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 5 November 2014 – Morning
Time: 1 hour 15 minutes

Paper Reference
5MB1H/01

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

Total Marks

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 ▶

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P 4 4 5 8 9 A 0 1 2 0

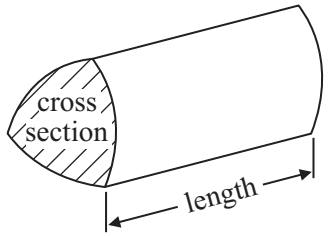
PEARSON

GCSE Mathematics 2MB01

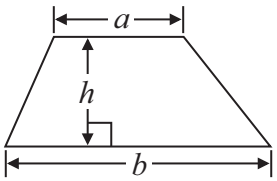
Formulae: Higher Tier

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

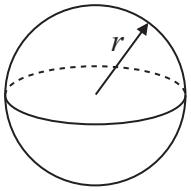


Area of trapezium = $\frac{1}{2}(a + b)h$



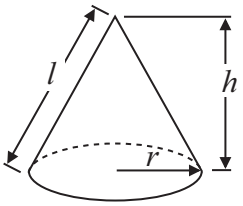
Volume of sphere = $\frac{4}{3}\pi r^3$

Surface area of sphere = $4\pi r^2$

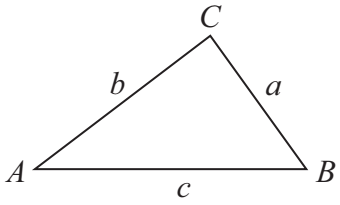


Volume of cone = $\frac{1}{3}\pi r^2 h$

Curved surface area of cone = πrl



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 $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

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

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

Answer ALL questions.

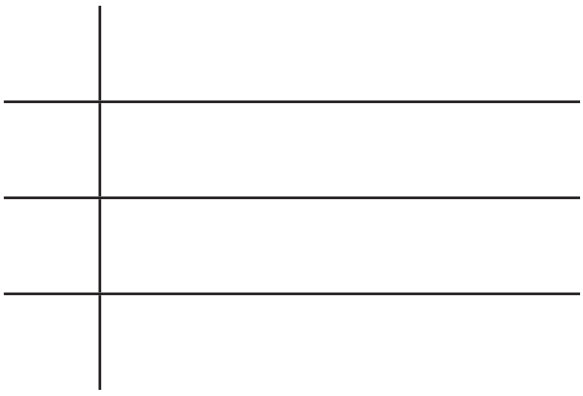
Write your answers in the spaces provided.

You must write down all stages in your working.

1 Here are the heights, in centimetres, of 15 children.

123	147	135	150	147
129	148	149	125	137
133	138	133	130	151

Show this information in an ordered stem and leaf diagram.



(Total for Question 1 is 3 marks)

2 Tendai is doing a survey to find out how often people travel by bus.
She is going to ask 10 women leaving a railway station.

(a) This may **not** produce a good sample for Tendai's survey.
Give 2 reasons why.

Reason 1 .....

.....

.....

Reason 2 .....

.....

.....

(2)

(b) Design a suitable question for Tendai to use on a questionnaire to find out the number of times people travel by bus.

(2)

(Total for Question 2 is 4 marks)

3 Dan, Harry and Regan sell cars.

Dan sells x cars.
Harry sells 5 more cars than Dan.
Regan sells twice as many cars as Dan.

Write an expression, in terms of x, for the mean number of cars Dan, Harry and Regan sell.

