Write your name here

Surname		Other names

**Pearson
Edexcel GCSE**

Centre Number | Candidate Number

Mathematics B
Unit 1: Statistics and Probability (Calculator)

Higher Tier

Wednesday 6 November 2013 – Morning
Time: 1 hour 15 minutes

Paper Reference
5MB1H/01

Total Marks

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser, calculator. Tracing paper may be used.

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
  – *there may be more space than you need*.
- **Calculators may be used.**
- If your calculator does not have a π button, take the value of π to be 3.142 unless the question instructs otherwise.

Information

- The total mark for this paper is 60
- The marks for **each** question are shown in brackets
  – *use this as a guide as to how much time to spend on each question.*
- Questions labelled with an **asterisk** (*****) are ones where the quality of your written communication will be assessed.

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ▶

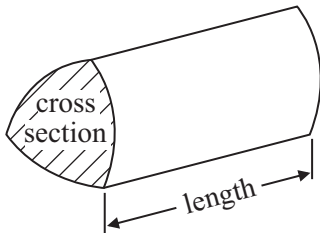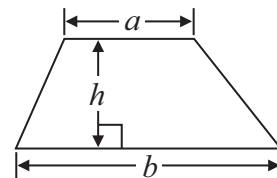**PEARSON**

Formulae: Higher Tier

**You must not write on this formulae page.
Anything you write on this formulae page will gain NO credit.**

Volume of prism = area of cross section × length

Area of trapezium = $\frac{1}{2}(a + b)h$

Volume of sphere = $\frac{4}{3}\pi r^3$

Surface area of sphere = $4\pi r^2$
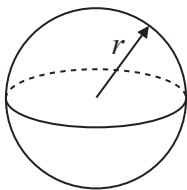
Volume of cone = $\frac{1}{3}\pi r^2 h$

Curved surface area of cone = $\pi r l$
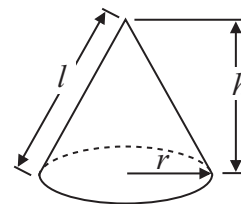
In any triangle *ABC*
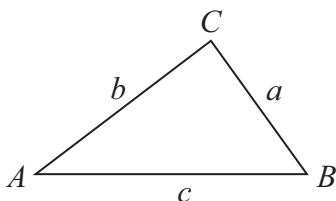
The Quadratic Equation
The solutions of $ax^2 + bx + c = 0$
where $a \neq 0$, are given by

$$x = \frac{-b \pm \sqrt{(b^2 - 4ac)}}{2a}$$

Sine Rule $\dfrac{a}{\sin A} = \dfrac{b}{\sin B} = \dfrac{c}{\sin C}$

Cosine Rule $a^2 = b^2 + c^2 - 2bc \cos A$

Area of triangle = $\frac{1}{2} ab \sin C$

Answer ALL questions.

Write your answers in the spaces provided.

You must write down all stages in your working.

1   Kerry wants to find out how much time people spend watching rugby on television.

She is going to carry out a survey using a questionnaire.

(a) Design a suitable question for Kerry to use on her questionnaire.

(2)

Kerry asks the girls in her class to do her questionnaire.

Her sample is biased.

(b) Give **two** reasons why.

1 ....

....

2 ....

....

(2)

(Total for Question 1 is 4 marks)

2 Tim plays a game.
He can win the game or he can lose the game or he can draw the game.

The probability that Tim will win the game is 0.25
The probability that Tim will lose the game is x.

(a) Give an expression, in terms of x, for the probability that he will draw the game.

....
(2)

Tim plays the game 240 times.

(b) Work out an estimate for the number of times he will win the game.

