Write your name here

Surname

Other names

Edexcel GCSE

Centre Number

Candidate Number

Mathematics B
Unit 1: Statistics and Probability (Calculator)

Higher Tier

Tuesday 1 March 2011 – Morning
Time: 1 hour 15 minutes

Paper Reference
5MB1H/01

You must have:
Ruler graduated in centimetres and millimetres, protractor, 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
  – *you should take particular care on these questions with your spelling, punctuation and grammar, as well as the clarity of expression.*

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.
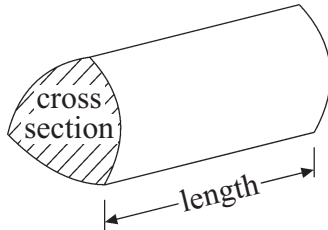
Turn over ▶

P 3 8 9 7 5 X A 0 1 2 0

edexcel
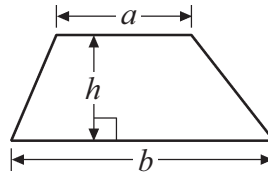advancing learning, changing lives

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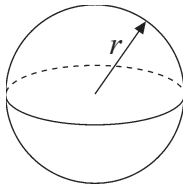
Volume of cone $= \frac{1}{3}\pi r^2 h$

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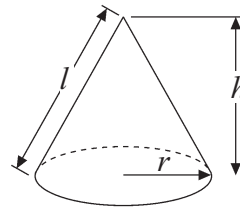
In any triangle *ABC*
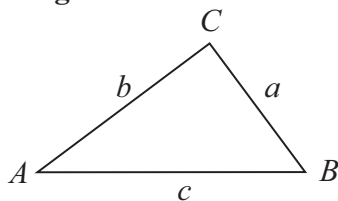
The Quadratic Equation
The solutions of $ax^2 + bx + c = 0$
where $a \neq 0$, are given by

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

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   (a) Dan is doing a survey to find out how much time students spend playing sport.
        He is going to ask the first 10 boys on the register for his PE class.

    This may **not** produce a good sample for Dan's survey.

    Give **two** reasons why.

    Reason 1

   ....

    ....

    ....

    Reason 2

    ....

    ....

    ....

                                                                                                                              (2)

    (b) Design a suitable question for Dan to use on a questionnaire to find out how much
        time students spend playing sport.