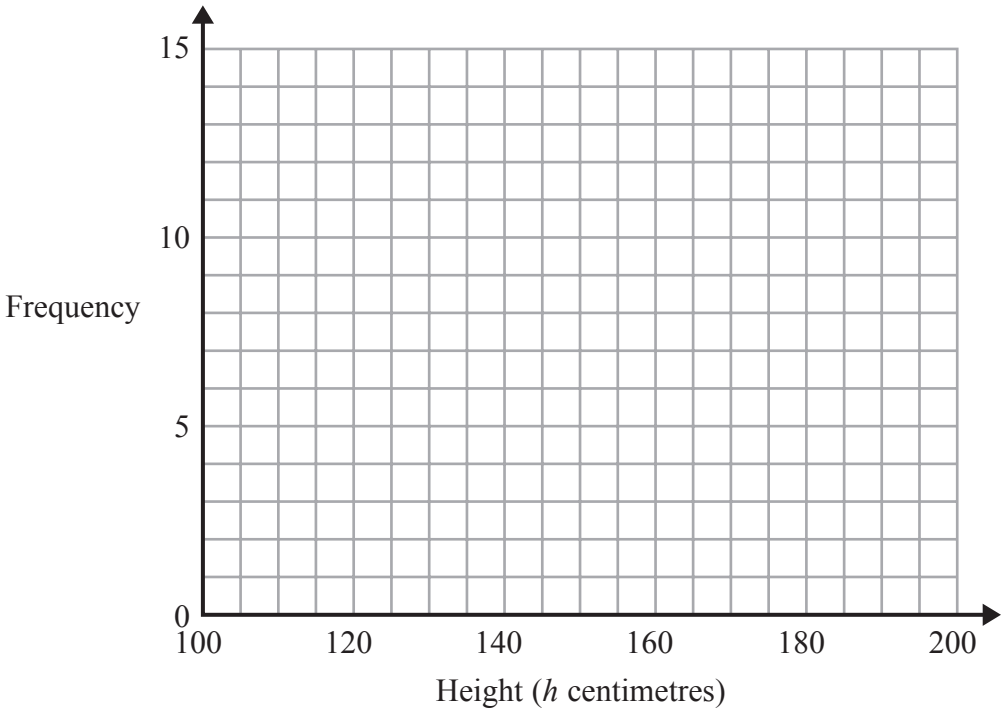
.....

(Total for Question 3 is 2 marks)

4 The table shows information about the heights, in centimetres, of 30 sunflower plants.

Height (h centimetres)	**Frequency**
$100 < h \leqslant 120$	2
$120 < h \leqslant 140$	6
$140 < h \leqslant 160$	7
$160 < h \leqslant 180$	12
$180 < h \leqslant 200$	3

(a) On the grid, draw a frequency polygon for this information.



(2)

(b) Write down the modal class interval.

.....

(1)

(Total for Question 4 is 3 marks)

5 There are only red counters, yellow counters, blue counters and green counters in a bag.
Olu takes at random a counter from the bag.

The table shows each of the probabilities.

Colour	**Red**	**Yellow**	**Blue**	**Green**
Probability	0.6	0.25	$2x$	x

The probability that Olu will take a blue counter is twice the probability that he will take a green counter.

(a) Work out the value of x.

.....

(3)

Olu takes a counter from the bag.
He writes down the colour of the counter.
He puts the counter back in the bag.

Olu does this 50 times.

(b) Work out an estimate for the number of times that Olu takes a red counter from the bag.

.....

(2)

(Total for Question 5 is 5 marks)

6 Nick has 2 cars.
Car A uses petrol.
Car B uses diesel.

Petrol costs £1.39 per litre.
Diesel costs £1.47 per litre.

The table below shows the average distance that Nick can drive each car using 1 litre of fuel.

Car A	10.3 miles per litre of petrol
Car B	14.6 miles per litre of diesel

Nick is going on a journey in one of his cars.
The distance Nick is going to drive is 450 miles.

Work out the difference of the total costs of the fuel for the 2 cars for this journey.

£.....

(Total for Question 6 is 4 marks)

7 60 children go to a nursery.
The ratio of girls to boys is 3 : 2

The children go to the nursery either in the morning or in the afternoon.

$\frac{3}{4}$ of the children go to the nursery in the morning.

The rest of the children go to the nursery in the afternoon.

7 boys go to the nursery in the afternoon.

