



General Certificate of Secondary Education
2025

Centre Number

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Candidate Number

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Statistics

Unit 2 (With Calculator)

Higher Tier

[GST22]



GST22

THURSDAY 19 JUNE, AFTERNOON

TIME

2 hours.

INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.

You must answer the questions in the spaces provided.

Do not write outside the boxed area on each page or on blank pages.

Complete in black ink only. **Do not write with a gel pen.**

Questions which require drawing can be completed using an HB pencil.

Any working **must** be clearly shown in the spaces provided. Marks may be awarded for partially correct solutions.

Answer **all eleven** questions.

INFORMATION FOR CANDIDATES

The total mark for this paper is 100.

Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.

You should have a calculator, ruler, compasses and protractor.

The formula sheet is on page 2.



HIGHER TIER FORMULA SHEET

$$\text{Standard deviation} = \sqrt{\frac{\sum fx^2}{\sum f} - \left[\frac{\sum fx}{\sum f}\right]^2}$$

Spearman's Rank Correlation Coefficient

$$r_s = 1 - \left[\frac{6 \sum d^2}{n(n^2 - 1)}\right]$$



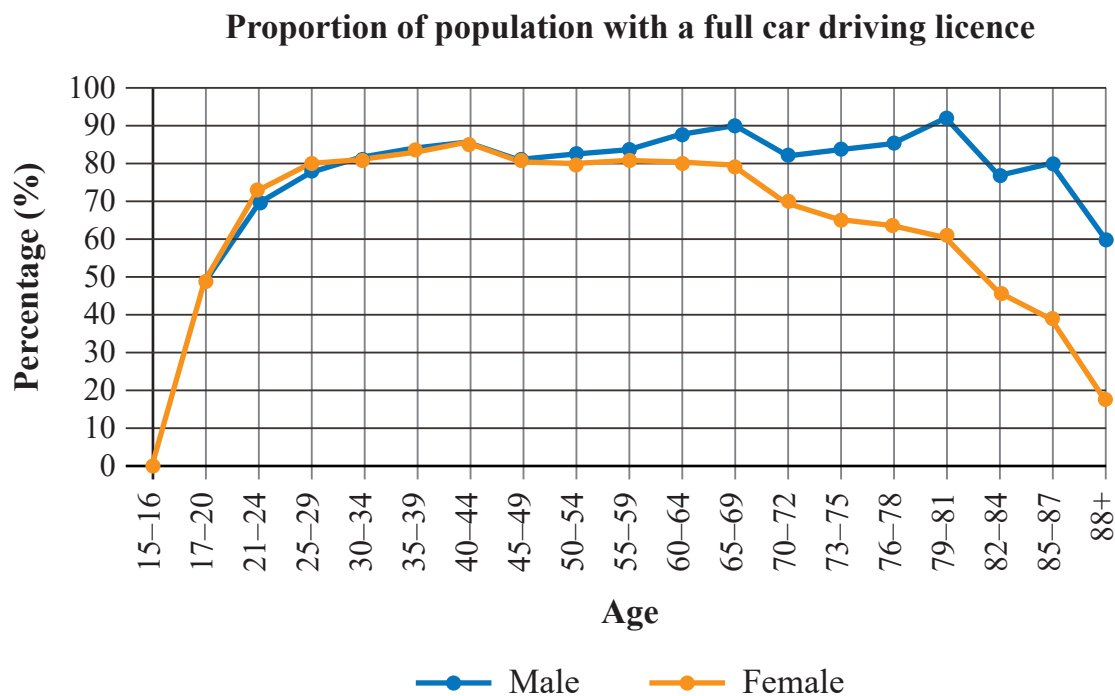


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Answer **all** questions

- 1 The graph below shows the proportion of the population with a full car driving licence by age for males and females in Northern Ireland at the end of March 2023



- (a) Complete this statement:

At the end of March 2023, approximately _____ % of Northern Ireland's male population, aged between 65 and 69 years, had a full car driving licence. [1]



(b) Using the graph opposite, compare the proportions of the population with a full car driving licence for males and females.

