

Write your name here

Surname

Other names

Centre Number

Candidate Number

Edexcel GCSE

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 ►

P38975XA



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

©2011 Edexcel Limited.

6/6/6/6/2

edexcel 
advancing learning, changing lives

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

His survey is biased - uses only boys from a PE class. They may also not be typical in terms of age.

Reason 2

Not a random sample.
(Also, sample size is too small).

(2)

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

How much time do you spend each week playing sport?

< 10 minutes

10 minutes →
1 hour

1 hr / minute
→ 2 hours

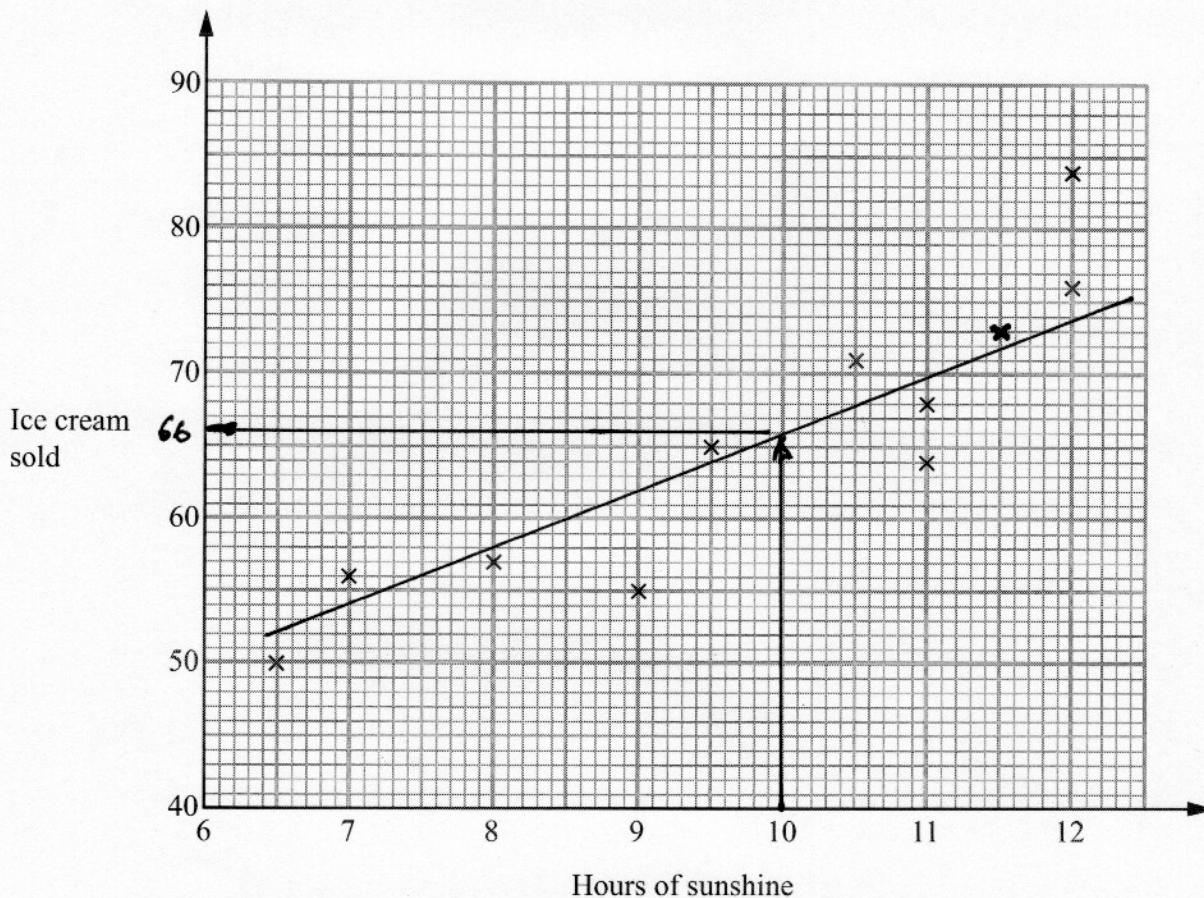
More than
2 hours

(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.

It is a positive correlation - on days with more hours of sunshine, more ice creams are sold

(1)

One day had 10 hours of sunshine.

- (c) Estimate how many ice creams were sold.