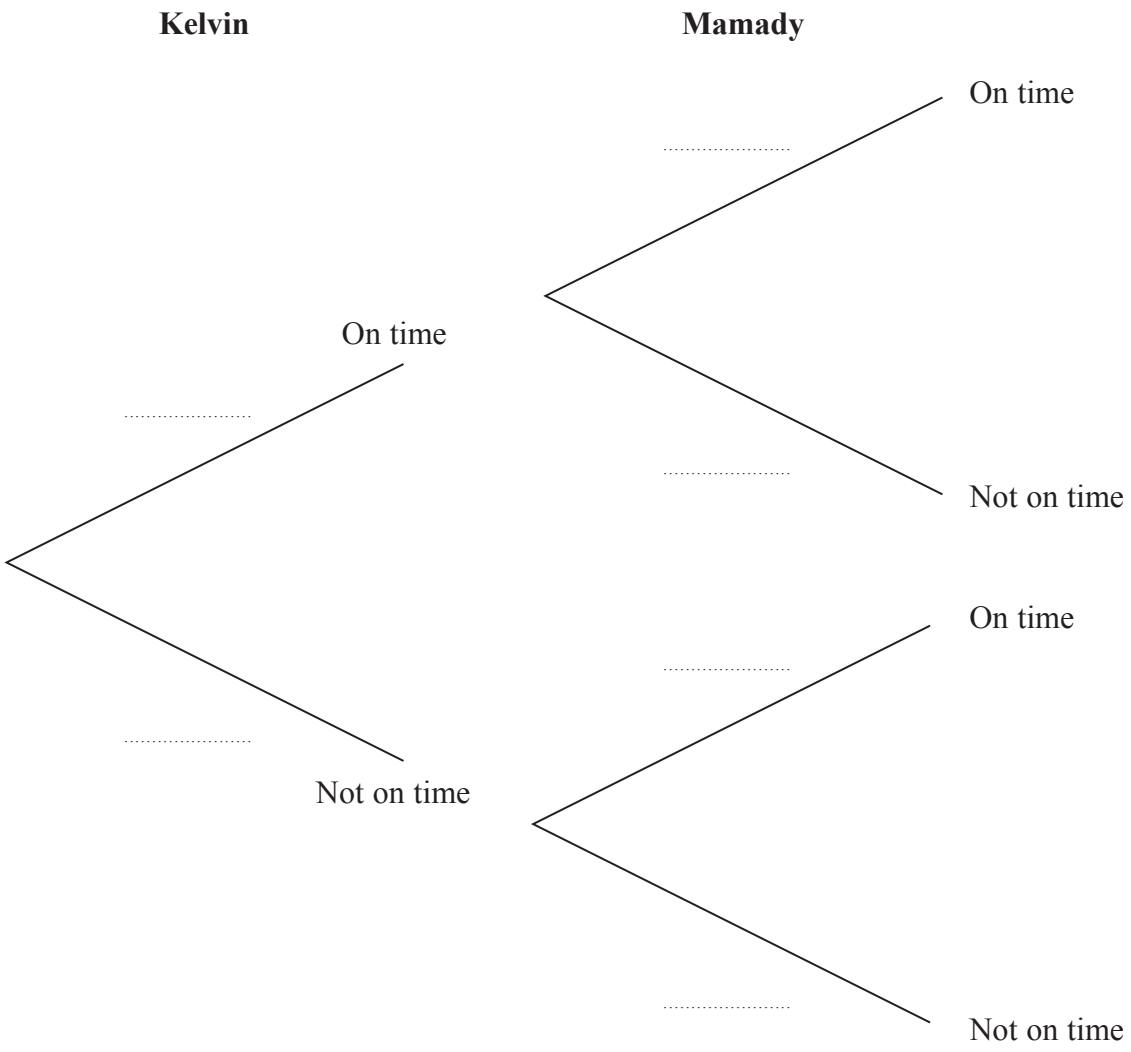
Work out how many girls go to the nursery in the morning.

.....

(Total for Question 7 is 5 marks)

