

Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										



General Certificate of Secondary Education
Foundation Tier
June 2015

Statistics
Unit 1 Written Paper

43101F

F

Thursday 18 June 2015 1.30 pm to 3.00 pm

<p>For this paper you must have:</p> <ul style="list-style-type: none"> • a calculator • mathematical instruments. 	
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Time allowed

- 1 hour 30 minutes

- Instructions**
- Use black ink or black ball-point pen. Draw diagrams in pencil.
 - Fill in the boxes at the top of this page.
 - Answer **all** questions.
 - You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
 - Do all rough work in this book. Cross through any work that you do not want to be marked.

- Information**
- The marks for questions are shown in brackets.
 - The maximum mark for this paper is 80.
 - You may ask for more answer paper, graph paper and tracing paper. These must be tagged securely to this answer book.
 - You are expected to use a calculator where appropriate.

- Advice**
- In all calculations, show clearly how you work out your answer.

For Examiner's Use	
Examiner's Initials	
Pages	Mark
3	
4 – 5	
6 – 7	
8 – 9	
10 – 11	
12 – 13	
14 – 15	
16 – 17	
18 – 19	
20 – 21	
22 – 23	
TOTAL	



J U N 1 5 4 3 1 0 1 F 0 1

You may need to use the following formulae:

Mean of a frequency distribution $= \frac{\sum fx}{\sum f}$

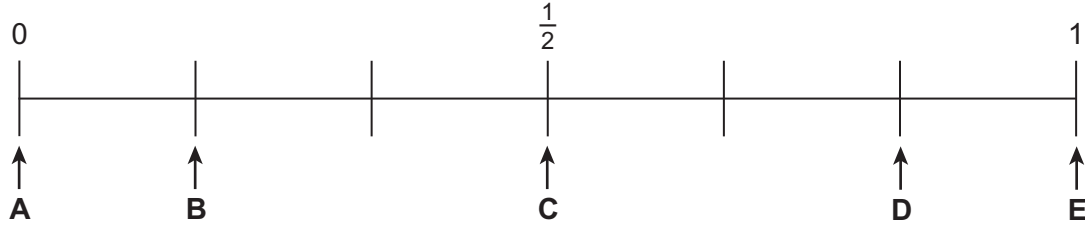
Mean of a grouped frequency distribution $= \frac{\sum fx}{\sum f}$,

where x is the mid-interval value.



Answer **all** questions in the spaces provided.

1 Here is a probability scale showing the probabilities A to E.



An ordinary, fair six-sided dice is rolled.

Match the events to the correct letter on the probability scale.
The first one has been done for you.

[3 marks]

Rolling the number 7

A

Rolling an even number

Rolling a number less than 6

Rolling the number 3



2 The table shows the number of cars a garage sold last month.

Salesperson	Number of cars sold
Anne	13
Tim	12
Ian	2
Rob	6
Clare	11
Total = 44	

2 (a) How many more cars did Anne sell than Rob last month?

[1 mark]

Answer

2 (b) What proportion of the cars sold last month did Clare sell?
Give your answer as a fraction in its simplest form.