[2]

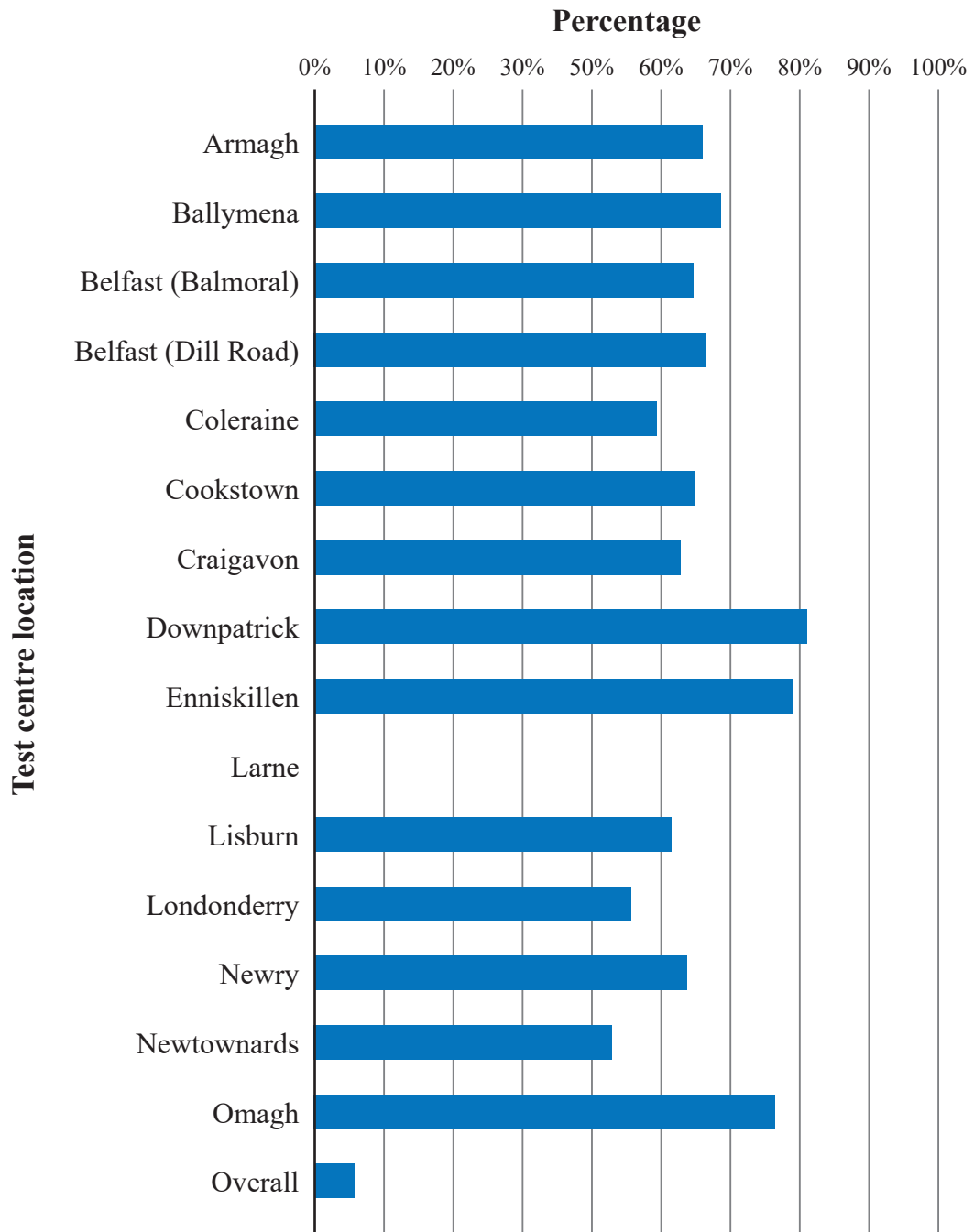
(c) Suggest a reason for the difference in the trends for males and females.

[1]

[Turn over



- 2 Rita has drawn a bar chart showing the pass rates for driving tests at the 15 test centres in Northern Ireland and the overall pass rate over a period of time.



List three problems with the bar chart opposite.

1. _____ [1]

2. _____ [1]

3. _____ [1]

[Turn over



3 Annie is investigating how the percentage of new cars that are electric has changed between 2014 and 2024

She intends to use the statistical enquiry cycle to carry out her investigation.

(a) Suggest a suitable hypothesis for Annie's investigation.

[1]

(b) What data would Annie need to collect?