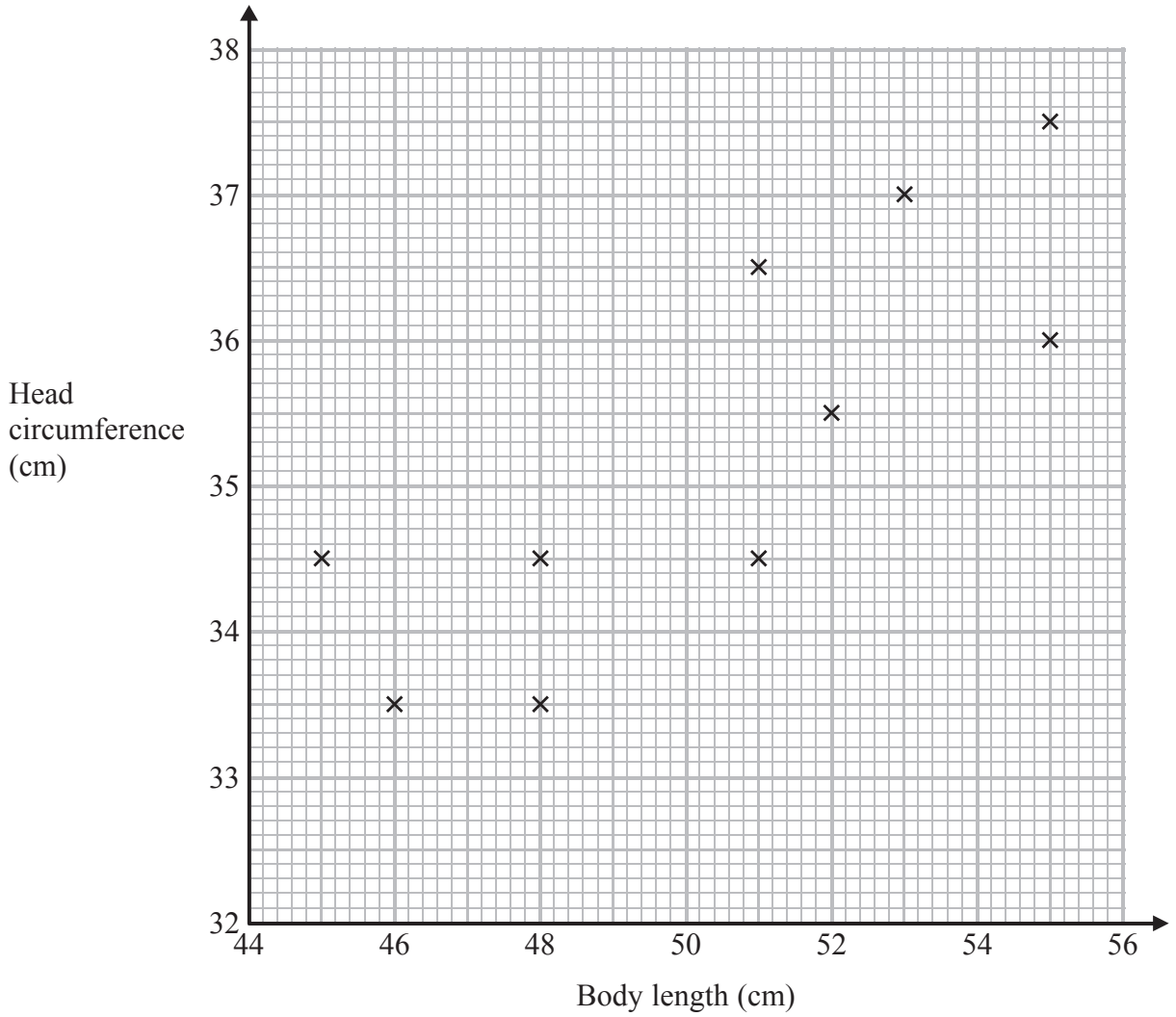
8 Kelvin and Mamady are in the same class.
The probability that Kelvin arrives on time is 0.7
The probability that Mamady arrives on time is 0.9

Complete the probability tree diagram.



(Total for Question 8 is 2 marks)

9 The scatter graph shows information about 10 newborn babies.
It shows each baby's body length and head circumference.



Another baby has a body length of 47 cm and head circumference 34 cm.

(a) Show this information on the scatter graph.

(1)

(b) What type of correlation does the scatter graph show?

.....

(1)

A baby has head circumference 35 cm.

(c) Estimate the body length of this baby.

..... cm

(2)

(Total for Question 9 is 4 marks)

10 Mason invests £1500 at 2.5% per year compound interest.
Work out the value of Mason's investment at the end of 3 years.

£.....

(Total for Question 10 is 3 marks)

***11** Tina went on a cycling holiday.
For the first 5 days, Tina cycled a mean distance of 55 kilometres per day.

On the sixth day, Tina cycled 50 kilometres.