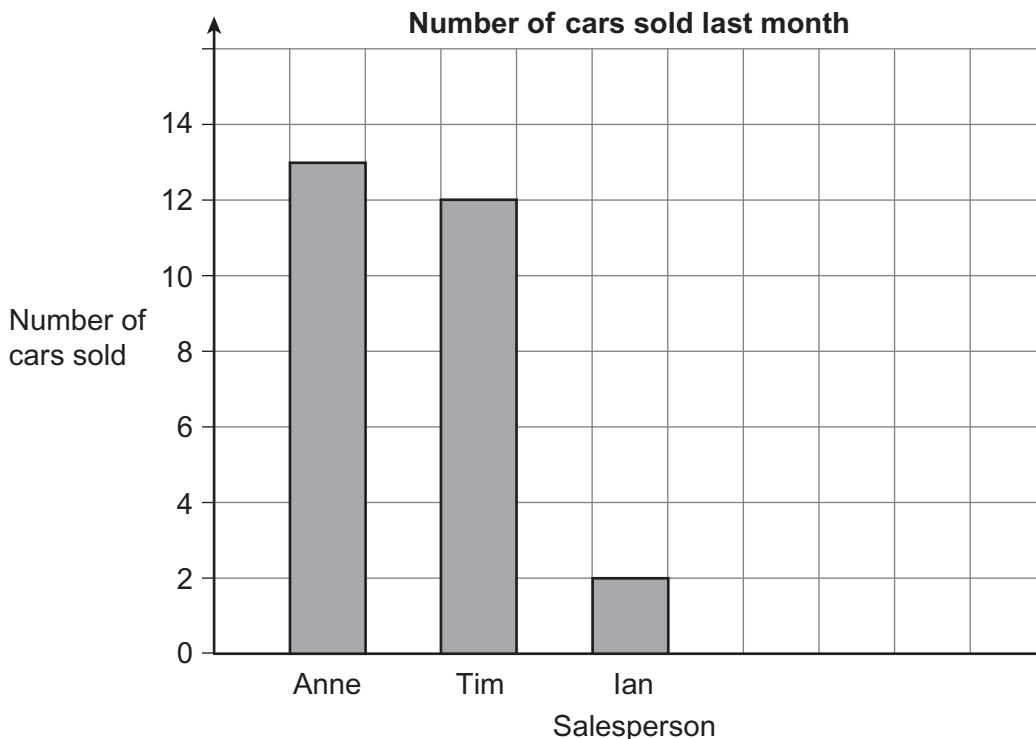
[2 marks]

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Answer

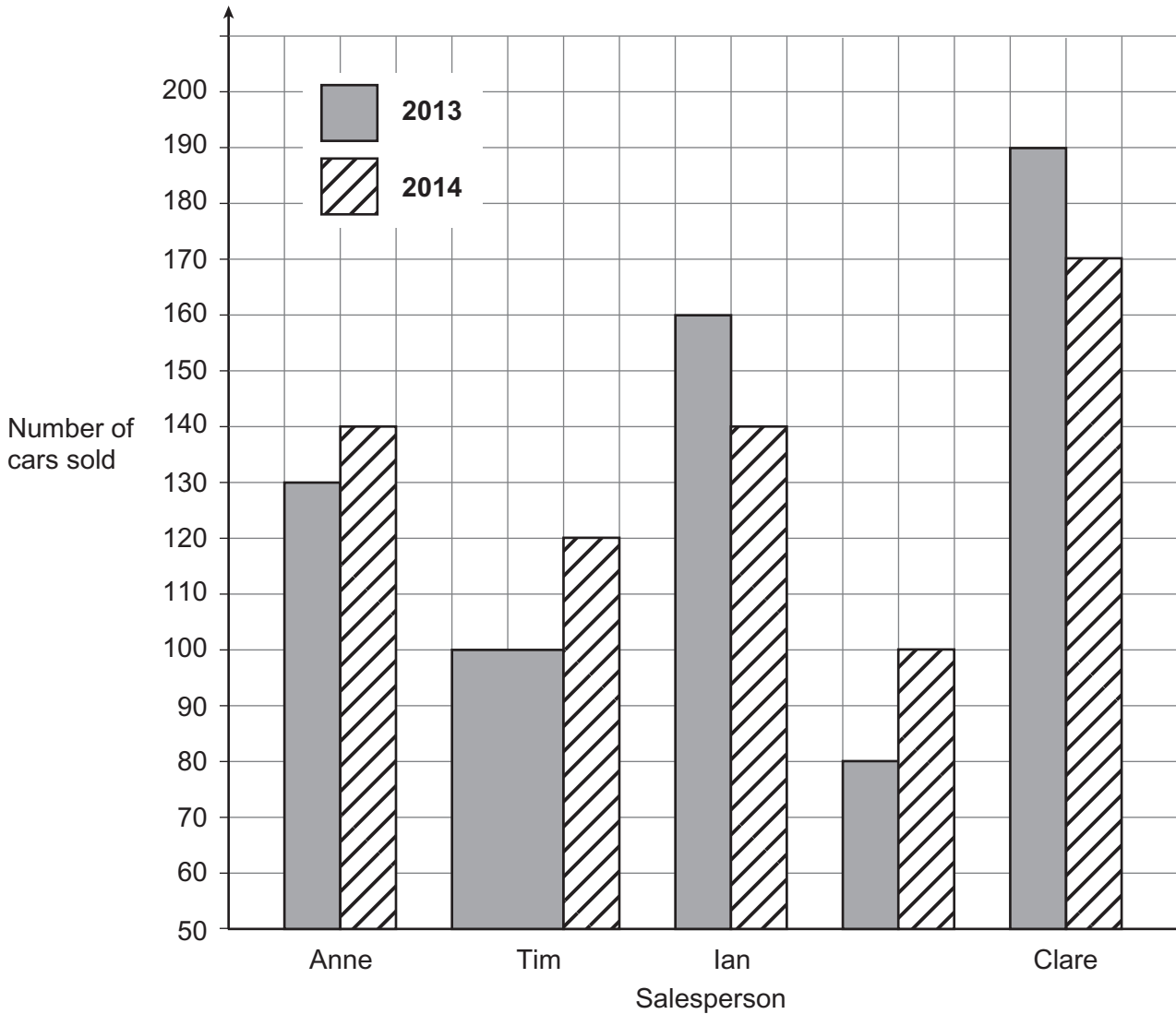
2 (c) Complete the bar chart.