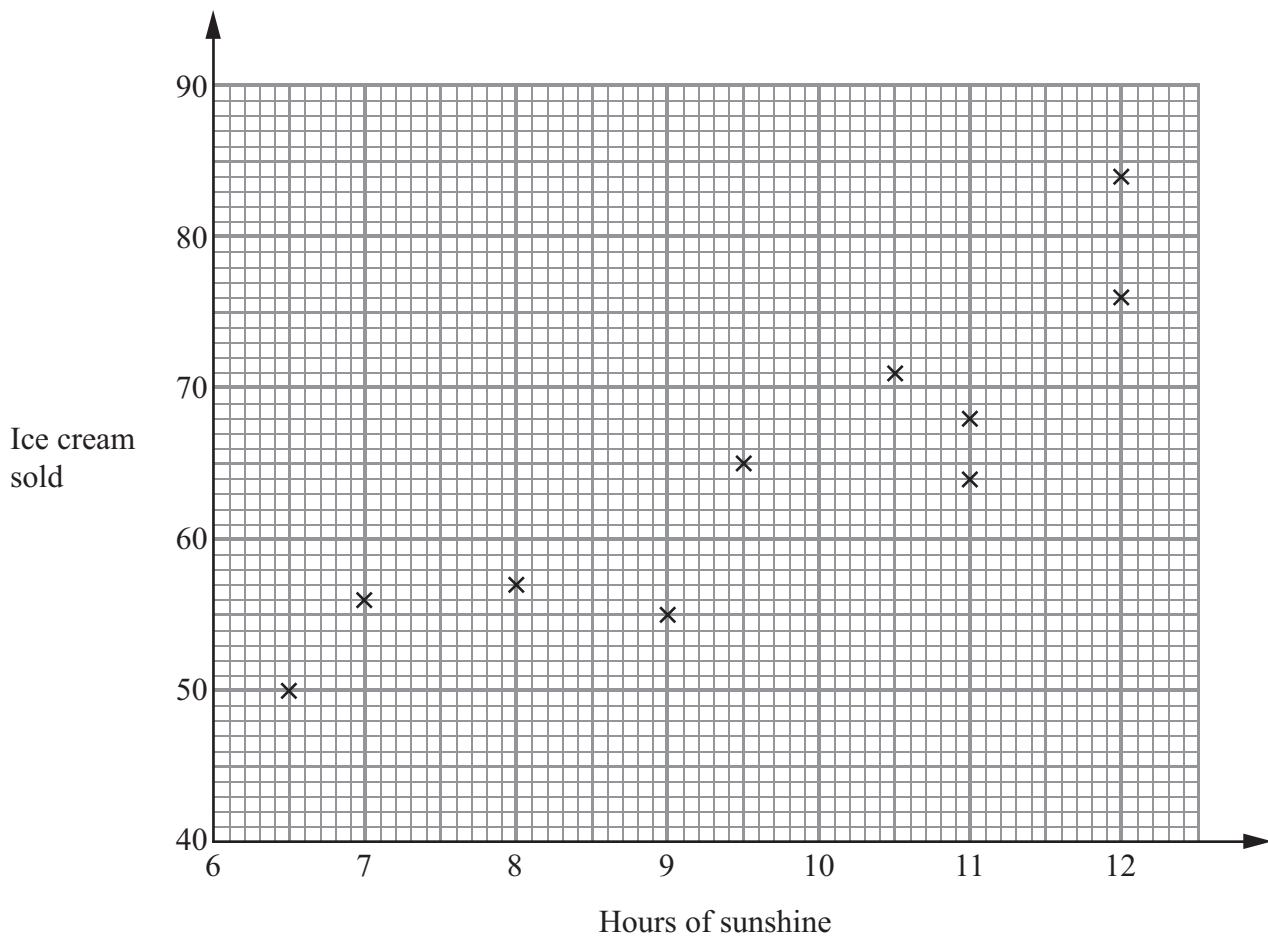   **(2)**

                                                                           (Total for Question 1 is 4 marks)

2   A beach cafe sells ice creams.
    Each day the manager records the number of hours of sunshine and the number of
    ice creams sold.

    The scatter graph shows this information.

    On another day there were 11.5 hours of sunshine and 73 ice creams sold.

    (a) Show this information on the scatter graph.

                                                                            (1)

    (b) Describe the relationship between the number of hours of sunshine and the number
        of ice creams sold.

    ....

    ....
                                                                            (1)

    One day had 10 hours of sunshine.

    (c) Estimate how many ice creams were sold.

                                                        ....
                                                                            (2)

    (Total for Question 2 is 4 marks)

3 A shop sells freezers and cookers.

The ratio of the number of freezers sold to the number of cookers sold is 5 : 2
The shop sells a total of 140 freezers and cookers in one week.

*(a) Work out the number of freezers and the number of cookers sold that week.

(3)

Jake buys this freezer in a sale.
The price of the freezer is reduced by 20%.

(b) Work out how much Jake saves.

| Freezer |
| Original Price |
| **£145** |

£ ....

(2)
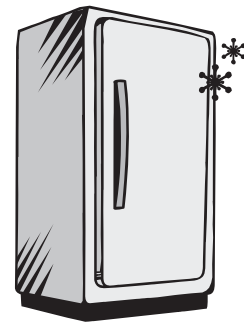
(Total for Question 3 is 5 marks)

4 A teacher asked 30 students if they had a school lunch or a packed lunch or if they went home for lunch.

     17 of the students were boys.
     4 of the boys had a packed lunch.
     7 girls had a school lunch.
     3 of the 5 students who went home were boys.

Work out the number of students who had a packed lunch.

....

(Total for Question 4 is 4 marks)

5 The probability that a seed will grow into a flower is 0.85
Loren plants 800 seeds.

Work out an estimate for the number of these seeds that will grow into flowers.

....

(Total for Question 5 is 2 marks)

6 There are 15 bags of apples on a market stall.
The mean number of apples in each bag is 9

The table below shows the numbers of apples in **14** of the bags.