....
(2)

(Total for Question 2 is 4 marks)

3 Here are the heights, in cm, of 15 students.

150	163	158	156	149
165	161	171	170	166
174	154	148	167	152

(a) Draw an ordered stem and leaf diagram for these heights.
   You must include a key.
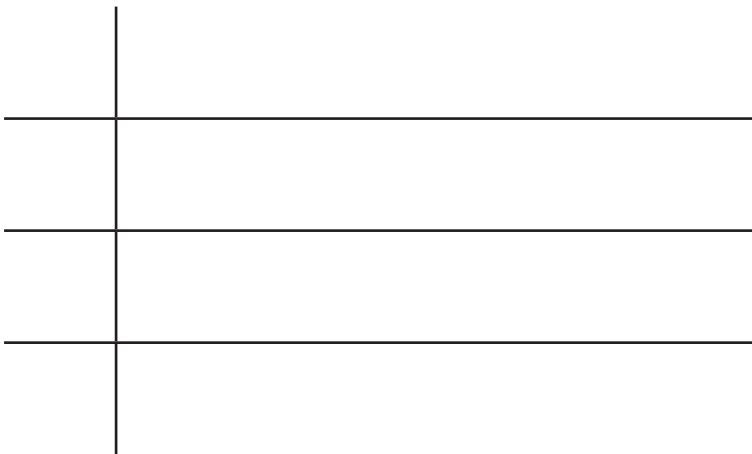
Key:

(3)

(b) Work out the interquartile range.

.... cm

(2)

(Total for Question 3 is 5 marks)

Turn over ▶

*4   You can use this graph to convert between litres and gallons.
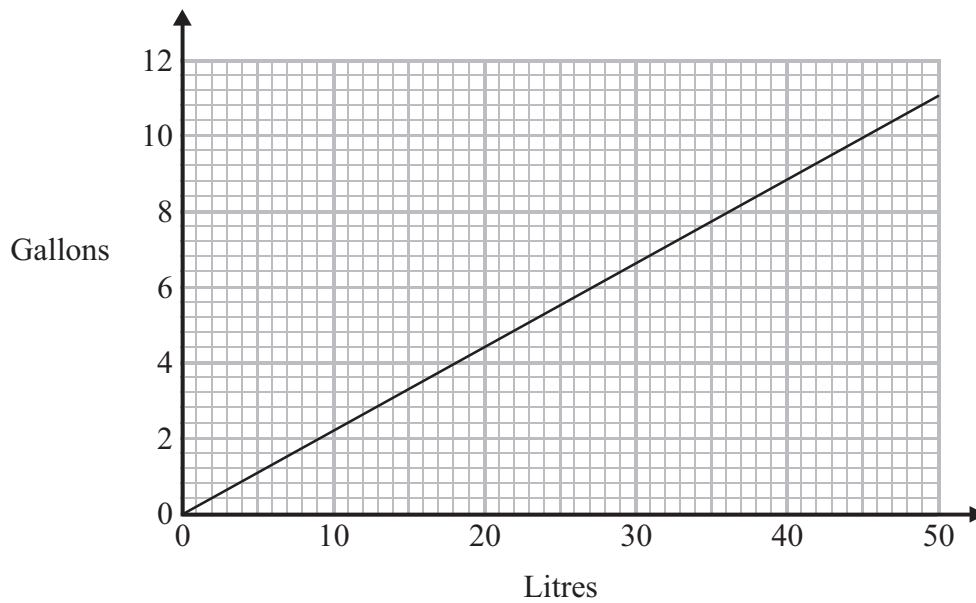
Gallons

Litres

Jack buys 8 gallons of diesel.
He pays £52

Francoise buys 40 litres of diesel.
She pays £58

Who got the better value for their money, Jack or Francoise?
You must show your working.

(Total for Question 4 is 3 marks)