[2 marks]



2 (d) The multiple bar chart shows the number of cars that each salesperson sold in 2013 and 2014. Numbers are to the nearest 10.

Number of cars sold in 2013 and 2014



Write down **three** problems with this multiple bar chart.

[3 marks]

Problem 1

Problem 2

Problem 3

Turn over ►



3 Here are the colours of 20 pens.

black	red	green	red	black
red	black	black	red	black
red	green	green	black	black
green	black	red	black	red

3 (a) What type of data is this?
Tick a box.

[1 mark]

Grouped	<input type="checkbox"/>	Qualitative	<input type="checkbox"/>
Quantitative	<input type="checkbox"/>	Continuous	<input type="checkbox"/>

3 (b) Fill in the tally column and the frequency column for the pens.

[3 marks]

Colour of pen	Tally	Frequency
Green		
Red		
Black		

3 (c) Write down a suitable average to use with the data.

[2 marks]

Suitable average

Give a reason for your answer.


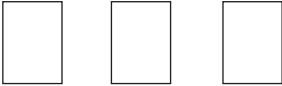


Reason
.....



3 (d)

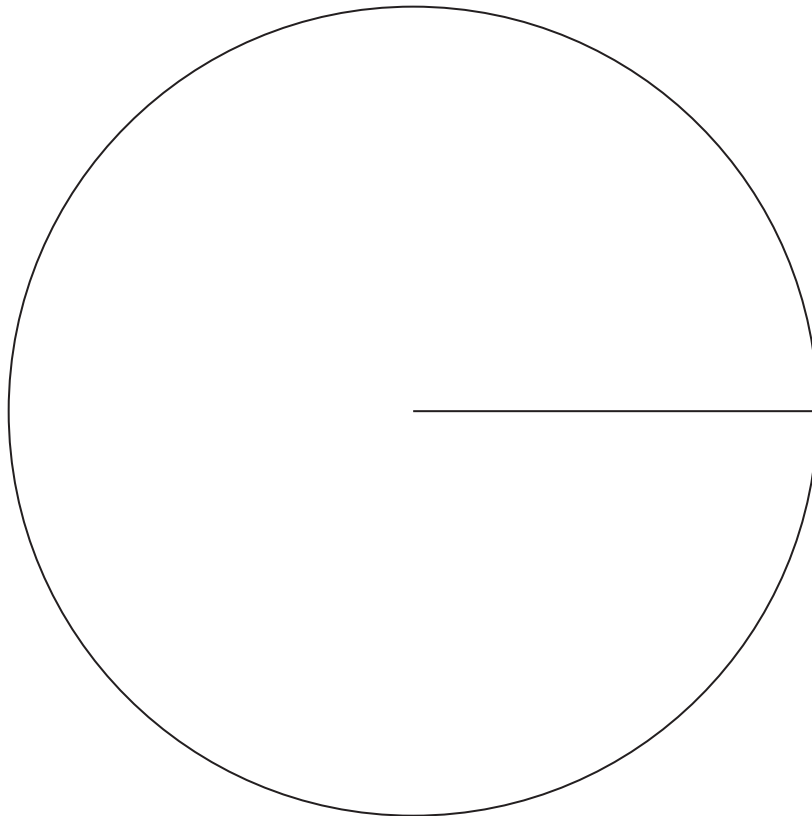
A school buys 40 boxes of pens.

