a short paragraph the students could use to do this.

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(4)

(l) As a follow-up to their observation the students decided to interview some of their peers about inconsiderate behaviours in their 6th Form Centre. The interviews were recorded.

Explain how the students could develop their interview findings by carrying out a content analysis and why content analysis would be appropriate in this case.

(3)

(m) Suggest **one** inconsiderate behaviour that the students might focus on in their content analysis.

(1)

(Total 36 marks)

Q10.

Read the item and then answer the questions that follow.

In a study of parasocial relationships a researcher studied male and female attachments to their favourite film star. An overall attachment score was calculated on the basis of answers to a questionnaire. A high score indicated a strong attachment and a low score indicated little attachment.

The scores are shown in the table below.

Males	**Females**
4	5
6	6
2	6
2	7
3	2
3	4
3	5
8	9
1	5
1	2
Median score 3	Median score 5

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(a) Explain why the data in the table is primary data and not secondary data.

(2)

(b) Explain **one** strength of primary data.

(3)

(c) The researcher decided to extend the study by using an inferential test to see if there was a significant difference between the two sets of scores.

Suggest an appropriate inferential test which the researcher could use. Justify your choice.

(4)

(Total 9 marks)

Q11.

Read the item and then answer the questions that follow.

In a study of gender schema a researcher studied the way in which boys and girls understood gender. An overall understanding score was calculated on the basis of answers to a questionnaire. A high score indicated a very fixed understanding and a low score indicated a flexible understanding. The scores are shown in the table below.

Girls	**Boys**
4	5
6	6
2	6
2	7
3	2
3	4
3	5
8	9
1	5
1	2
Median score 3	Median score 5

(a) Explain why the data in the table is primary data and not secondary data.

(2)

(b) Explain **one** strength of primary data.

(3)

(c) The researcher decided to extend the study by using an inferential test to see if there was a significant difference between the two sets of scores.

Suggest an appropriate inferential test which the researcher could use. Justify your choice.

(4)

(Total 9 marks)

Q12.

Read the item and then answer the questions that follow.

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In a study of social cognition a researcher studied perspective-taking in children aged 5 years and 9 years. An overall perspective-taking score was calculated on the basis of answers to a questionnaire. A high score indicated good perspective taking and a low score indicated poor perspective-taking.

The scores are shown in the table below.

5-year-olds	**9-year-olds**
4	5
6	6
2	6
2	7
3	2
3	4
3	5
8	9
1	5
1	2
Median score 3	Median score 5

(a) Explain why the data in the table is primary data and not secondary data.

(2)

(b) Explain **one** strength of primary data.

(3)

(c) The researcher decided to extend the study by using an inferential test to see if there was a significant difference between the two sets of scores.

Suggest an appropriate inferential test which the researcher could use. Justify your choice.

(4)

(Total 9 marks)

Q13.

Read the item and then answer the questions that follow.

A psychologist was investigating the effect of prison conditions on institutional aggression.

He selected a sample of 12 prisoners and counted the number of aggressive acts of each prisoner over one day in the exercise yard.

The prison conditions were then changed, such that the number of prisoners per cell was reduced and regular exercise periods introduced.

After three months of these new conditions the psychologist observed the same 12 prisoners and again counted the number of aggressive acts of each prisoner over one day in the exercise yard.

This study involves a repeated measures design.

(a) Explain **one** advantage of using a repeated measures design in this study.

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(2)

(b) The psychologist obtained the following results:

- For two of the prisoners the number of aggressive acts increased
- For eight of the prisoners the number of aggressive acts decreased
- For two of the prisoners the number of aggressive acts stayed the same

The psychologist decides to use a sign test to see if his data are significant.

What is the calculated value of the sign test statistic 'S'? Explain your answer.

(2)

(c) Look at the table of critical values of 'S' below and then answer the question that follows.

