

**Statistics GCSE****Paper 1**

Edexcel Higher - 2026

Higher Tier

Variant 3

1ST0/1H

**Instructions**

- Write all answers in the spaces provided.
- Answer all questions.
- You must show all your working.
- There may not be enough space to show all your working out.

**Information**

- This is a practise paper to aid your revision for your exams.
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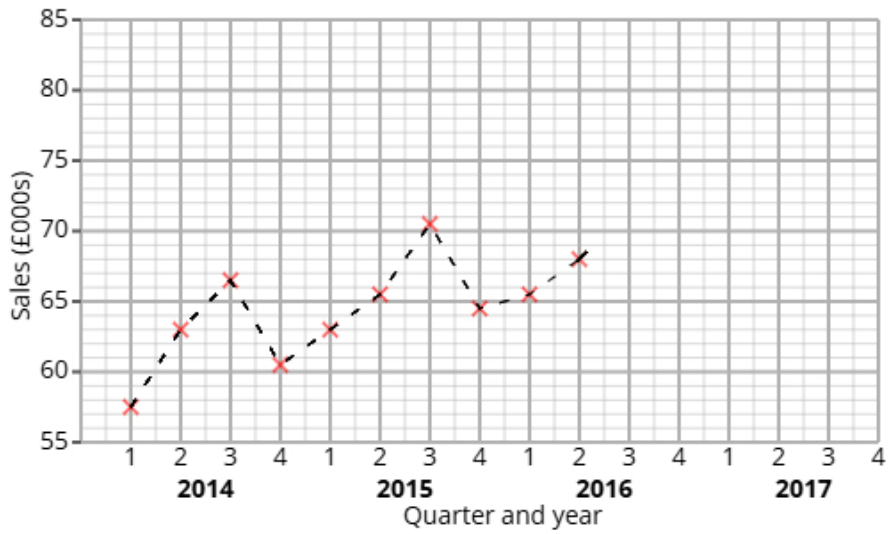
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**Advice**

- You can get support for all these questions at our website: [www.statsgcse.com](http://www.statsgcse.com)
- This paper and more are available on our site with questions that change subtly after each attempt.
- Good luck!

1 The time series graph shows information about the sales at a clothes shop from 2014 to 2016.



Ava calculates the 4-point moving averages from the time series graph, which are shown below.

62      63      64      65      66      67      67

(a) Identify and interpret in context one example of seasonality displayed in the time series graph.

(2 marks)

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(b) Ava uses the time series graph to estimate that there was £70000 of sales in Q1 2017

i) Plot the moving averages onto the time series graph and draw a trend line from 2014 to 2016.

ii) Describe the trend.

iii) By using the average seasonal effect for Q1, show that Ava's estimate is reasonable.

(7 marks)

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(c) Explain why a 4-point moving average is appropriate.

(1 mark)

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2 A fair 4-sided spinner is numbered 1, 2, 3, 4.

A fair 3-sided spinner is numbered 1, 2, 3.

The spinners are used to play a game. Both spinners are spun and the total score is recorded.

		3-sided spinner		
		1	2	3
4-sided spinner	1	2	3	
	2	3		
	3			
	4			

The game is won when the total is at least 5.

Kai plays the game once.

(a) Complete the sample space diagram.

(2 marks)

(b) Find the probability that Kai wins the game.

(2 marks)

- 3 Sara organises two painting classes, Class Red and Class Blue, to help people learn watercolour techniques. She wants to compare the two classes to see which improves skills more.

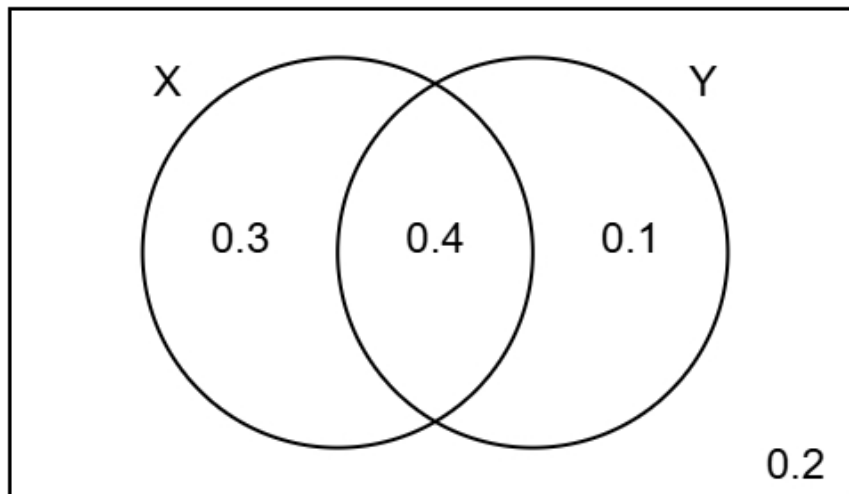
The table shows number of participants who passed or failed the painting challenge.