[2]

(c) (i) Should Annie collect primary or secondary data?

[1]

(ii) Explain your choice.

[1]

(d) Write down a possible source for Annie's data.

[1]



(e) Suggest a suitable diagram which Annie could use to display her data.

Diagram _____ [1]

Explain your choice _____

_____ [1]

[Turn over



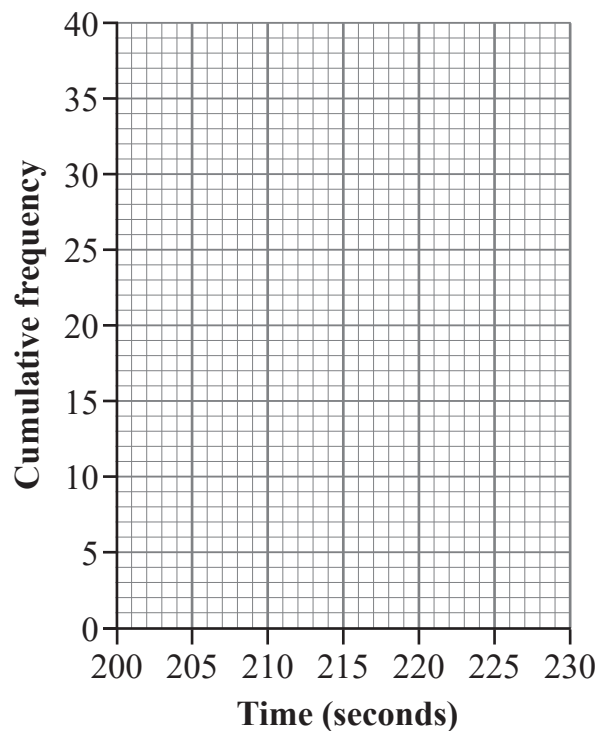
- 4 The times taken, in seconds, for some cyclists to complete a mountain bike course are recorded in the table below.

Time, t (seconds)	Frequency	Cumulative frequency
$200 \leq t < 205$	6	
$205 \leq t < 210$	8	
$210 \leq t < 215$	9	
$215 \leq t < 220$	11	
$220 \leq t < 225$	4	
$225 \leq t < 230$	2	

- (a) Complete the cumulative frequency column in the table above.

[2]

- (b) Plot a cumulative frequency diagram on the axes below.



[3]



(c) Use the cumulative frequency diagram opposite to estimate:

(i) the median time taken to complete the course;

Answer _____ seconds [1]

(ii) the interquartile range of the times taken to complete the course.

Answer _____ seconds [2]

To qualify for the final, cyclists must complete the course in 207 seconds or less.

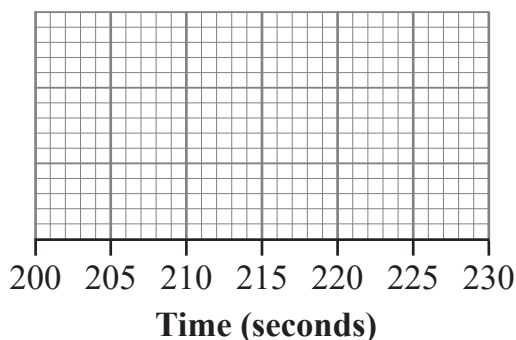
(d) Use the diagram opposite to estimate the number of cyclists who qualify for the final.

Answer _____ [1]

The winning time to complete the course was 201 seconds.

The range of times to complete the course was 25 seconds.

(e) Use this information to draw a box plot on the grid below for the times.



[4]

[Turn over



- (f) Use the box plot to suggest the name of a statistical distribution which could be used to model the times taken by these cyclists to complete the course.