N	.10	.05	.025	.01
4	0			
5	0	0		
6	0	0	0	
7	1	0	0	0
8	1	1	0	0
9	2	1	1	0
10	2	1	1	0
11	2	2	1	1
12	3	2	2	1

To be significant, the calculated/observed value must be equal to or less than the critical/table value.

Using the table of critical values of 'S' above, state whether the findings of the study are significant at $p < 0.05$. Explain your answer.

(2)

(Total 6 marks)

Q14.

Read the item and then answer the questions that follow.

A psychologist wanted to see if a combination of behaviour modification and anger management would be effective in reducing levels of aggression in people given custodial sentences.

She selected a sample of 12 prisoners immediately after sentencing and counted the number of aggressive acts of each prisoner over one day.

The prisoners were then given one month of daily sessions of behaviour modification combined with anger management.

At the end of this month, they were again observed, and the number of aggressive acts of each prisoner was recorded over one day.

This study involves a repeated measures design.

(a) Explain **one** advantage of using a repeated measures design in this study.

(2)

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(b) The psychologist obtained the following results:

- For two of the prisoners the number of aggressive acts increased
- For eight of the prisoners the number of aggressive acts decreased
- For two of the prisoners the number of aggressive acts stayed the same

The psychologist decides to use a sign test to see if her data are significant.

What is the calculated value of the sign test statistic 'S'? Explain your answer.

(2)

(c) Look at the table of critical values of 'S' below and then answer the question that follows.

N	.10	.05	.025	.01
4	0			
5	0	0		
6	0	0	0	
7	1	0	0	0
8	1	1	0	0
9	2	1	1	0
10	2	1	1	0
11	2	2	1	1
12	3	2	2	1

To be significant, the calculated/observed value must be equal to or less than the critical/table value.

Using the table of critical values of 'S' above, state whether the findings of the study are significant at $p < 0.05$. Explain your answer.

(2)

(Total 6 marks)

Q15.

Read the item and then answer the questions that follow.

A psychologist wanted to see if even a brief period of aversion therapy would help smokers reduce their level of smoking. A group of 12 volunteers who smoked regularly recorded the number of cigarettes smoked over a one week period.

The psychologist then exposed them to aversion therapy for one week.

The participants were then allowed to smoke freely recording the number of cigarettes smoked during the week following therapy.

This study involves a repeated measures design.

(a) Explain **one** advantage of using a repeated measures design in this study.

(2)

(b) The psychologist obtained the following results:

- For two of the volunteers the number of cigarettes smoked increased
- For eight of the volunteers the number of cigarettes smoked decreased

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- For two of the volunteers the number of cigarettes smoked stayed the same

The psychologist decides to use a sign test to see if the data are significant.

What is the calculated value of the sign test statistic 'S'? Explain your answer.

(2)

(c) Look at the table of critical values of 'S' below and then answer the question that follows.

N	.10	.05	.025	.01
4	0			
5	0	0		
6	0	0	0	
7	1	0	0	0
8	1	1	0	0
9	2	1	1	0
10	2	1	1	0
11	2	2	1	1
12	3	2	2	1

To be significant, the calculated/observed value must be equal to or less than the critical/table value.

Using the table of critical values of 'S' above, state whether the findings of the study are significant at $p < 0.05$. Explain your answer.

(2)

(Total 6 marks)

Q16.

In an observational study, 100 cars were fitted with video cameras to record the driver's behaviour. Two psychologists used content analysis to analyse the data from the films. They found that 75% of accidents involved a lack of attention by the driver. The most common distractions were using a hands-free phone or talking to a passenger. Other distractions included looking at the scenery, smoking, eating, personal grooming and trying to reach something within the car.

(a) What is content analysis?

(2)

(b) Explain how the psychologists might have carried out content analysis to analyse the film clips of driver behaviour.

(4)

(c) Explain how the two psychologists might have assessed the reliability of their content analysis.

The psychologists then designed an experiment to test the effects of using a hands-free phone on drivers' attention. They recruited a sample of 30 experienced police drivers and asked them to take part in two computer-simulated driving tests. Both tests involved watching a three-minute film of a road. Participants were instructed to click the mouse as quickly as possible, when a potential hazard (such as a car pulling out ahead) was spotted.