	Passed	Failed	Total
Class Red	24	8	32
Class Blue	35	25	60

- (i) Find the relative risk of failing the painting challenge having been in Class Red compared to Class Blue.  
(ii) Give an interpretation of your answer to part (i).

(4 marks)

- 4 The Venn diagram shows information about the probabilities of two events occurring.  
The events are labelled as X and Y.



- (a) Find the probability of event Y happening.

(1 mark)

- (b) Find  $P(X \text{ and } Y)$

(1 mark)

- (c) Find  $P(Y | X)$

(2 marks)

(d) Two different events events R and S are independent.

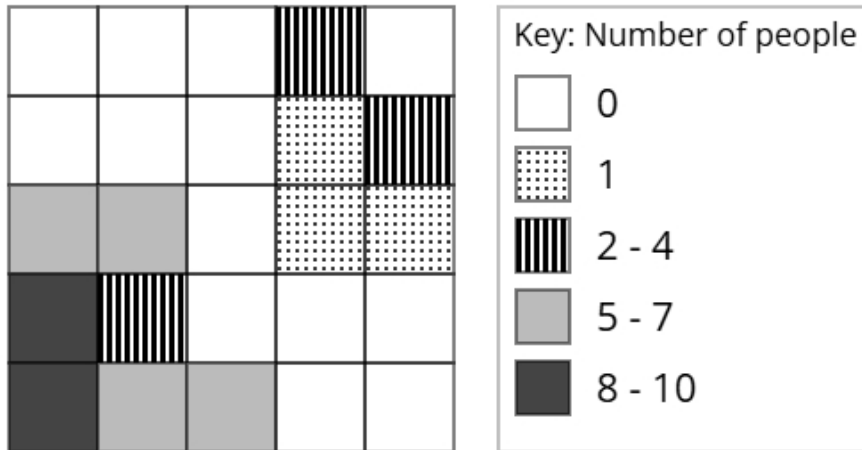
$$P(R) = 0.4$$

$$P(S) = 0.8$$

Find  $P(R \text{ and } S)$

(2 marks)

- 5 The choropleth map below represents a town square that has been divided into 25 squares of equal area. Aisha has collected data about the popularity of different parts of the town square. The number of people recorded in each square on one Thursday morning is shown.



- (a) Calculate an estimate of the total number of people that were recorded on Thursday.

(3 marks)

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- (b) Aisha would like to open a flower stall in the town square.

After analysing the data, she decides that she should open the flower stall in the corner of the town square shown at the bottom left of the choropleth map.

Using the information in the choropleth map, assess the validity of Aisha's conclusion.

(2 marks)

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(c) Daniel argues that the method used by Aisha to collect the data is not appropriate for reaching a reliable conclusion.

Assess whether Daniel's argument is correct and give a reason.

(1 mark)

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6 A scientist is conducting an experiment to investigate the impact of sleep on reaction time. She plans to use a matched pairs design.

Marco is one of the participants in the study.

As part of the experiment, he takes four timed response tests.

Each test has a different weighting.

The table below shows the weightings and Marco's scores for each test.

Test	Weighting	Score
A	3	22
B	2	19
C	4	27
D	1	14

(a) Explain the concept of matched pairs in an experimental design.

(2 marks)

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(b) Calculate the weighted mean score for Marco's four tests.

(3 marks)

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**8** A company team leader wants to find out if software developers have taken extended lunch breaks in the last 6 months.

Harry suggests using the random response technique to ask the developers if they have taken extended lunch breaks.

**(a)** Explain why Harry has suggested using the random response technique for this situation.

(1 mark)

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(c) The final questionnaire will be distributed to a sample of developers.

The developers are made up from those who work with front-end, back-end, and full-stack.

They work either full-time or part-time.

The table shows how many developers there are in each category

		Type		
		Front-End	Back-End	Full-Stack
Employment status	Full-time	88	72	68
	Part-time	33	78	24

The company team leader plans to take a stratified sample based on type and employment status and requires a minimum of 15 individuals from each stratum.

If the calculated sample size for a particular stratum is a decimal, he will round it to the nearest integer.

Determine the smallest total sample size that ensures at least 15 people are selected from each stratum.