66

(2)

(Total for Question 2 is 4 marks)



3 A shop sells freezers and cookers.

freezers / 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.

$$5 + 2 = 7 \text{ parts, } 1 \text{ part} = \frac{140}{7} = 20 \text{ appliances}$$

$$5 \times 20 = 100 \text{ freezers}$$

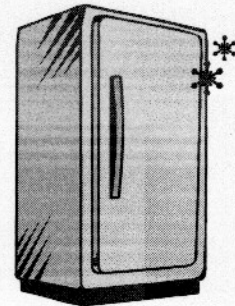
$$2 \times 20 = 40 \text{ cookers}$$

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



$$20\% \text{ of } \pounds 145 = 0.2 \times 145 = 29$$

£ 29

(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.

Put this information into a 2-way table:

	School lunch	Packed lunch	Went home	Total
Boys:		4	3	17
Girls:	7			
totals:			5	30

Now fill in the spaces:

	School lunch	Packed lunch	Went home	Total
Boys	10	4	3	17
Girls	7	4	2	13
totals		(8)	5	30

8

(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.

$$800 \times 0.85 = 680$$

680

(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 x	Frequency f	fx
7	2	14
8	3	24
9	3	27
10	4	40
11	2	22

total
 $14 + 24 + 27 + 40 + 22$
 $= 127$ apples in
14 bags.

Calculate the number of apples in the 15th bag.

$$\text{Total in 15 bags} = 15 \times 9 = 135 \text{ apples}$$

$$\therefore \text{The 15}^{\text{th}} \text{ bag contains } 135 - 127 = 8 \text{ apples}$$

8

(Total for Question 6 is 3 marks)



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.

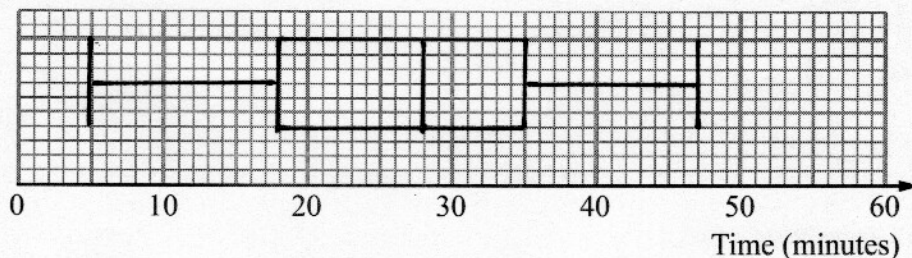
"35 minutes or more" = upper quartile & beyond

$$\frac{48}{4} = 12$$

12

(2)

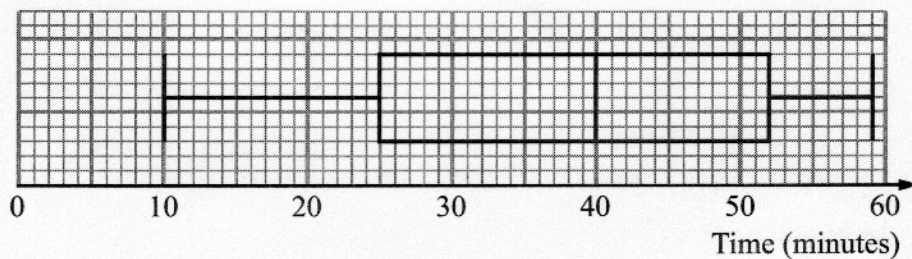
(b) On the grid, draw a box plot to show the information in the table.



(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.



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

On Tuesday most journeys took longer. The median time was longer on Tuesday (also minimum, maximum and each quartile). There was also more variation in journey time: the interquartile range was higher 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 <u>per person</u> per night (£)		Dinner (£)
	Double room	Single room	<u>per person</u> 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?

3 nights in June:
 $74.25 \times 2 = 148.50$
 $148.50 \times 3 = 445.50$ } room price
 $31 \times 2 = 62$
 $62 \times 3 = 186$ } dinner price
 $445.50 + 186 = 631.50$ } total price

- First multiply by 2 for the 2 people
- Then multiply by the number of nights

4 nights in November:
 $59.75 \times 2 = 119.50$
 $119.5 \times 2 = 239$ } 3 nights for price of 2
 $239 + 119.5 = 358.5$ } 4 nights price
 $31.75 \times 2 = 63.50$
 $63.5 \times 4 = 254$ } dinner price
 $358.5 + 254 = 612.50$ } total price

The November holiday is cheapest (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 .

The sum of all the probabilities is 1

$$0.09 + x + 3x + 0.16 + 0.21 + 0.30 = 1$$

$$4x + 0.76 = 1$$

$$4x = 0.24$$

$$x = 0.06$$

0.06

(3)

Mary plays the game twice.