Each participant completed two computer-simulated driving tests:

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- Test A, whilst chatting with one of the psychologists on a hands-free phone
- Test B, in silence, with no distractions.

The order in which they completed the computer tests was counterbalanced.

(3)

(d) Explain why the psychologists chose to use a repeated measures design in this experiment.

(3)

(e) Identify **one** possible extraneous variable in this experiment. Explain how this variable may have influenced the results of this experiment.

(3)

(f) Explain **one or more** ethical issues that the psychologists should have considered in this experiment.

(4)

(g) Write a set of standardised instructions that would be suitable to read out to participants, before they carry out Test A, chatting on a hands-free phone.

The computer simulator measured two aspects of driver behaviour:

- the number of hazards detected by each driver
- the time taken to respond to each hazard, in seconds.

The mean scores for each of these measures is shown in the table below.

Table to show the mean number of hazards detected and mean reaction times in seconds for Test A and Test B

Mean scores	Test A: with hands-free phone	Test B: in silence
Number of hazards detected	26.0	23.0
Reaction time in seconds	0.45	0.27

The psychologists then used an inferential statistical test to assess whether there was a difference in the two conditions.

(5)

(h) Identify an appropriate statistical test to analyse the difference in the number of hazards detected in the two conditions of this experiment. Explain why this test of difference would be appropriate.

They found no significant difference in the number of hazards detected ($p > 0.05$), but there was a significant difference in reaction times (p . 0.01).

(3)

(i) Explain why the psychologists did not think that they had made a Type 1 error in relation to the difference in reaction times.

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(2)

(j) Replication is one feature of the scientific method. The psychologists decided to replicate this experiment using a larger sample of 250 inexperienced drivers.

Explain why replication of this study would be useful.

(3)

(Total 32 marks)

Q17.

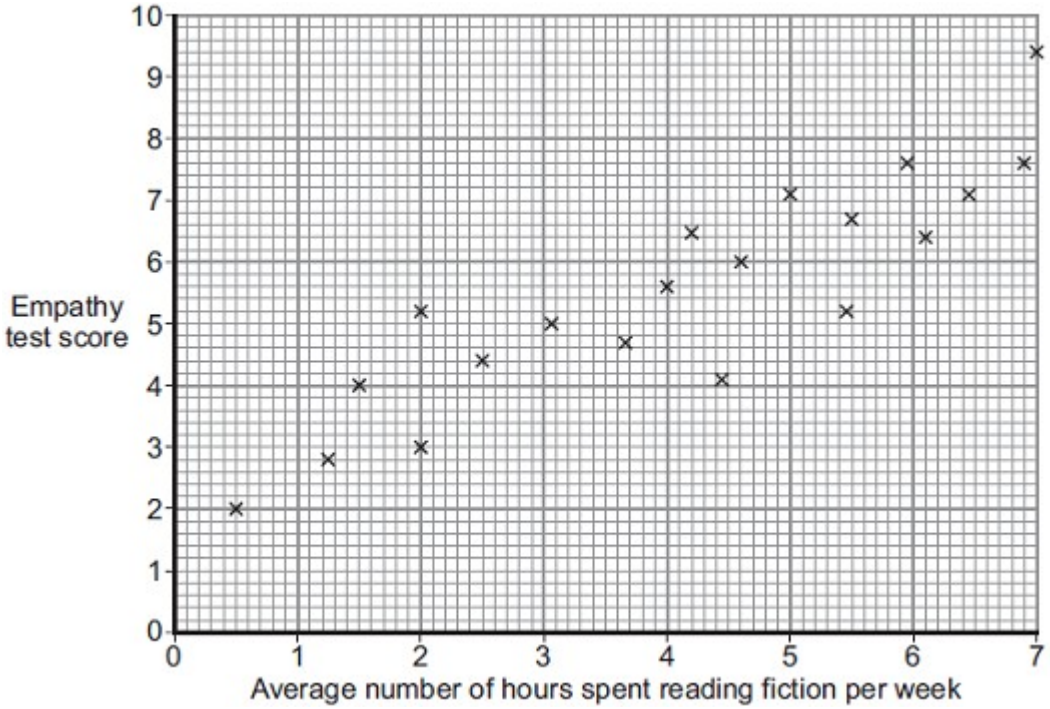
A student teacher was interested in the relationship between empathy (consideration and feelings for others) and the time spent reading fiction. She decided to investigate whether or not such a relationship was present in children.