5 The scatter graph gives information about the rainfall (mm) and the number of umbrellas sold in a shop for each of eight months last year.
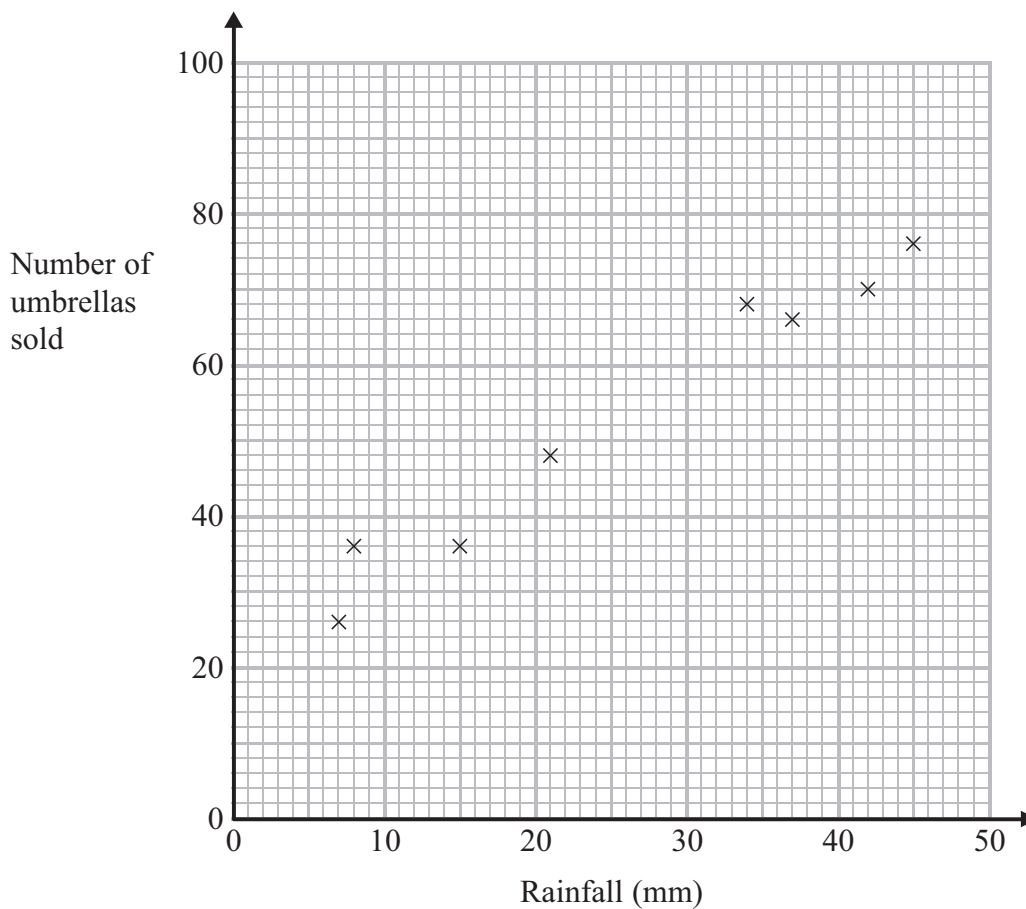
(a) Describe the relationship between the rainfall and the number of umbrellas sold.

....

....

(1)

In a different month, the rainfall was 28 mm.

(b) Estimate the number of umbrellas sold in the shop that month.

....

(2)

(Total for Question 5 is 3 marks)

*6 The Kumar family are going to go to New York.
They will go with Highway Airlines or Jetstream Airlines.
The tables show how much it costs for each adult and each child to go with these airlines.

Highway Airlines

Date	Adult	Child
4 – 10 July	£475	£280
11 – 17 July	£488	£282
18 – 24 July	£516	£304
25 – 31 July	£506	£297
1 – 7 August	£462	£251
8 – 14 August	£430	£238
15 – 21 August	£421	£235
22 – 28 August	£399	£221

Jetstream Airlines

Date	Adult	Child
4 – 10 July	£483	£286
11 – 17 July	£493	£296
18 – 24 July	£526	£315
25 – 31 July	£519	£303
1 – 7 August	£485	£218
8 – 14 August	£429	£245
15 – 21 August	£409	£232
22 – 28 August	£401	£222

Highway Airlines give a discount of 5% of the total cost for booking online.
Jetstream Airlines give a discount of £25 per person for booking online.

The Kumar family are going to New York on 3 August.
They will buy 2 adult tickets and 1 child ticket.
They will book online.

The Kumar family want to pay the lower total cost.
Which airline should they choose?

(Total for Question 6 is 5 marks)

7 Chelsea's height is 168 cm to the nearest cm.

(a) What is Chelsea's minimum possible height?

.... cm
(1)

(b) What is Chelsea's maximum possible height?

.... cm
(1)

(Total for Question 7 is 2 marks)

8 Alice is a lorry driver.
She recorded the distance she drove on each of 40 trips.

The table gives information about these distances.