Number of apples	Frequency
7	2
8	3
9	3
10	4
11	2

Calculate the number of apples in the 15th bag.

....

(Total for Question 6 is 3 marks)

Turn over ▶

**7** Kelly recorded the length of time 48 teachers took to travel to school on Monday.

The table shows information about these travel times in minutes.

Least time	5
Greatest time	47
Median	28
Lower quartile	18
Upper quartile	35

(a) Work out the number of teachers with a travel time of 35 minutes or more.
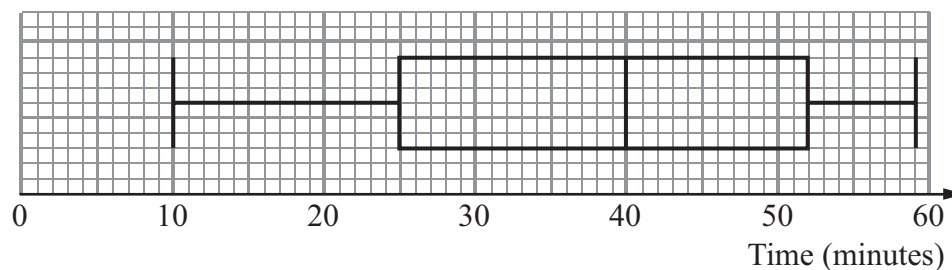
....
(2)

(b) On the grid, draw a box plot to show the information in the table.

Time (minutes)
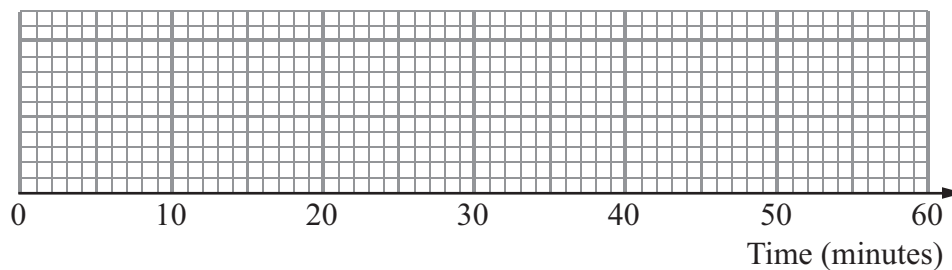
(2)

Kelly then recorded the times the same 48 teachers took to travel to school on Tuesday.

The box plot shows some information about these times.

Time (minutes)

(c) Compare the travel times on Monday and on Tuesday.

....

....

....

....

(2)

(Total for Question 7 is 6 marks)

*8 Jon and Alice are planning a holiday.
They are going to stay at a hotel.

The table shows information about prices at the hotel.

	Price per person per night (£)		Dinner (£)
	Double room	**Single room**	**per person per day**
01 Nov – 29 April	59.75	118.00	31.75
30 April – 08 July	74.25	147.00	31.00
09 July – 29 Aug	81.75	161.75	31.00
30 Aug – 31 Oct	74.25	147.00	31.00

Saver Prices
5 nights for the price of 4 nights from 1st May to 4th July.
3 nights for the price of 2 nights in November.

Jon and Alice will stay in a double room.
They will eat dinner at the hotel every day.

They can stay at the hotel for 3 nights in June or 4 nights in November.

Which of these holidays is cheaper?

(Total for Question 8 is 5 marks)

9 Mary plays a game of throwing a ball at a target.

The table shows information about the probability of each possible score.

Score	0	1	2	3	4	5
Probability	0.09	x	$3x$	0.16	0.21	0.30

Mary is 3 times as likely to score 2 points than to score 1 point.

(a) Work out the value of x.

....
(3)

Mary plays the game twice.

(b) Work out the probability of Mary scoring a total of 8

....
(3)

(Total for Question 9 is 6 marks)

10 The table shows some information about the weights, in grams, of 60 eggs.

Weight (*w* grams)	Frequency		
$0 < w \leqslant 30$	0		
$30 < w \leqslant 50$	14		
$50 < w \leqslant 60$	16		
$60 < w \leqslant 70$	21		
$70 < w \leqslant 100$	9		

(a) Calculate an estimate for the mean weight of an egg.