Name of distribution _____ [1]

Explain your answer _____

_____ [1]





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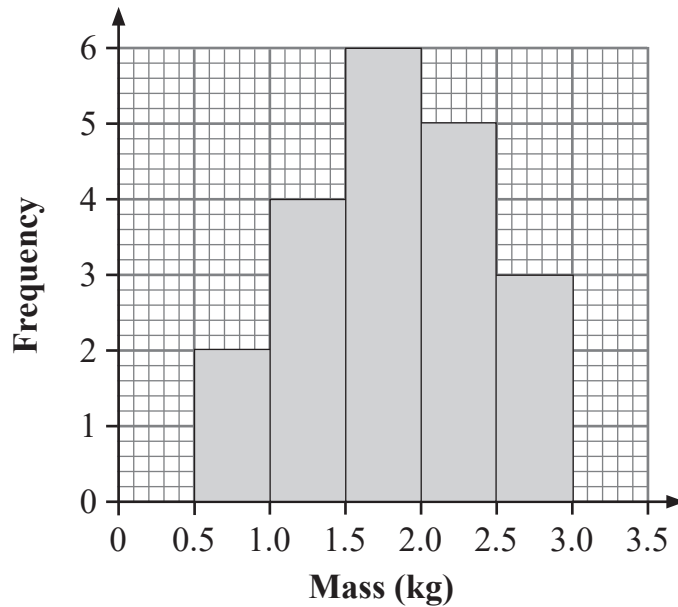
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- 5 A group of Year 12 students record the masses, in kg, of their revision files to compare who has the most revision notes.

The results are shown in the histogram below.



- (a) Calculate an estimate for the mean mass of the revision files.

You may use the table below to help you.

Mass (kg)	Frequency		

Answer _____ kg [4]



- (b) One of the students realises that they made a mistake in recording the mass of their file.

They recorded it as 2.04 kg, but it should have been 2.4 kg.

- (i) If this mistake is corrected, what effect will it have on the estimated mean?

_____ [1]

- (ii) Explain your answer.

_____ [1]

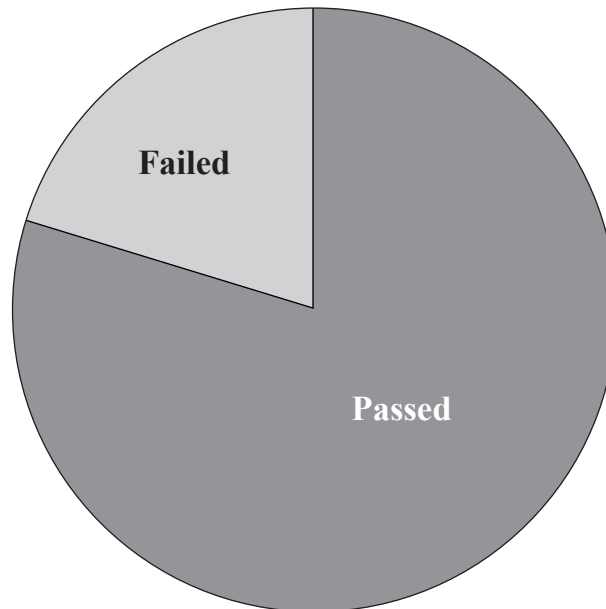
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6 Henry owns a garage which prepares cars for MOT tests.

In 2023, Henry prepared 281 cars for MOT tests at his garage.

The pie chart below shows the proportions of cars prepared by Henry which passed or failed the MOT test in 2023



(a) How many of these cars failed the MOT test in 2023?

Answer _____ [3]



In 2024, of the cars prepared by Henry, 215 passed the MOT test.

The angle for the sector in a comparative pie chart for 2024 representing this value is 306°

(b) How many of the cars prepared by Henry failed the MOT test in 2024?

Answer _____ [2]

(c) Calculate the radius of this pie chart for 2024, giving your answer correct to 1 decimal place.

Answer _____ cm [3]