Distance (d miles)	Frequency
$400 < d \leqslant 450$	9
$450 < d \leqslant 500$	15
$500 < d \leqslant 550$	12
$550 < d \leqslant 600$	4

Work out an estimate for the mean distance.

.... miles

(Total for Question 8 is 4 marks)

Turn over ▶

9 Presta recorded the number of lemons on each of 60 lemon trees.

The incomplete table and box plot give information about her results.

	Number of lemons
Smallest number	
Lower quartile	8
Median	11
Upper quartile	
Greatest number	22
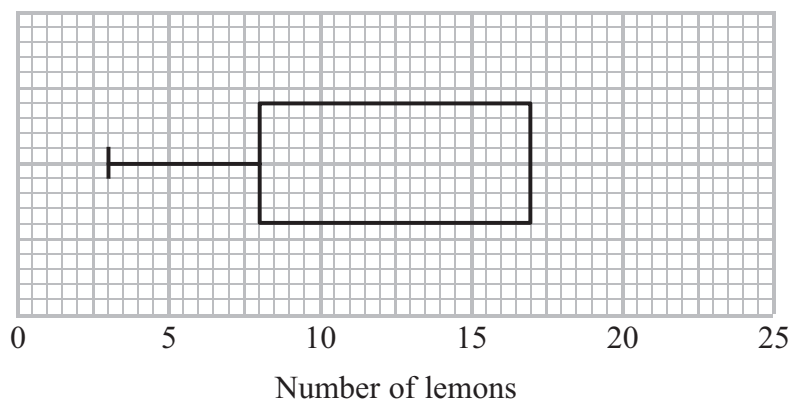
Number of lemons

(a) (i) Use the information in the table to complete the box plot.

(ii) Use the information in the box plot to complete the table.

(3)

Some of these 60 lemon trees have 8 or more lemons on them.

(b) Find an estimate for the number of lemon trees with 8 or more lemons on them.

....

(2)

(Total for Question 9 is 5 marks)

10 The table gives information about the time it took each of 80 children to do a jigsaw puzzle.

	Number of children	Mean time (minutes)
Boys	32	32.4
Girls	48	28.4

Work out the mean time for all 80 children.

.... minutes

(Total for Question 10 is 3 marks)

11 The cumulative frequency graphs give information about the heights of two groups of children, group A and group B.
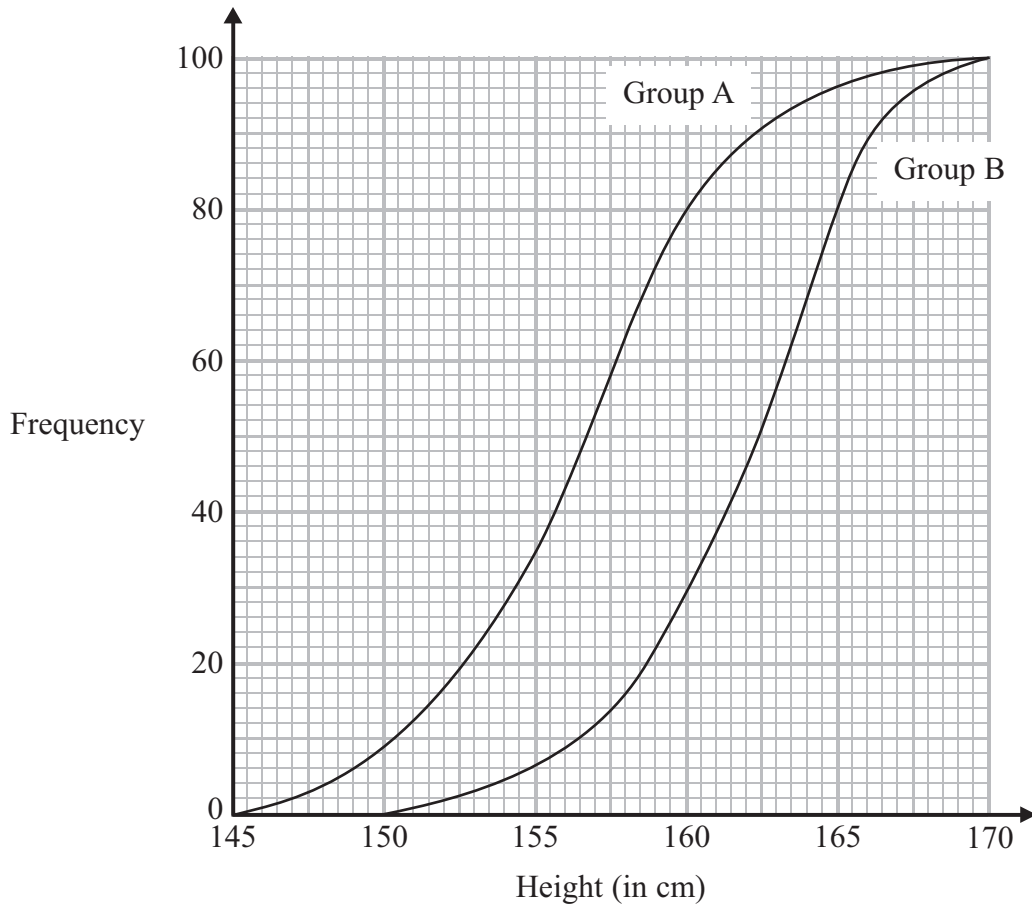
Compare the heights of the children in group A and the heights of the children in group B.