The pictogram shows the number of boxes of each colour.

Colour of pen	Key:  = 5 boxes
Green	
Red	
Black	

Complete the pie chart to represent this information.

[3 marks]



4 A coach company takes weekly trips to the seaside.

The coach driver can go by route A or route B.

The journey times (in minutes) for each route, based on a sample of 15 journeys of each route, are summarised in the table.

	Mean time taken (minutes)	Range of times (minutes)
Route A	55	10
Route B	40	50

4 (a) Which route takes longer on average?
Tick a box.

Route A Route B

Give a reason to explain your answer.

[1 mark]

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.....

4 (b) Last week, the coach left at 9 am and arrived at the seaside at 10.10 am

Which route do you think the driver took?
Tick a box.

Route A Route B

Give a reason to explain your answer.

[1 mark]

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The manager wants to interview some of the passengers on a trip.
There are 53 passengers.

4 (c) Write down one reason why the manager might want to take a sample rather than carry out a census. **[1 mark]**

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4 (d) What population does the manager select from? **[1 mark]**

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4 (e) Briefly describe how the manager could obtain a random sample of 10 passengers. **[2 marks]**

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Turn over for the next question



5 The table shows the National Minimum Wage for workers in 2014.

Age (years)	Hourly rate
21 and above	£6.31
18 to 20	£5.03
Under 18	£3.72

Adapted from <http://www.hmrc.com>

Samantha is 20 years old and is paid the National Minimum Wage.

5 (a) How much is Samantha paid per hour?

[1 mark]

Answer £

5 (b) Samantha works 18 hours each week.

After her next birthday how much **extra** will she get paid each week?

[3 marks]

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Answer £



6 Amy lives near a new airport.

She wants to investigate how the new airport has changed the house prices in the area where she lives.

She lists, in order, the five tasks that she plans to do to investigate this.

Two of the tasks are missing.

Fill in the missing tasks so that Amy has a suitable strategy for her investigation.

[2 marks]