.... g

(4)

(b) Complete the cumulative frequency table.

Weight (*w* grams)	Cumulative frequency
$0 < w \leqslant 30$	0
$0 < w \leqslant 50$	
$0 < w \leqslant 60$	
$0 < w \leqslant 70$	
$0 < w \leqslant 100$	

(1)
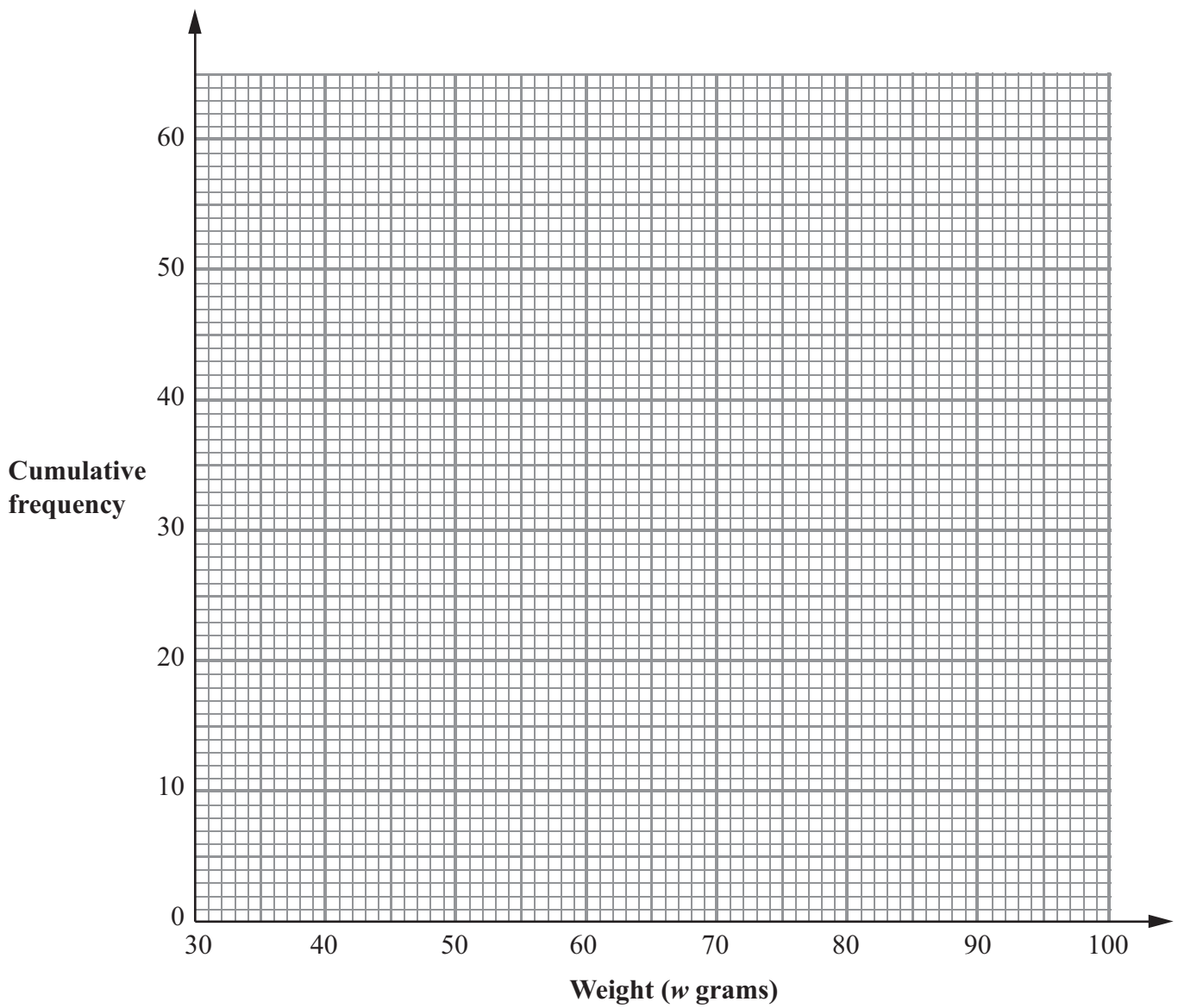
(c) On the grid, draw a cumulative frequency graph for your table.