....

....

....

....

....

....

....
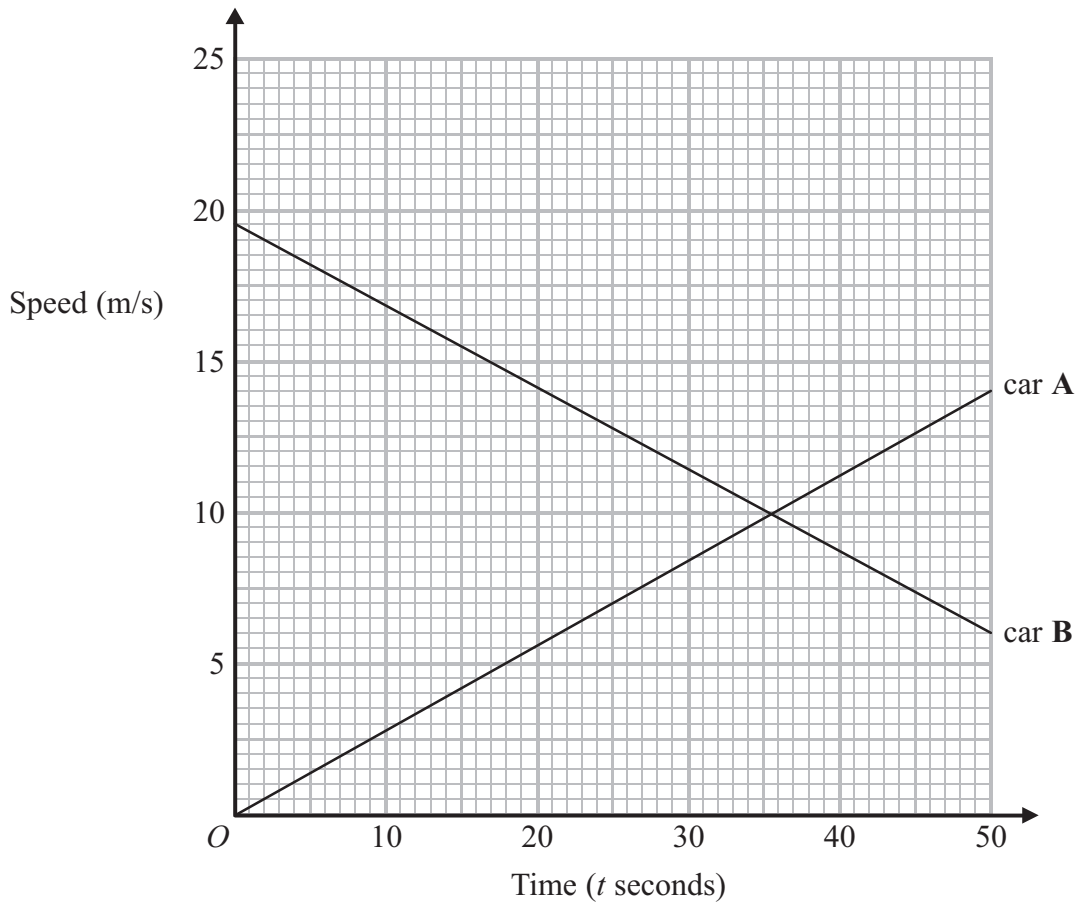
(Total for Question 11 is 2 marks)

12 The graph shows information about the speeds of two cars.

(a) Work out the gradient of the line for car A.