First task Decide on a hypothesis

Second task

Third task Collect the data

Fourth task Draw diagrams and make some calculations

Last task

Turn over for the next question

6

Turn over ►

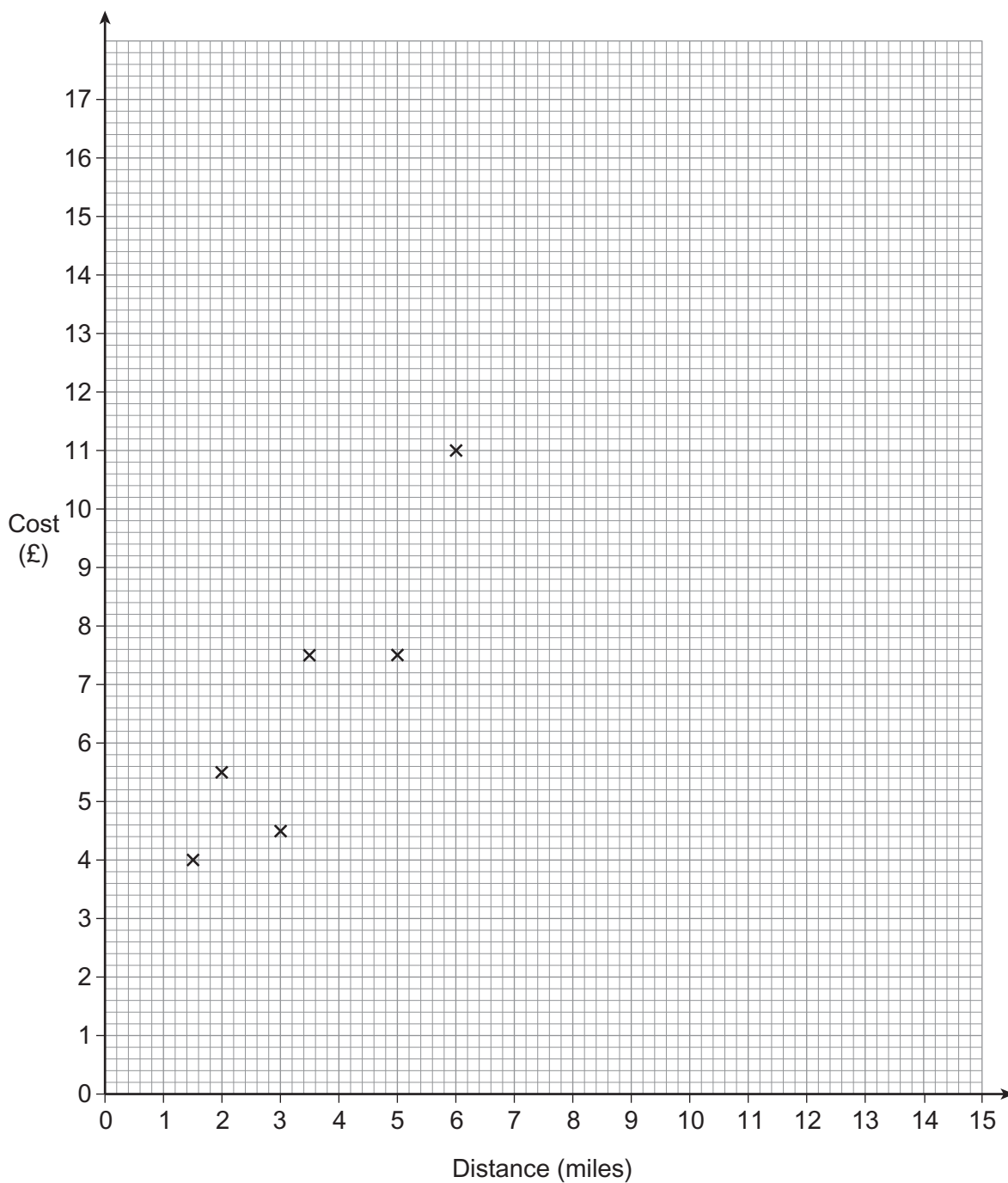


7 The table shows the distance travelled (miles) and the cost (£) of nine taxi journeys.

Distance (miles)	1.5	2	3	3.5	5	6	6.5	8	9.5
Cost (£)	4.00	5.50	4.50	7.50	7.50	11.00	8.50	10.00	13.50

7 (a) Complete the scatter diagram for the data.
The first six points have been plotted for you.

[2 marks]



7 (b) Circle the most likely value of Spearman's rank correlation coefficient for the data. [1 mark]

-0.87 0.08 0.93 8.45

7 (c) The mean distance travelled for these nine journeys is 5 miles and the mean cost is £8
Use these mean values to draw a line of best fit on the scatter diagram. [2 marks]

7 (d) Use your line of best fit to estimate the cost of a 7 mile taxi journey. [1 mark]

Answer £

7 (e) Jack paid £15 for his taxi journey.
Use your line of best fit to estimate the distance he travelled. [1 mark]

Answer miles

7 (f) Which of the answers, 7(d) or 7(e), do you think is **more** reliable?
Tick a box. [1 mark]

7(d) 7(e)

Give a reason for your answer.