(2)

(d) Use your graph to find an estimate for the number of eggs with a weight greater than 63 grams.

....

(2)

(Total for Question 10 is 9 marks)

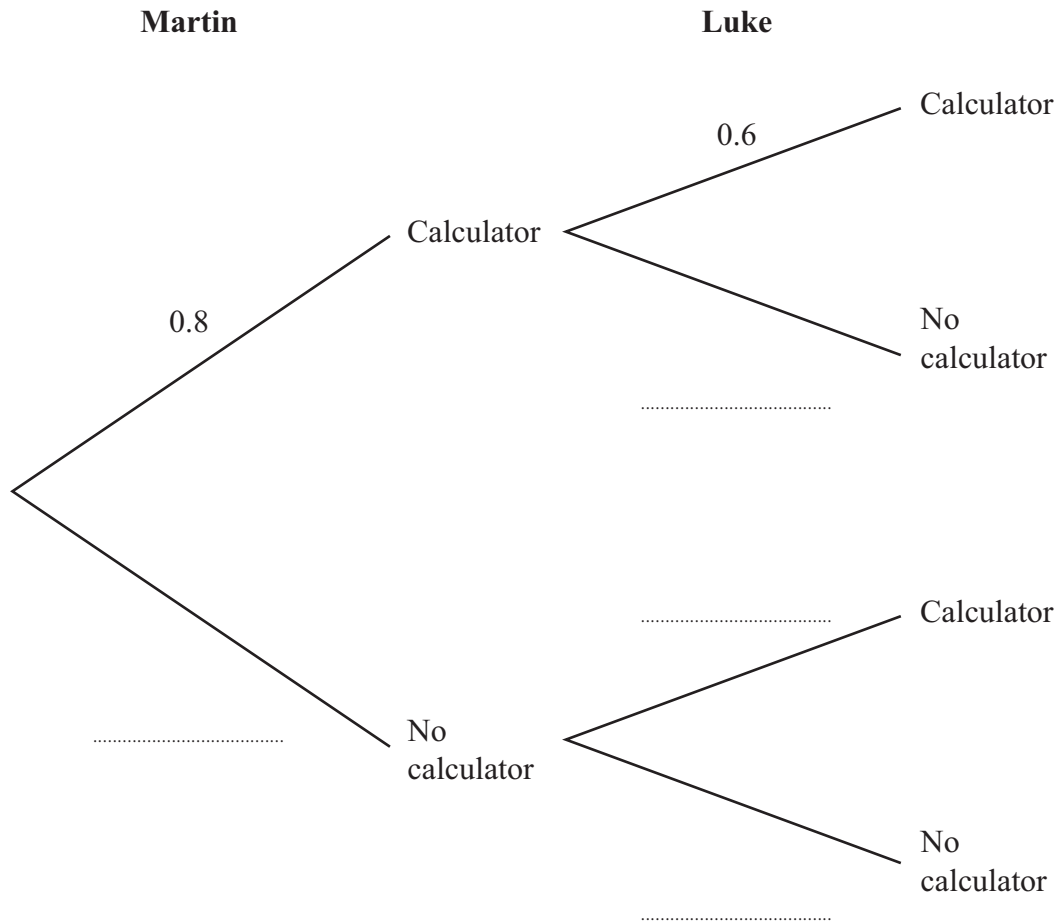**11** Martin and Luke are students in the same maths class.

The probability that Martin will bring a calculator to a lesson is 0.8
The probability that Luke will bring a calculator to a lesson is 0.6

(a) Complete the probability tree diagram.

Martin   **Luke**

Calculator

0.6

Calculator

0.8

No
calculator

....

....

....

Calculator

No
calculator

No
calculator

....

(2)

(b) Work out the probability that **both** Martin and Luke will **not** bring a calculator to a lesson.

....

(2)

(Total for Question 11 is 4 marks)

12 182 students go to an outdoor activity centre for a day.
Each student chooses one activity, climbing or sailing.

The table shows information about the activities the students chose.