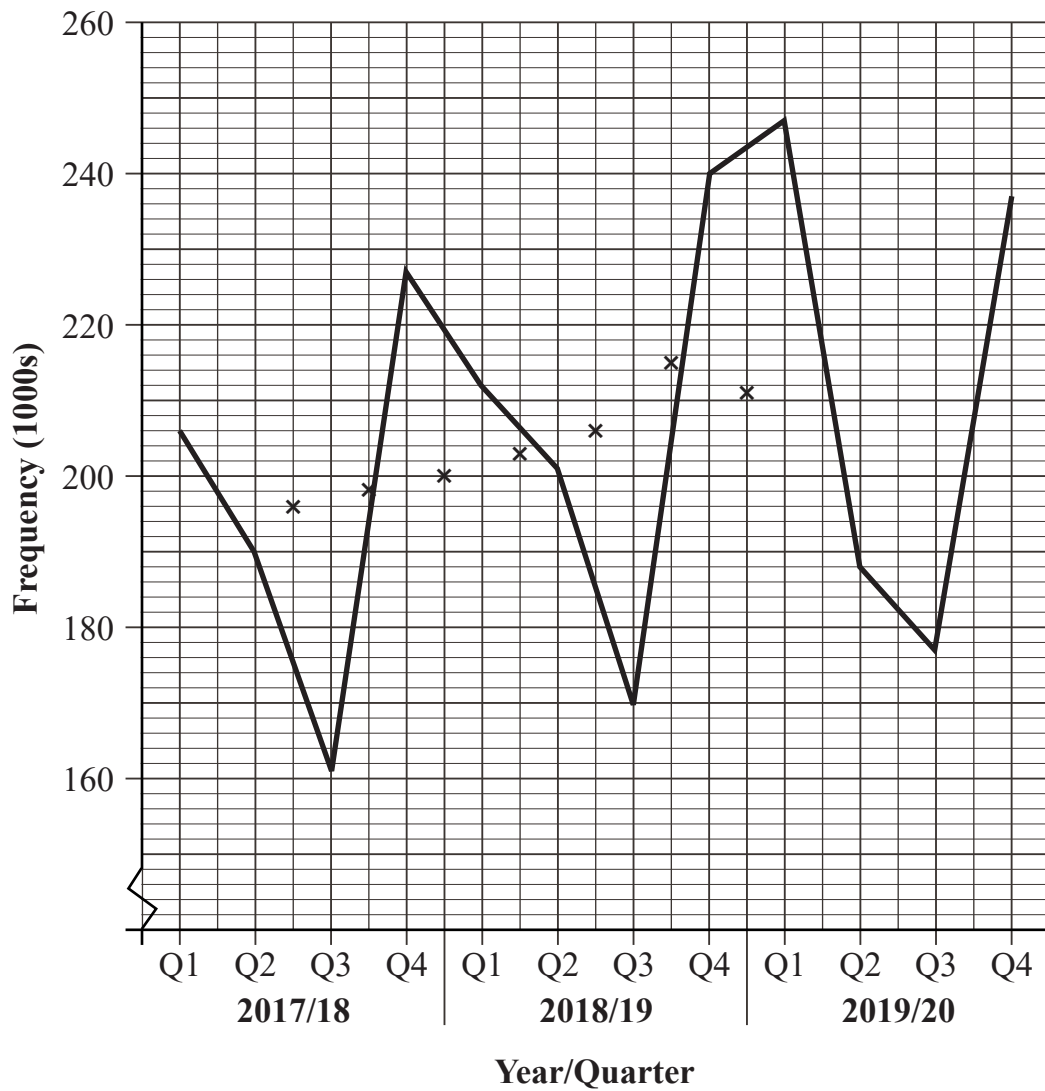
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- 7 The table below shows the number of vehicle test applications, in 1000s to the nearest whole number, for private cars each quarter between the years 2017/18 and 2019/20

2017/18				2018/19				2019/20			
Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
206	190	161	227	212	201	170	240	247	188	177	237

The values in the table have been plotted on the line graph below.



The first seven 4-point moving averages, in 1000s to the nearest whole number, are:

196 198 200 203 206 215 211

- (a) Calculate the next two 4-point moving averages, giving your answers in 1000s to the nearest whole number.

Answer _____ thousand
_____ thousand [2]

- (b) Plot these moving averages on the graph opposite and draw a trend line. [3]

- (c) (i) Use your trend line to estimate the expected number of vehicle test applications for private cars in Quarter 1 of 2020/21, giving your answer in 1000s to the nearest whole number.

Answer _____ thousand [3]

- (ii) What assumption have you made in answering part (c)(i)?

_____ [1]

[Turn over



8 A school is planning a trip for Year 13 pupils to an outdoor activity centre.

Each pupil must choose at least one activity.

They can choose from archery, wall climbing and canoeing.

21 pupils chose archery alone.

15 pupils chose wall climbing alone.

13 pupils chose canoeing alone.

23 pupils chose only archery and wall climbing.

14 pupils chose only wall climbing and canoeing.