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.



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

(1)

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

(8)

(Total 18 marks)

Q18.

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

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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
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)

Q19.

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)

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(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
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

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- 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)

Q20.

A study was carried out to test the effectiveness of a new anger management programme. The programme had been designed by a team of psychologists working in a young offenders' institution.

Fifteen male offenders aged 17– 21 years took part in the programme. An anger score for each offender was obtained before the start of the programme. This score was based on a questionnaire designed by the psychologists. The questionnaire had 10 items. The maximum score was 50; the higher the score, the greater the level of anger.

The month-long programme of anger management involved 8 two-hour sessions.

Throughout the programme, the offenders were told to keep a diary of situations that made them angry and to record their anger in these situations. After the programme had ended, they were told to continue to keep their diary.

Two weeks later, after the programme had ended, a second anger score was obtained for each offender. The same questionnaire was used.

The data obtained are shown in **Table 1** below.

Table 1: Median anger scores and the ranges before and after the programme

	Before	**After**
Median	**35**	**24**
Range	**15**	**17**

(a) Explain why measures of dispersion are often used in addition to measures of central tendency to summarise data. Refer to the results of this study in your answer.

(2)

(b) A Wilcoxon signed ranks test was used to test for a significant difference between the anger scores at the start of the programme and after the programme had ended.

The calculated value of *T* was found to be 22.

Table 2: Critical values of *T*

Level of significance for two-tailed	0.1	0.05	0.02

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test			
Critical value of *T* (when *N* = 15)	30	25	19

T must be equal to or less than the critical value to be significant.

Using **Table 2** above, explain whether or not the result is significant.

(2)

(c) Explain why the psychologists decided to use a Wilcoxon signed ranks test to analyse the data.

(3)

(d) Explain **two** possible reasons for asking each offender to keep a diary.

(4)

(e) An independent researcher reviewed the design of the study and noted that there was no control group.

Explain how having a control group could have improved this study.

(3)

(f) The independent researcher was also concerned that the psychologists had not checked the reliability and validity of the questionnaire used to measure the level of anger.

Outline how the psychologists could check the reliability **and** the validity of the questionnaire.

(5)

(Total 19 marks)

Q21.

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)

(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?

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(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)

Q22.

The psychologists then wanted to see whether the use of diagrams in medical consultations would affect recall of medical information.

In a laboratory experiment involving a medical consultation role-play, participants were

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randomly allocated to one of two conditions. In Condition A, a doctor used diagrams to present to each participant a series of facts about high blood pressure. In Condition B, the same doctor presented the same series of facts about high blood pressure to each participant but without the use of diagrams.

At the end of the consultation, participants were tested on their recall of facts about high blood pressure. Each participant was given a score out of ten for the number of facts recalled.

(a) In this case, the psychologists decided to use a laboratory experiment rather than a field experiment. Discuss advantages of carrying out this experiment in a laboratory.

(4)

(b) Identify an appropriate statistical test that the psychologists could use to analyse the data from the follow-up study. Give **one** reason why this test is appropriate.

(2)

(Total 6 marks)

Q23.

Psychological research suggests an association between birth order and certain abilities. For example, first-born children are often logical in their thinking whereas later-born children tend to be more creative. A psychologist wonders whether this might mean that birth order is associated with different career choices. She decides to investigate and asks 50 artists and 65 lawyers whether they were the first-born child in the family or not.