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

Ways of getting a total of 8

Game 1	Game 2	Probability
3	5	$0.16 \times 0.3 = 0.048$
5	3	$0.3 \times 0.16 = 0.048$
4	4	$0.21 \times 0.21 = 0.0441$
4		

Total probability = 0.1401

0.1401

(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	Mid weight (x)	fx
$0 < w \leq 30$	0	15	$0 \times 15 = 0$
$30 < w \leq 50$	14	40	$14 \times 40 = 560$
$50 < w \leq 60$	16	55	$16 \times 55 = 880$
$60 < w \leq 70$	21	65	$21 \times 65 = 1365$
$70 < w \leq 100$	9	85	$9 \times 85 = 765$

(a) Calculate an estimate for the mean weight of an egg. $\Sigma = 3570$

Estimate for mean weight

$$\frac{\Sigma fx}{\Sigma f}$$

$$\frac{3570}{60} = 59.5 \text{ g}$$

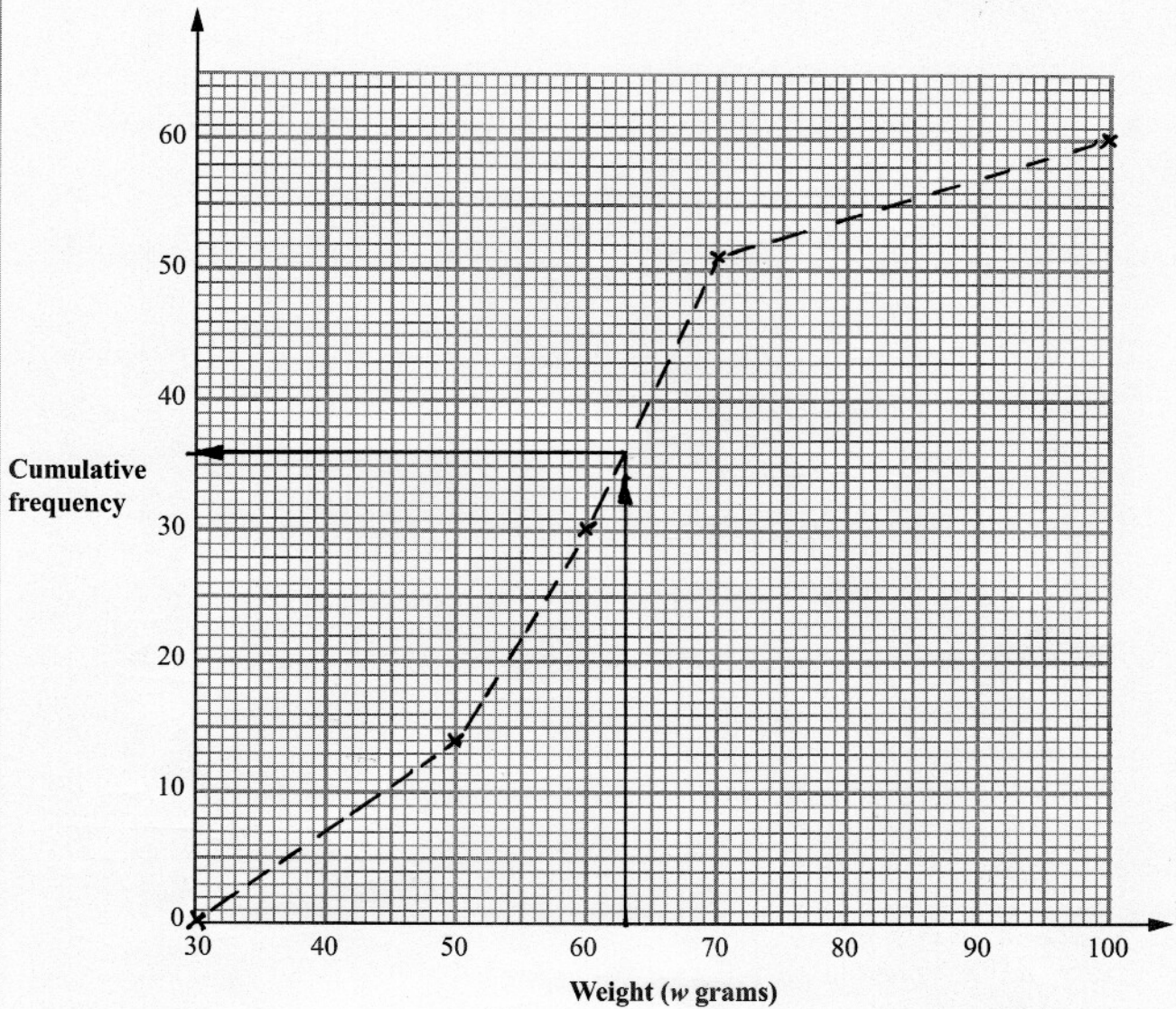
$$\frac{59.5}{(4)} \text{ g}$$

(b) Complete the cumulative frequency table.