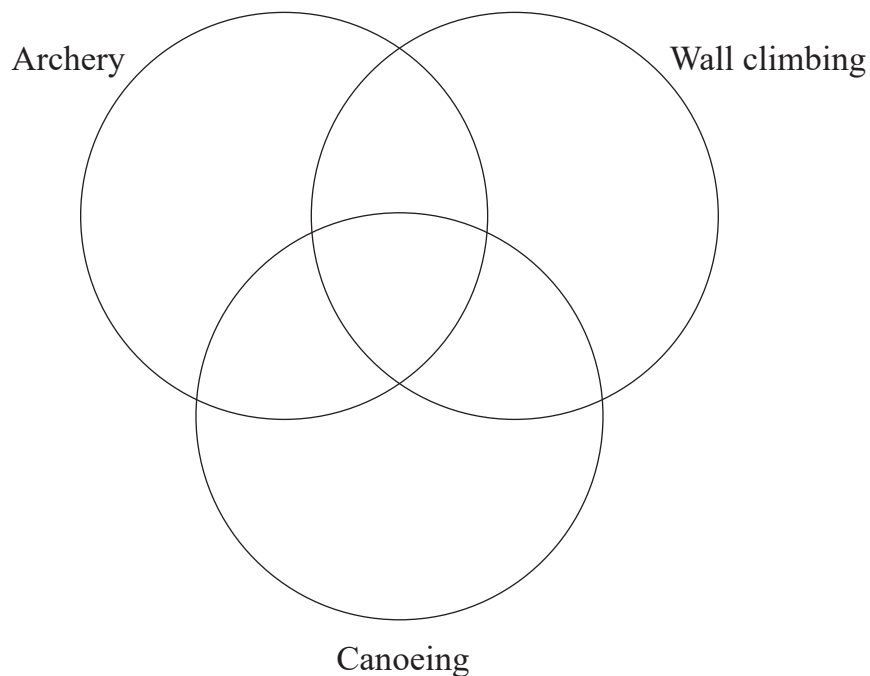
24 pupils chose only archery and canoeing.

12 pupils chose all three activities.

(a) Why is a Venn diagram a suitable way of displaying this data?

[1]

(b) Complete the Venn diagram below with this data.



[3]



(c) Calculate the probability that one of these pupils, selected at random, chose:

(i) exactly two activities;

Answer _____ [2]

(ii) wall climbing, given that they chose canoeing.

Answer _____ [2]



The school also plans to take a Year 8 class to the same activity centre.

It has been decided to estimate the number of pupils for each activity using the Year 13 data.

There are 28 pupils in the Year 8 class.

- (d) (i)** Estimate how many of the Year 8 pupils will choose archery, either on its own or with other activities.

Answer _____ [3]

- (ii)** Comment on the reliability of your answer to part **(d)(i)**.

[2]





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- 9 As shown in the table below, Jenny has recorded the cost of a one-hour driving lesson each year between 2019 and 2024

	2019	2020	2021	2022	2023	2024
Cost	£22	£24	£24	£26		£29
Chain base index number	100	109.1		108.3	103.9	107.4

- (a) Write down the chain base index number for 2021

Answer _____ [1]

The chain base index number for 2022 is 108.3

- (b) Explain what is meant by this value.

_____ [3]

- (c) Calculate the cost of a driving lesson in 2023, correct to the nearest £1

Answer £ _____ [2]



(d) Calculate the geometric mean of the index numbers for 2022 to 2024

Answer _____ [2]

(e) Explain the meaning of your answer to part (d).