	Activity chosen	
	Climbing	**Sailing**
Male	34	57
Female	26	65

The manager of the centre gives a questionnaire to some of the students.
He takes a sample of 50 students stratified by gender and the activity chosen.

Work out the number of male students who chose climbing he should have in his sample.

....

(Total for Question 12 is 2 marks)

13 Aminata invested £2500 for *n* years in a savings account.
She was paid 3% per annum compound interest.

At the end of *n* years, Aminata has £2813.77 in the savings account.

Work out the value of *n*.

....
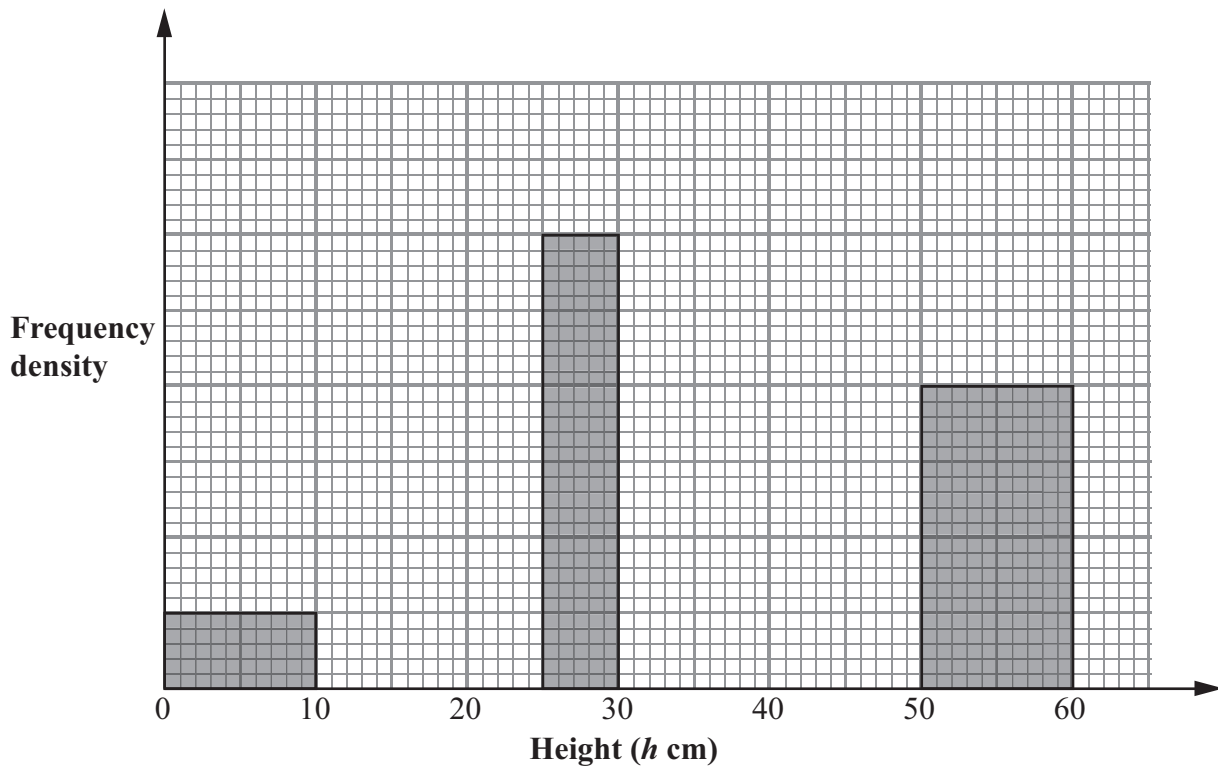
(Total for Question 13 is 2 marks)

14 The incomplete frequency table and histogram give some information about the heights, in centimetres, of some tomato plants.

Height (*h* cm)	Frequency
$0 < h \leqslant 10$	
$10 < h \leqslant 25$	30
$25 < h \leqslant 30$	
$30 < h \leqslant 50$	50
$50 < h \leqslant 60$	20

(a) Use the information in the histogram to complete the table.

(2)

(b) Use the information in the table to complete the histogram.

(2)

(Total for Question 14 is 4 marks)

TOTAL FOR PAPER IS 60 MARKS

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