(2 marks)

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- 9 Taylor is investigating the profits made by two different shops, Oak & Co and Pine & Co.  
Taylor has obtained the annual percentage profits made by Oak & Co for the years 2014 to 2018 and the annual percentage profits made by Pine & Co for the years 2015 to 2018.

The table below gives this information.

Year	Percentage profit (%)	
	Oak & Co	Pine & Co
2014	2.5	
2015	2.8	0.6
2016	3	1.4
2017	3.6	1.2
2018	4	4.8

Taylor concludes that the average annual percentage profit made by Pine & Co over the 4 years is greater than the average annual percentage profit made by Oak & Co over the 5 years.

By using appropriate geometric means, assess Taylor's conclusion.

You must show your working.

(5 marks)

**10** Daniel has collected data about the heights, in cm, of gymnasts in a school.

The table gives some of the percentiles of Daniel's data.

Percentile	Height (cm)
97.5th	171.5
80th	165.1
60th	161.9
40th	159.1
20th	155.9
5th	151.5
2.5th	149.5

(a) Find the 2.5th to 97.5th interpercentile range.

(1 mark)

\_\_\_\_\_ cm

(b) One of the gymnasts from the sample is selected at random.

Find the probability that their height is between 151.5 cm and 165.1 cm.

(1 mark)

\_\_\_\_\_ %

(c) Give a reason why it is appropriate for Daniel to use the mean and the standard deviation to summarise this data

(1 mark)

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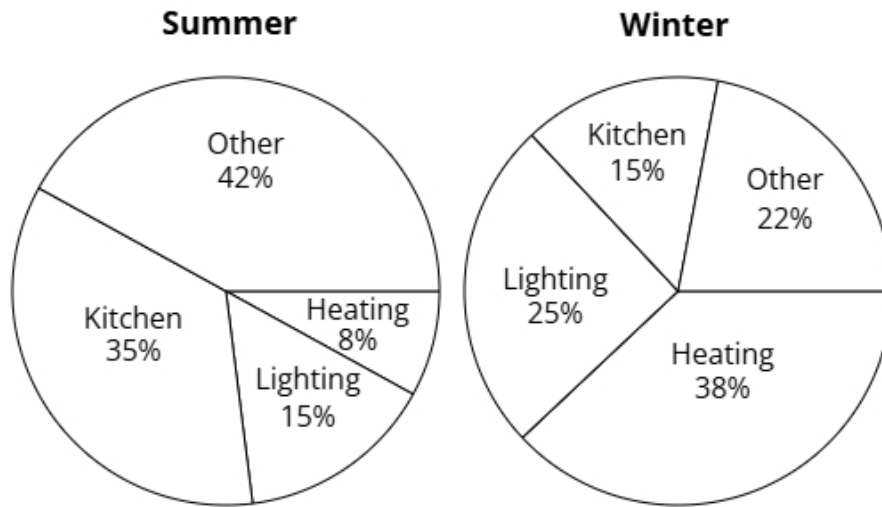
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11 The pie charts show the electricity usage in a house in Summer and Winter.



In Summer the total electricity usage was 640 kWh (nearest ten).

In Winter the total electricity usage was 830 kWh (nearest ten).

Liam wants to use the totals to draw pie charts.

Explain, giving reasons, how Liam can use the totals to draw these pie charts.

(5 marks)

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**12** A company manufactures car tires.

The tires have a target pressure of 32 psi.

The company uses quality assurance to monitor the pressure of each tire.

Samples of the tires are taken from the production line at regular intervals and the mean pressure of the tires in each sample is found.

The sample means should be normally distributed with a mean of 32 psi and a standard deviation of 0.8 psi.

**(a)** Find the upper action limit for the sample means for the tires.

(2 marks)

\_\_\_\_\_ psi

**(b)** The upper action limit will be set closer to the target pressure of 32 psi.

Describe the effect this will have on the frequency of production process stoppages.

(1 mark)