Andy says,

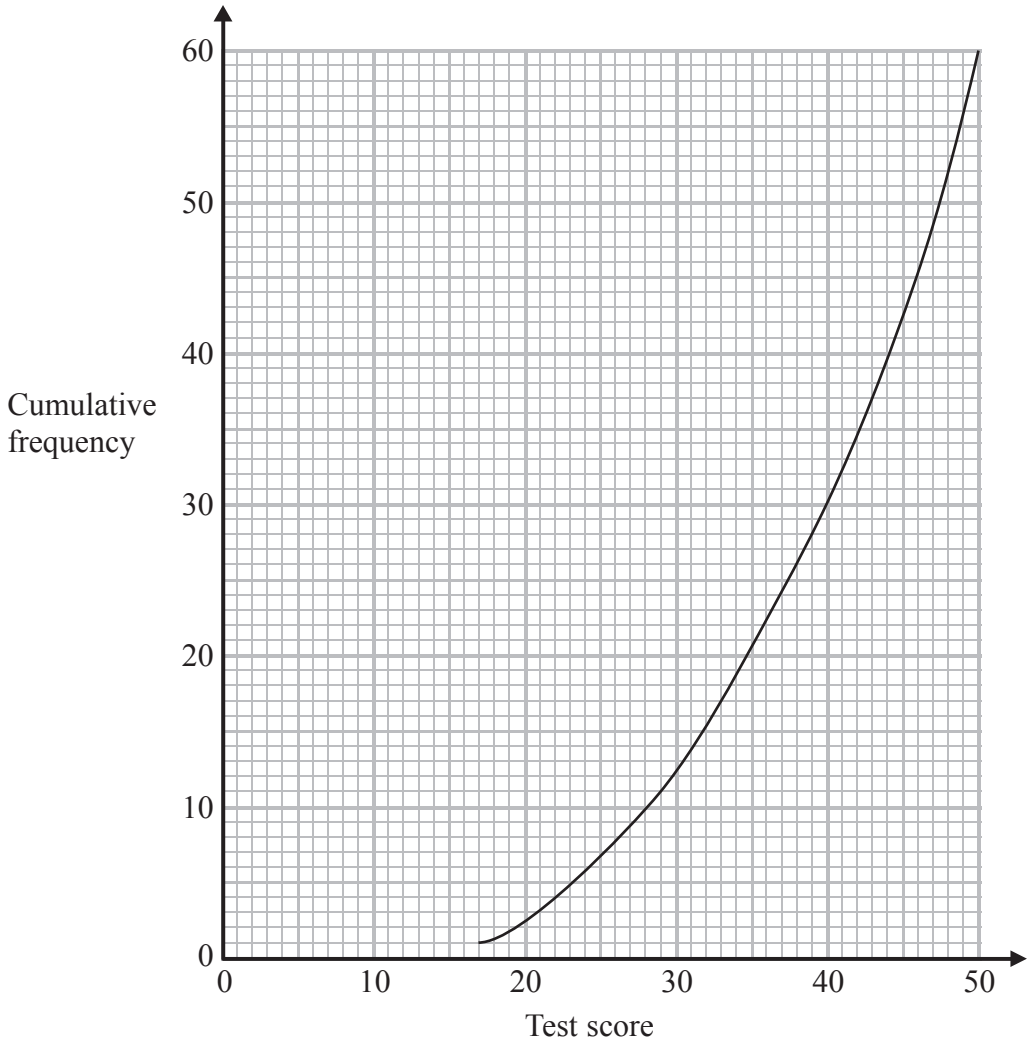
> "for all 6 days, the mean distance that Tina cycled per day was 52.5 kilometres".

Is Andy correct?
You must show your working.

(Total for Question 11 is 4 marks)

12 60 people took a driving theory test.

The cumulative frequency graph shows information about their test scores.



(a) Use the graph to find an estimate for the median test score.

.....

(1)

People pass the test when their test score is 43 or more.

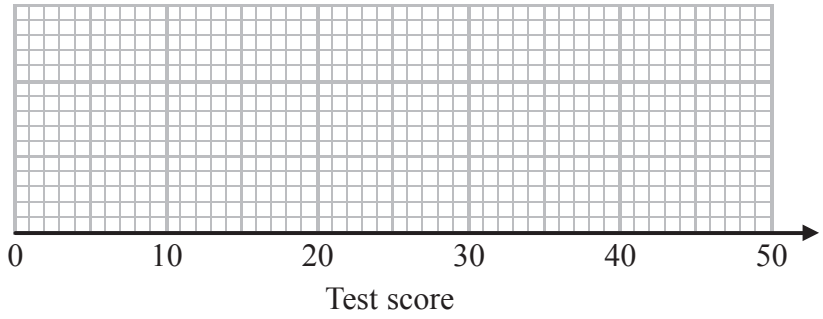
(b) Find an estimate for the number of these people who passed the test.

.....

(2)

The lowest test score was 17
The highest test score was 50

(c) Use this information and the information from the cumulative frequency graph to draw a box plot.