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8 The table shows the number of people (in thousands) of different age groups who went to Accident and Emergency in England in 2010 and 2011

Age group (years)	Number of people (thousands)	
	Year 2010	Year 2011
0–9	2350	2536
10–19	2162	2239
20–29	2639	2876
30–39	1983	2137
40–49	1896	2044
50–59	1432	1568
60–69	1256	1359
70–79	1176	1249
80–89	1050	1117
90+	300	337
	Total = 16 244	Total = 17 462

Source: Adapted from <http://www.hscic.gov.uk/>

8 (a) In 2010, how many people aged 30–39 went to Accident and Emergency? **[2 marks]**

Answer

8 (b) Write down **one** similarity between the data from 2010 and the data from 2011 **[1 mark]**

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8 (c) Work out the percentage of people who went to Accident and Emergency in **2011** who were under 20 years old.

Give your answer to a suitable degree of accuracy.

[4 marks]

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Answer %

Turn over for the next question

7

Turn over ►



9 Eight dancers take part in a competition.
Each dancer performs a dance which is marked by two judges.
The table shows the scores (out of 10) the judges gave to each dancer.

	Alex	Nina	Tanya	Rachel	Sam	Cruz	Jess	Mira
Judge A	6	5	10	3	9	3	7	7
Judge B	7	7	9	5	7	6	7	6

9 (a) Work out the median of the scores given by **Judge A**. [2 marks]

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Answer

9 (b) Work out the mean of the scores given by **Judge B**. [2 marks]

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Answer

9 (c) Which judge gave higher marks on average?
Tick a box. [2 marks]

Judge A Judge B

You **must** support your answer with calculations.

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9 (d) How do you know there was some inter-observer bias? **[1 mark]**

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9 (e) Which dancer suffered the most from inter-observer bias? **[1 mark]**

Answer

9 (f) Give **one** way of reducing or avoiding inter-observer bias in this situation. **[1 mark]**

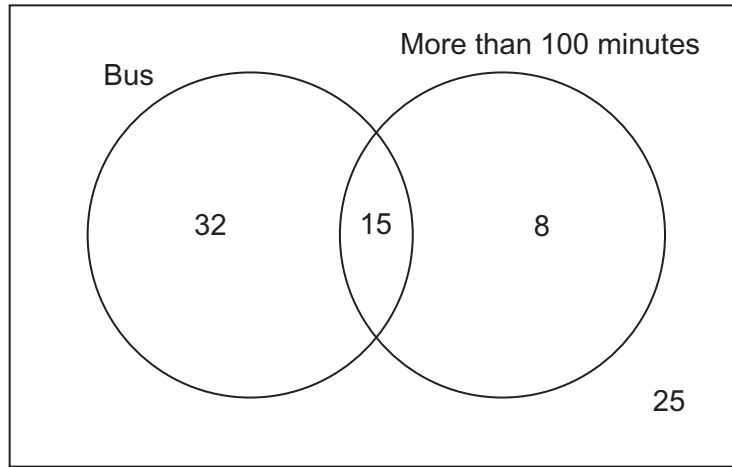
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Turn over for the next question



10 A survey of the times taken by bus and by train of journeys from Oxford to London is taken.

Information about the times of 80 of these journeys is shown in the Venn diagram.



10 (a) Explain what the 8 represents.

[1 mark]

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10 (b) How many of the bus and train journeys take 100 minutes or less?

[2 marks]

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Answer

10 (c) A **bus** journey is chosen at random.

What is the probability it took longer than 100 minutes?

[2 marks]