....

(2)

(b) After how many seconds is the speed of car A equal to the speed of car B?

.... seconds
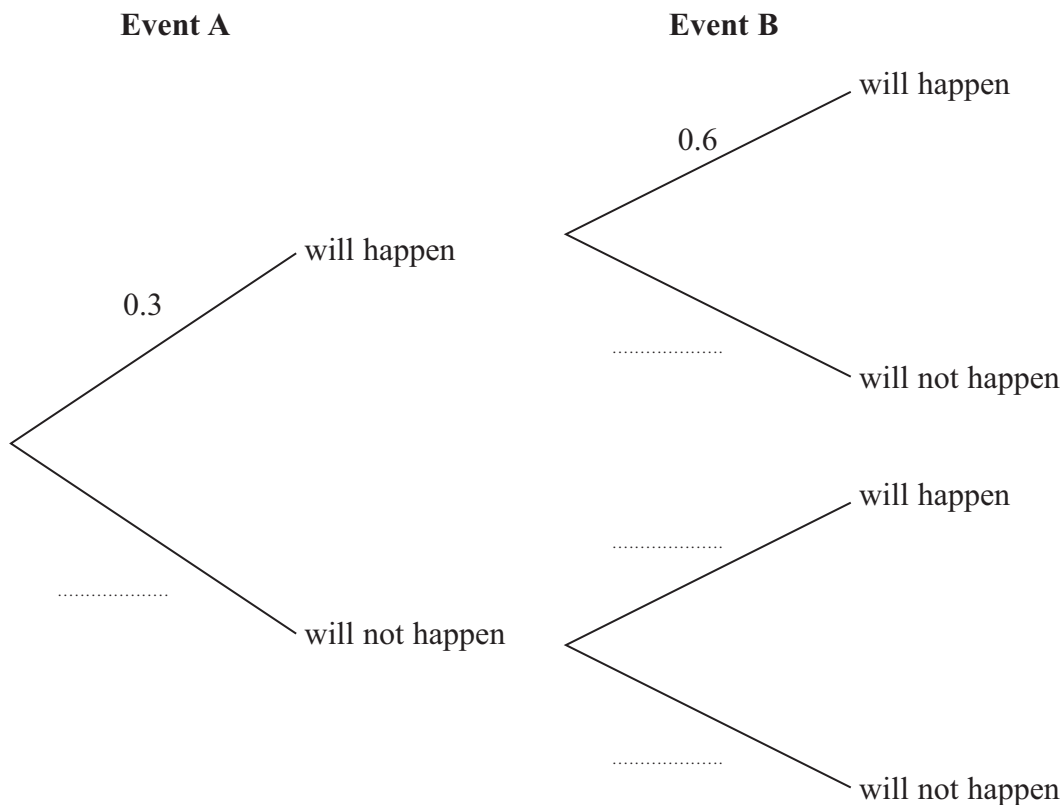
(1)

(Total for Question 12 is 3 marks)

13 Event A and event B are independent events.

The probability that event A will happen is 0.3
The probability that event B will happen is 0.6

(a) Complete the probability tree diagram.

Event A   **Event B**

                                                    will happen
                                        0.6
                              will happen
                 0.3
                                        ....
                                                    will not happen

                                                    will happen
                                        ....
                              will not happen
         ....
                                        ....
                                                    will not happen

(2)

(b) Work out the probability that either event A will happen or event B will happen but not both.

....

(2)

(Total for Question 13 is 4 marks)

14 156 students went to London.

Each student visited one of the British Museum or the National Gallery or the Stock Exchange.

The table gives information about these students.