_____ [2]

[Turn over

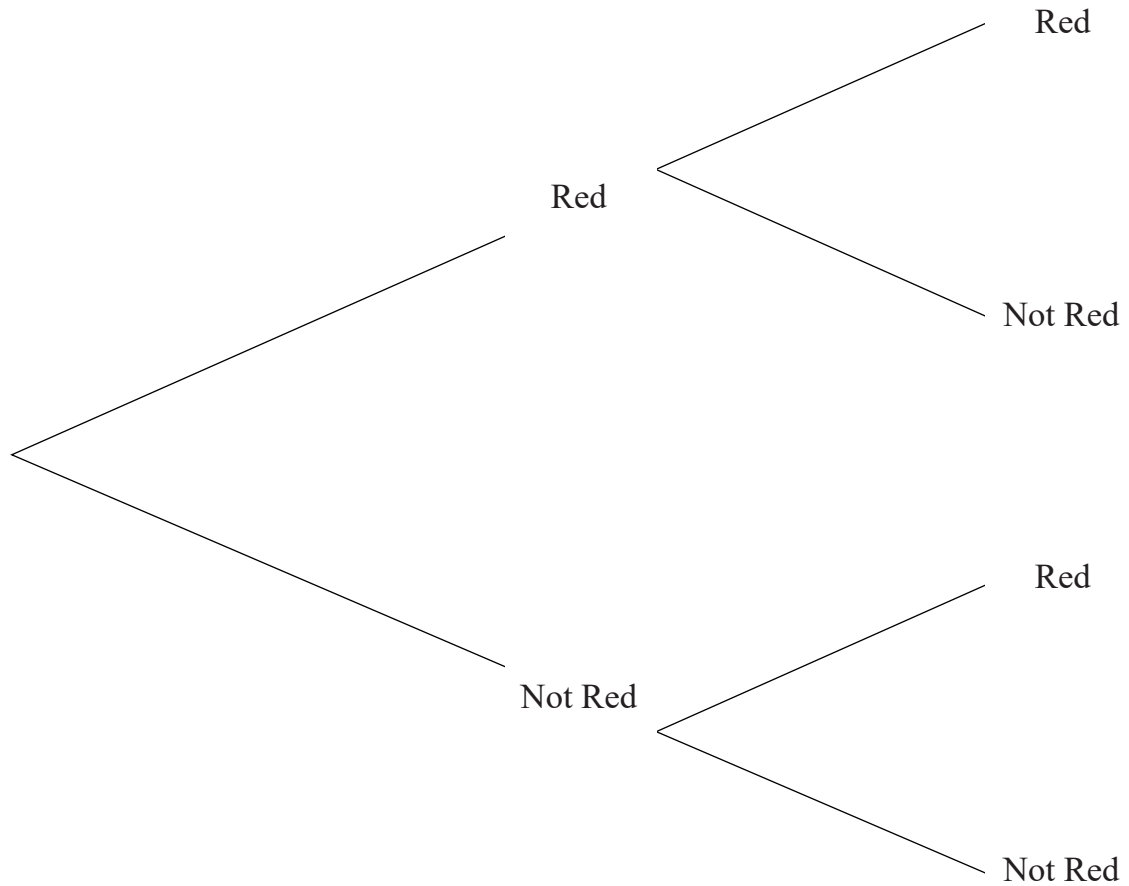


10 Tony has a packet of sweets containing 5 red, 3 orange, 2 purple, 2 yellow and 1 green.

He takes two sweets out of the packet at random.

Tony likes the red sweets best.

(a) Complete the probability tree diagram below.



[3]



(b) Find the probability that:

(i) both sweets are red;

Answer _____ [2]

(ii) at least one of the sweets is red;

Answer _____ [3]

(iii) both sweets are red, given that at least one sweet is red.

Answer _____ [3]

[Turn over



11 Mrs McNeill is concerned about the punctuality of some pupils in her Form Class.

One morning, she records the following information for all pupils in the class.

	Late for school	Not late for school
Missed bus	4	2
Did not miss bus	5	13

(a) Find the risk of a pupil from this Form Class being late for school.

Answer _____ [2]

(b) (i) Calculate the risk of being late for school relative to missing the bus.

Answer _____ [3]

(ii) Give an interpretation of your answer to part (b)(i).

[2]



Chloe estimates that she is late for school 19% of the time.

(c) Write down the probability that Chloe is not late for school.

Answer _____ [1]

In part (d) of this question, you may use:

$$(p + q)^5 = p^5 + 5p^4q + 10p^3q^2 + 10p^2q^3 + 5pq^4 + q^5$$

A binomial distribution can be used to model the number of days in a school week that Chloe is late.

(d) For a school week of five days, calculate the probability that:

(i) Chloe is not late for school any of these five days, giving your answer correct to 3 decimal places;

Answer _____ [2]

(ii) Chloe is late for school fewer than three times, giving your answer correct to 3 decimal places.

Answer _____ [3]



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Sources

Q1, Q2.....© <https://www.infrastructure-ni.gov.uk/sites/default/files/publications/infrastructure/dfi-driver-vehicle-operator-and-enforcement-statistics-2022-23-q4-report-july23.pdf>

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