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Answer

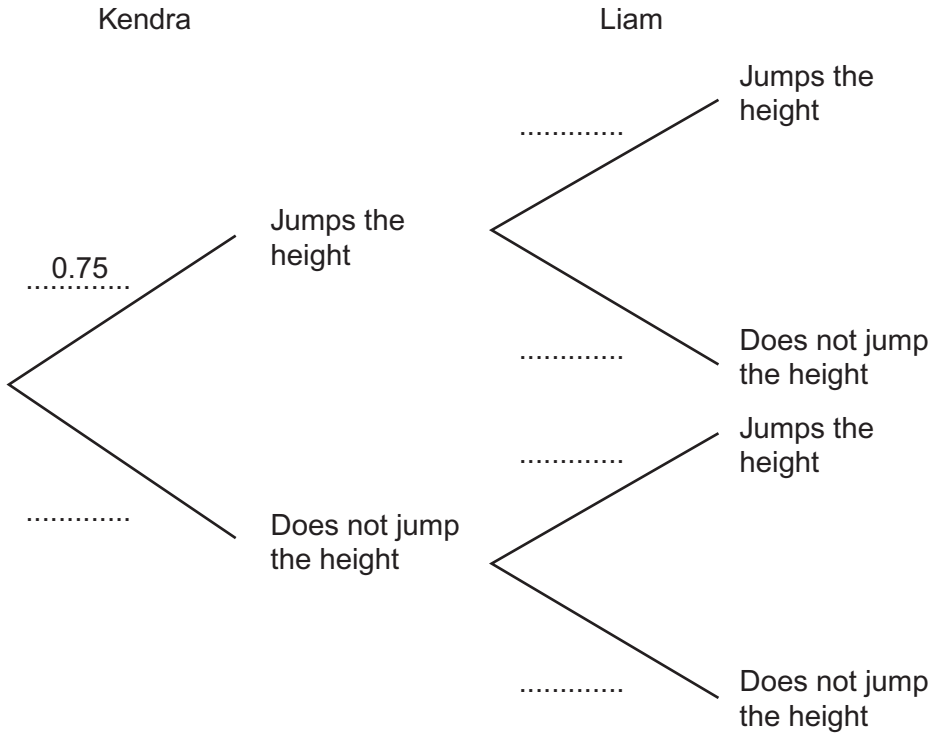


11 Kendra and Liam are in a high jump competition. They each have one chance to jump a height of 170 cm

The probability that Kendra can jump this height is 0.75
The probability that Liam can jump the height is 0.8

11 (a) Complete the tree diagram. Assume that the jumps of Kendra and Liam are independent.

[2 marks]



11 (b) Work out the probability that **both** Kendra and Liam jump the height.

[2 marks]

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Answer



12 People who use mobile phones can choose different contracts for their phones. Each contract includes a number of free minutes of phone calls each month.

Sarah wants to find out if the number of minutes included in the contracts chosen by women is the same as the number of minutes included in the contracts chosen by men.

12 (a) Write a suitable hypothesis for Sarah to test.

[1 mark]

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12 (b) Sarah decides to stand outside a mobile phone shop one lunchtime and survey everyone who goes inside the shop.

Describe **one** problem with this data selection method.

[1 mark]

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12 (c) (i) Sarah collects information from mobile phone users with monthly contracts. She asks these users the following question:

How many free minutes are included in your monthly contract?			
100 – 200	<input type="checkbox"/>	200 – 400	<input type="checkbox"/>
500+	<input type="checkbox"/>	Unlimited	<input type="checkbox"/>

Write down two criticisms of the **response** section.

[2 marks]

Criticism 1

Criticism 2



12 (c) (ii) For these mobile phone users, explain why it may not be possible to calculate an estimate of the mean number of free minutes per month.

[1 mark]

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Sarah also wants to investigate how much people pay each month for their mobile phone contracts.

12 (d) Write a suitable question that Sarah can use.
You should include a response section.

[3 marks]

12 (e) Write down an extraneous variable, other than the number of free minutes, that could affect the cost of a mobile phone contract.

[1 mark]