	Place visited		
	British Museum	**National Gallery**	**Stock Exchange**
Male	25	18	35
Female	27	32	19

Kate takes a sample of 30 of these students.
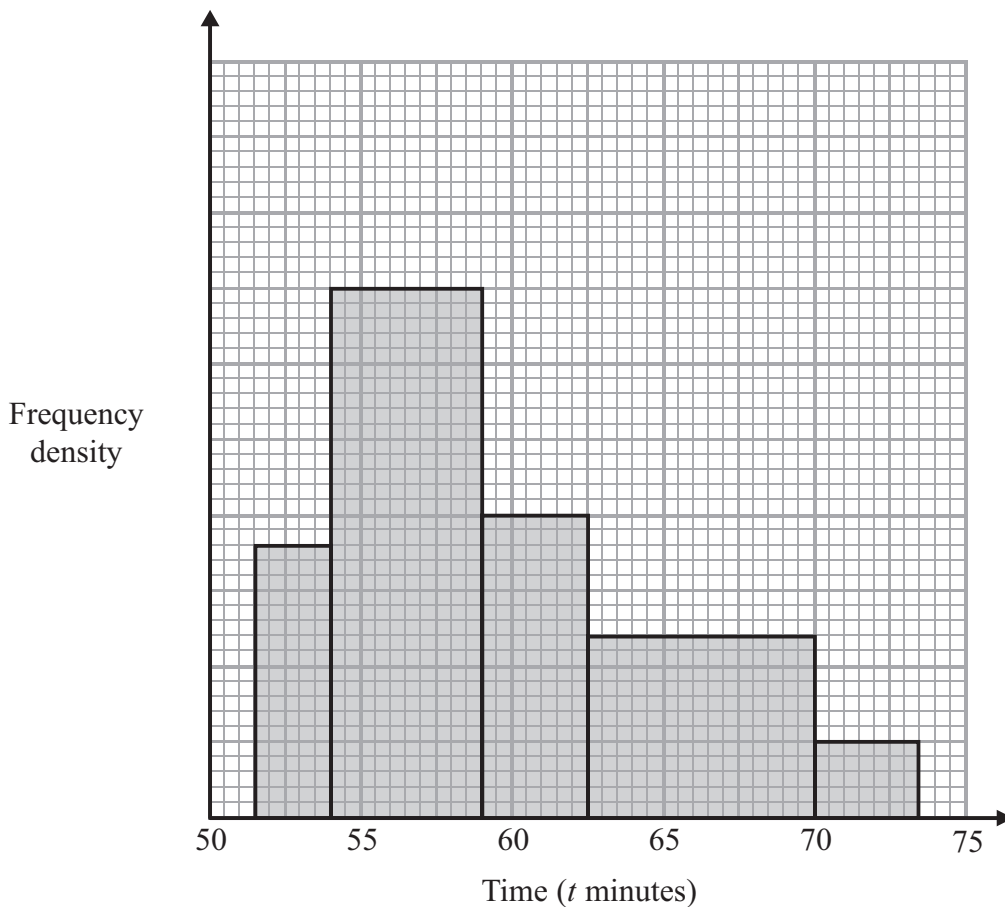The sample is stratified by place visited and by gender.

Work out the number of male students who visited the Stock Exchange in the sample.

....

(Total for Question 14 is 2 marks)

15 Ulrika recorded the times some people took to run a race.

The histogram gives information about these times.

Time (*t* minutes)

25% of the people took a time less than *T* minutes.

Work out an estimate for *T*.

.... minutes

(Total for Question 15 is 3 marks)

16 There are 11 girls and 8 boys in a tennis club.

Jake is going to pick at random a team from the tennis club.
The team will have two players.

Work out the probability that Jake will pick two boys or two girls for the team.

....

(Total for Question 16 is 4 marks)

Turn over ▶

17 Clive wants to estimate the number of bees in a beehive.

Clive catches 50 bees from the beehive.
He marks each bee with a dye.
He then lets the bees go.

The next day, Clive catches 40 bees from the beehive.
8 of these bees have been marked with the dye.

(i) Work out an estimate for the number of bees in the beehive.

.... bees

(ii) Write down any assumptions you have made.

....

....

....

(Total for Question 17 is 4 marks)

TOTAL FOR PAPER IS 60 MARKS

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