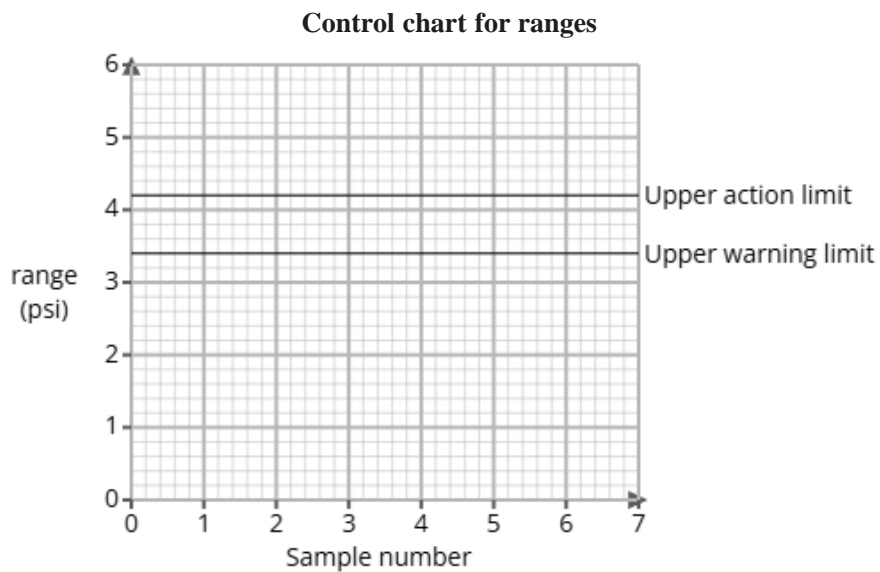
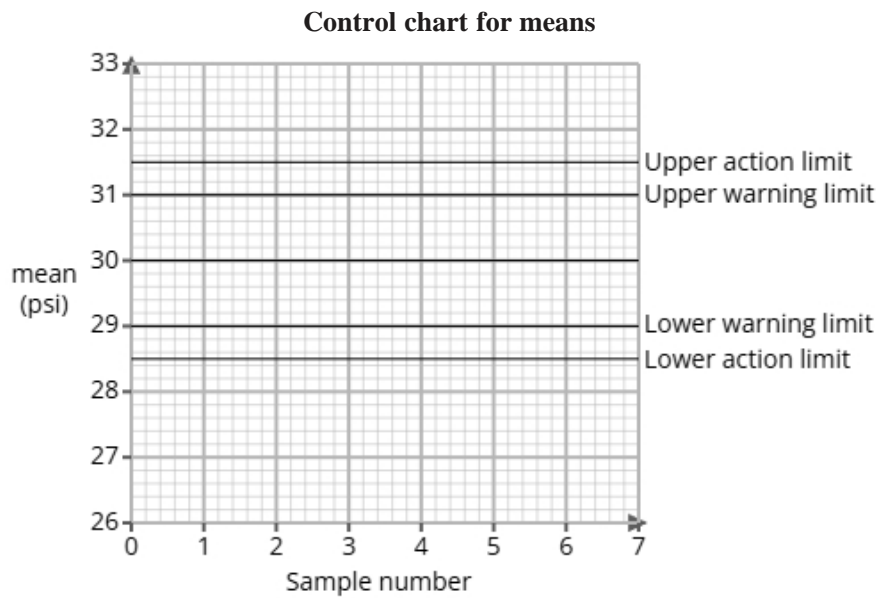
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- (c) The company also manufactures bike tires and uses quality assurance to monitor the pressure of each tire. Here are the control charts for the sample means and for the sample ranges of the pressures of the tires.



A sample is taken and is found to have a mean of 31.1 psi and a range of 3.2 psi.

Use the sample mean and range to determine what action, if any, needs to be taken.

(2 marks)

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**13** A study took place in Brazil to find if there was a relationship between caffeine intake and reaction time of university students.

The researchers found the equations of the regression lines for the relationship between caffeine intake ( $x$  mg) and reaction time ( $y$  ms) for male students and female students before and after exams.

The table below gives the equations of the regression lines.

	before exams	after exams
male students	$y = -0.2x + 350$	$y = -0.25x + 340$
female students	$y = -0.1x + 330$	$y = -0.15x + 320$

**(a)** Compare the relationships between caffeine intake and reaction time in male and female students. Include in your comparisons reference to whether it is before or after exams.

(3 marks)

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**(b)** The researchers would like to use a normal distribution as a model for the reaction time of male students before exams.

- i) Explain how they could check whether a normal distribution is a suitable model by drawing a histogram.
- ii) Explain how they could check whether a normal distribution is a suitable model by calculating the averages and the standard deviation.

(3 marks)

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**14** A factory produces lightbulbs, 5% of which are defective.

An inspector randomly selects 3 bulbs and the number of defective lightbulbs is recorded.

**(a)** Identify two conditions needed so that a binomial distribution is a suitable model for the number of defective lightbulbs is recorded.

(2 marks)

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**(b)** Calculate the probability, as a fraction, that all 3 of the lightbulbs are defective.

(2 marks)

**(c)** Calculate the probability, as a fraction, that at least 2 of the lightbulbs are defective.

(3 marks)