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

(2)

(b) Identify an appropriate sampling method for this study and explain how the psychologist might have obtained such a sample

The psychologist found the following results:

- 20 of the 50 artists were first-born children
- 35 of the 65 lawyers were first-born children.

She analysed her data using a statistical test and calculated a value of x^2 = 2.27. She then looked at the relevant table to see whether this value was statistically significant. An extract from the table is provided below.

Table: Critical values of x^2

Level of significance for a one-tailed test				
	0.10	0.05	0.025	0.01
Level of significance for a two-tailed test				
	0.20	0.10	0.05	0.02
df				
1	1.64	2.71	3.84	5.41

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Calculated value of x^2 must be equal to or exceed the table (critical) values for significance at the level shown

(3)

(c) Imagine that you are writing the results section of the report on this investigation. Using information from the description of the study above and the relevant information from the statistical table, provide contents suitable for the results section.

You must provide all of the following:

- an appropriately labelled 2×2 contingency table a sketch of an appropriately labelled bar chart
- identification of the appropriate statistical test with justification for its use
- identification of an appropriate significance level
- a statement of the results of the statistical test in relation to the hypothesis.

(12)

(Total 17 marks)

Q24.

A teacher has worked in the same primary school for two years. While chatting to the children, she is concerned to find that the majority of them come to school without having eaten a healthy breakfast. In her opinion, children who eat 'a decent breakfast' learn to read more quickly and are better behaved than children who do not. She now wants to set up a pre-school breakfast club for the children so that they can all have this beneficial start to the day. The local authority is not willing to spend money on this project purely on the basis of the teacher's opinion and insists on having scientific evidence for the claimed benefits of eating a healthy breakfast.

(a) Explain why the teacher's personal opinion cannot be accepted as scientific evidence.
Refer to some of the major features of science in your answer.

A psychologist at the local university agrees to carry out a study to investigate the claim that eating a healthy breakfast improves reading skills. He has access to 400 five-year-old children from 10 local schools, and decides to use 100 children (50 in the experimental group and 50 in the control group). Since the children are so young, he needs to obtain parental consent for them to take part in his study.

(6)

(b) The psychologist used a random sampling method. Explain how he could have obtained his sample using this method.

(3)

(c) Explain limitations of using random sampling in this study.

(3)

(d) Explain why it is important to operationalise the independent variable and the dependent variable in this study and suggest how the psychologist might do this.

(5)

(e) The psychologist used a Mann-Whitney test to analyse the data. Give **two** reasons why he chose this test.

(2)

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(f) He could have used a matched pairs design. Explain why this design would have been more difficult to use in this study.

(2)

(g) Other than parental consent, identify **one** ethical issue raised in this study and explain how the psychologist might address it.

(2)

(h) The psychologist asks some of his students to conduct a separate observational study at the same time on the same group of children. The aim of this observational study is to test the idea that eating a healthy breakfast affects playground behaviour.

Design an observational study to investigate the effects of a healthy breakfast on playground behaviour. Include in your answer sufficient detail to allow for reasonable replication of the study. You should state the hypothesis you are setting out to test.

In your answer, refer to:

- an appropriate method of investigation
- materials/apparatus and procedure.

Justify your design decisions.

(12)

(Total 35 marks)

Q25.

(a) The psychologist was also interested in the effects of a restricted diet on memory functioning and he expected memory to become impaired. The psychologist's hypothesis was that participants' scores on a memory test are lower after a restricted diet than before a restricted diet. He gave the volunteers a memory test when they first arrived in the research unit and a similar test at the end of the four-week period. He recorded the memory scores on both tests and analysed them using the Wilcoxon signed ranks test. He set his significance level at 5%.

His calculated value was $T = 53$.

State whether the hypothesis for this study is directional or non–directional.

(1)

(b) **Table: Extract from table of critical values from the Wilcoxon signed ranks test**

Level of significance for a one-tailed test	0.05	0.025
Level of significance for a two-tailed test	0.1	0.05
N	*T*≤	
19	53	46
20	60	52
21	67	58
22	75	65

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Calculated *T* must be equal to or less than the critical value (table value) for significance at the level shown

Using the table above, state whether or not the psychologist's result was significant. Explain your answer.