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9

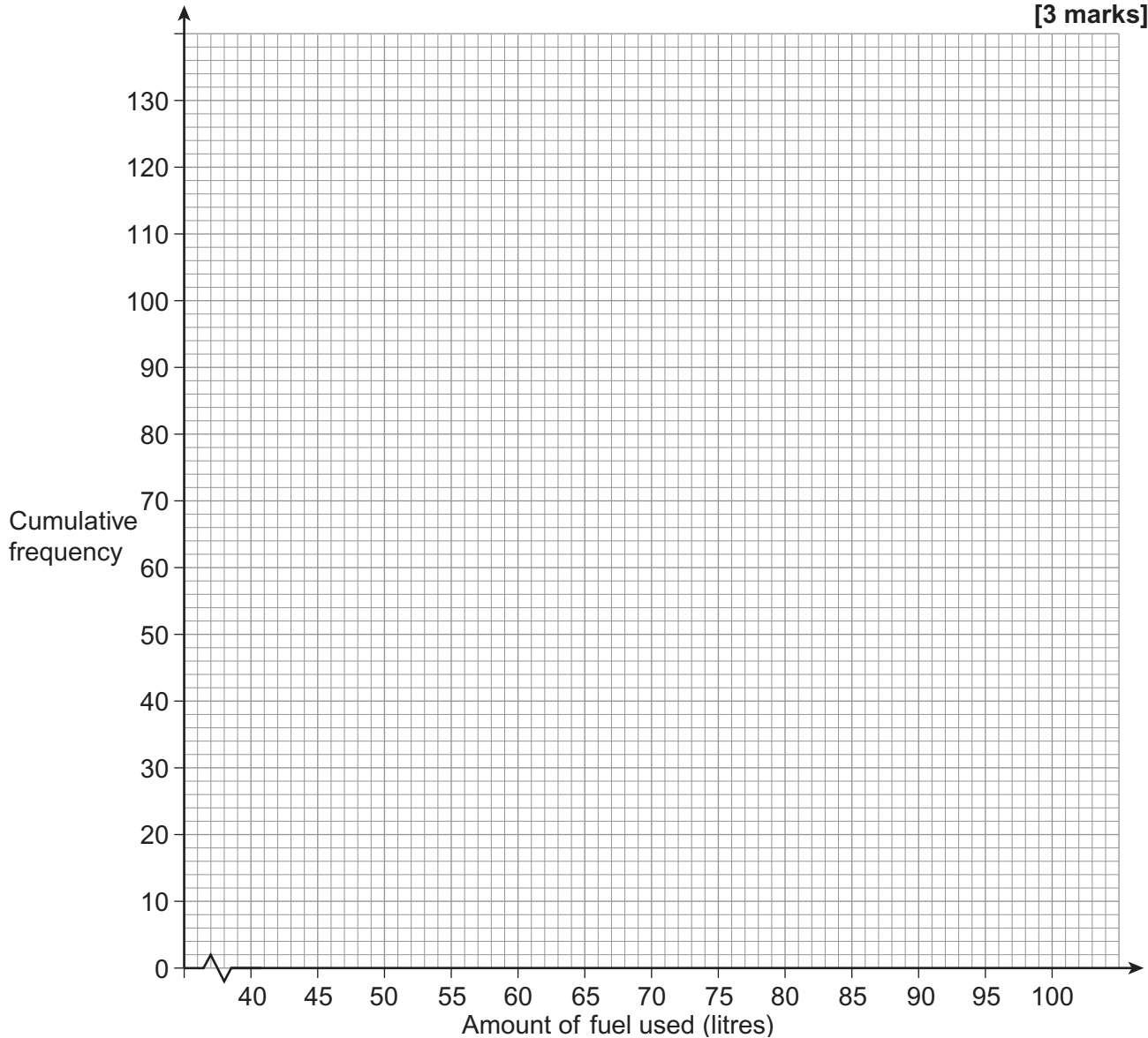
Turn over ►



- 13** Matt owns a lorry company. He regularly sends lorries from his depot to the port of Dover. He records the amount of fuel used (litres) for a sample of 120 of these journeys. His results are shown in the table.

Amount of fuel used x (litres)	Frequency	Cumulative Frequency
$40 < x \leq 50$	8	8
$50 < x \leq 60$	22	30
$60 < x \leq 70$	50	
$70 < x \leq 80$	26	
$80 < x \leq 90$	10	
$90 < x \leq 100$	4	

- 13 (a)** Complete the cumulative frequency column above. **[1 mark]**
- 13 (b)** Draw a cumulative frequency graph to show the data. **[3 marks]**



13 (c) The company has a target that at least three-quarters of the trips to Dover should use 75 litres of fuel or less.

Do the data suggest that the company's target is being met?
Tick a box.

Target met Target not met

Show how you worked out your answer.

[2 marks]

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END OF QUESTIONS

6



There are no questions printed on this page

**DO NOT WRITE ON THIS PAGE
ANSWER IN THE SPACES PROVIDED**