(3)

(Total for Question 12 is 6 marks)

13 A nail weighs 4 g correct to the nearest gram.
Alice buys exactly 1 kg of nails.

Work out the least number of nails Alice could get.

.....

(Total for Question 13 is 3 marks)

14 (a) Explain what is meant by a stratified sample.

.....

.....

(1)

1786 people belong to a sports club.
They have either peak membership or off-peak membership.

The table shows information about the membership.

	Membership Type	
	Peak	**Off-peak**
Male	650	213
Female	429	494

The manager of the sports club gives a questionnaire to some of these people.

He takes a sample of 120 people stratified by membership type and gender.

(b) Work out the number of females with off-peak membership there should be in the sample.

.....

(2)

(Total for Question 14 is 3 marks)

15 These 6 coins are in a box.

10p	10p	10p	20p	20p	50p

Pritesh takes at random 2 coins from the box.

Work out the probability that the total value of the 2 coins is at least 40p.

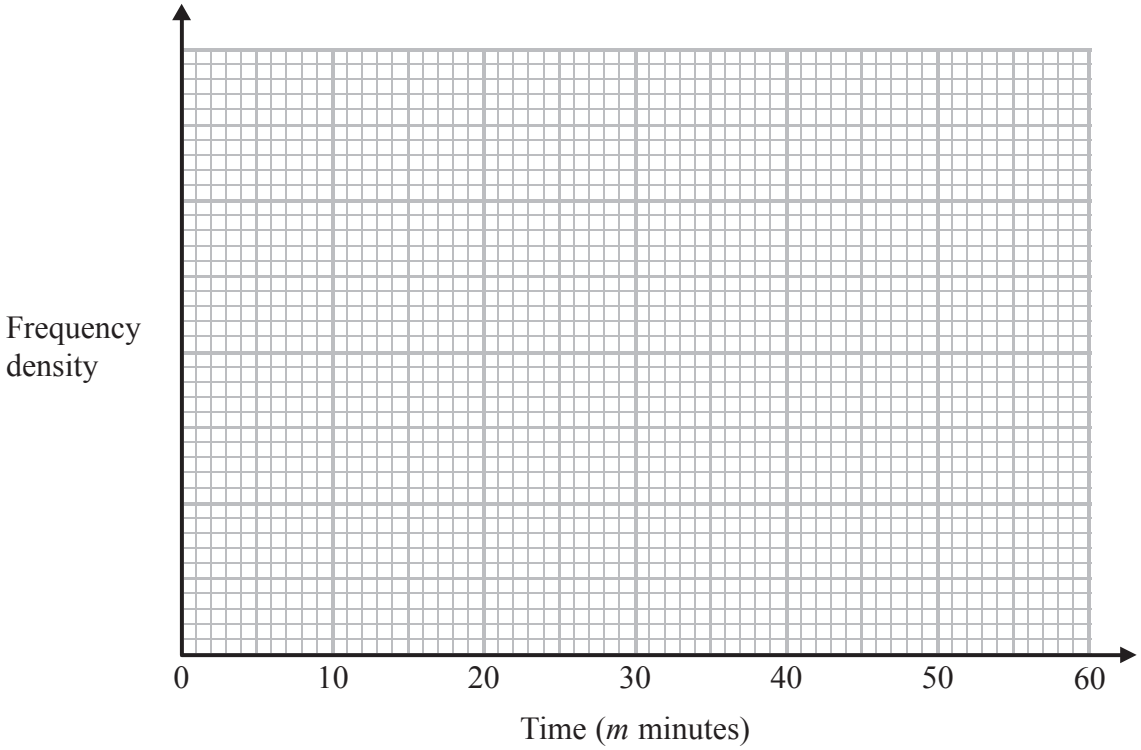
.....

(Total for Question 15 is 4 marks)

16 The table shows information about the times, in minutes, that 84 customers spent in a cafe.

Time (m minutes)	Frequency
$0 < m \leqslant 5$	6
$5 < m \leqslant 15$	21
$15 < m \leqslant 30$	33
$30 < m \leqslant 40$	16
$40 < m \leqslant 60$	8

(a) Draw a histogram for the information in the table.



(3)

(b) Work out an estimate for the number of customers who spent 20 minutes or less in the cafe.

.....

(2)

(Total for Question 16 is 5 marks)

TOTAL FOR PAPER IS 60 MARKS

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