(3)

(Total 4 marks)

Q26.

Read the text below and answer the questions that follow.

A psychologist is using the observational method to look at verbal aggression in a group of children with behavioural difficulties. Pairs of observers watch a single child in the class for a period of one hour and note the number of verbally aggressive acts within ten-minute time intervals. After seeing the first set of ratings, the psychologist becomes concerned about the quality of inter-rater reliability. The tally chart for the two observers is shown in the table below.

Table: Observation of one child – number of verbally aggressive acts in ten-minute time intervals

Time slots	0–10	11–20	21–30	31–40	41–50	51–60
Observer A	2	5	0	6	4	3
Observer B	4	3	2	1	6	5

(a) Use the data in the Table above to sketch a scattergram. Label the axes and give the scattergram a title.

(4)

(b) Using the data in the Table above, explain why the psychologist is concerned about inter-rater reliability.

(4)

(c) Identify an appropriate statistical test to check the inter-rater reliability of these two observers. Explain why this is an appropriate test.

(3)

(d) If the psychologist does find low reliability, what could she do to improve inter-rater reliability before proceeding with the observational research?

(4)

(Total 15 marks)

Q27.

A psychologist was interested in testing a new treatment for people with eating disorders. She put up adverts in several London clinics to recruit participants. Thirty people came forward and they were all given a structured interview by a trained therapist. The therapist then calculated a numerical score for each participant as a measure of their current functioning, where 50 indicates excellent, healthy functioning and zero indicates failure to

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function adequately. The psychologist then randomly allocated half the participants to a treatment group and half to a no-treatment group. After eight weeks, each participant was re-assessed using a structured interview conducted by the same trained therapist, and given a new numerical score. The trained therapist did not know which participants had been in either group.

For each participant, the psychologist calculated an improvement score by subtracting the score at the start of the study from the score after eight weeks. The greater the number, the better the improvement.

Median and range of improvement scores for the treatment group and for the no-treatment group

	Treatment group	**No–treatment group**
Median	10.9	2.7
Range	2.1	0.8

(a) With reference to the data in the table above, outline what the findings of this investigation seem to show about the effectiveness of the treatment.

(2)

(b) The psychologist used a statistical test to find out whether there was a significant difference in improvement between the 'treatment' and 'no-treatment' groups. She found a significant difference at the 5% level for a one-tailed test ($p \leq 0.05$).

Identify an appropriate statistical test for analysing the participants' scores. Explain why it would be a suitable test to use in this study.

(4)

(c) What is the likelihood of the psychologist having made a Type 1 error in this study? Explain your answer.

(2)

(d) The psychologist assumed that improvements in the treatment group were a direct result of the new type of treatment. Suggest **two** other reasons why people in the treatment group might have improved.

(4)

(e) The psychologist could have used self-report questionnaires to assess the participants instead of using interviews with the therapist. Explain **one** advantage and **one** disadvantage of using self-report questionnaires in this study rather than interviews.

(4)

(f) The psychologist needed to obtain informed consent from her participants. Write a brief consent form which would be suitable for this study. You should include some details of what participants could expect to happen in the study and how they would be protected.

(5)

(g) What is meant by reliability? Explain how the reliability of the scores in this study could be checked.

(4)

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(h) The psychologist noticed that female and male participants seemed to have responded rather differently to the treatment.

She decided to test the following hypothesis:

> Female patients with an eating disorder will show greater improvement in their symptoms after treatment with the new therapy than male patients.

She used a new set of participants and, this time, used self-report questionnaires instead of interviews with a therapist.

Imagine that you are the psychologist and are writing up the report of the study. Write an appropriate methods section which includes reasonable detail of design, participants, materials and procedure. Make sure that there is enough detail to allow another researcher to carry out this study in the future.

(10)

(Total 35 marks)

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