Weight (w grams)	Cumulative frequency
$0 < w \leq 30$	0
$0 < w \leq 50$	14
$0 < w \leq 60$	30
$0 < w \leq 70$	51
$0 < w \leq 100$	60

(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.

Estimate 36 eggs weighed $< 63g$,

so $60 - 36 = 24$ weighed more than 63g

[21-25 allowed, a curved line goes about 22]



24

(2)

(Total for Question 10 is 9 marks)

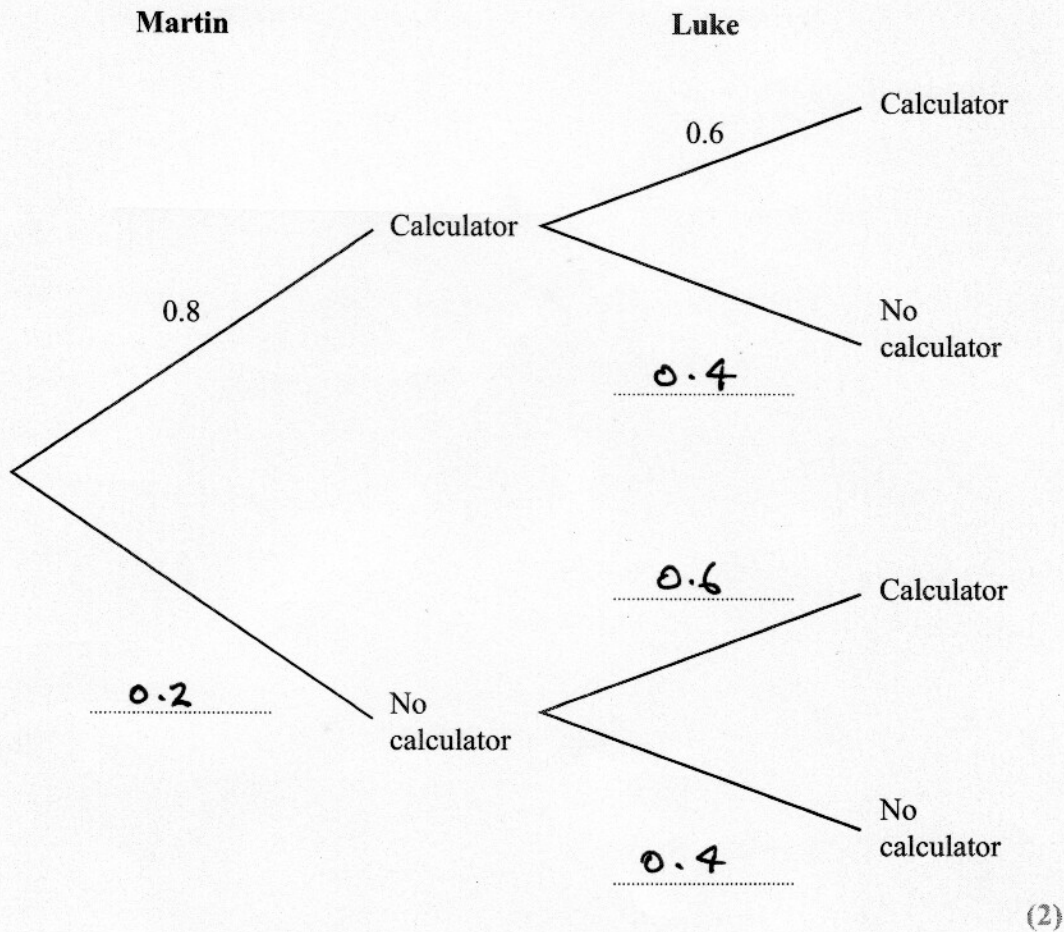


11 Martin and Luke are students in the same maths class.

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.



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

$$0.2 \times 0.4 = 0.08$$

0.08

(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.

$$\frac{34}{182} \times 50 = 9.34$$

Need a whole number of students

\therefore round to 9

9

(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 .

$$\begin{aligned} 2500 \times 1.03 &= 2575 && \text{after 1 year} \\ \text{ANS} \times 1.03 &= 2652 && \text{" 2 years} \\ \text{"} &= 2731.82 && \text{" 3 " } \\ \text{"} &= 2813.77 && \text{" 4 " } \end{aligned}$$

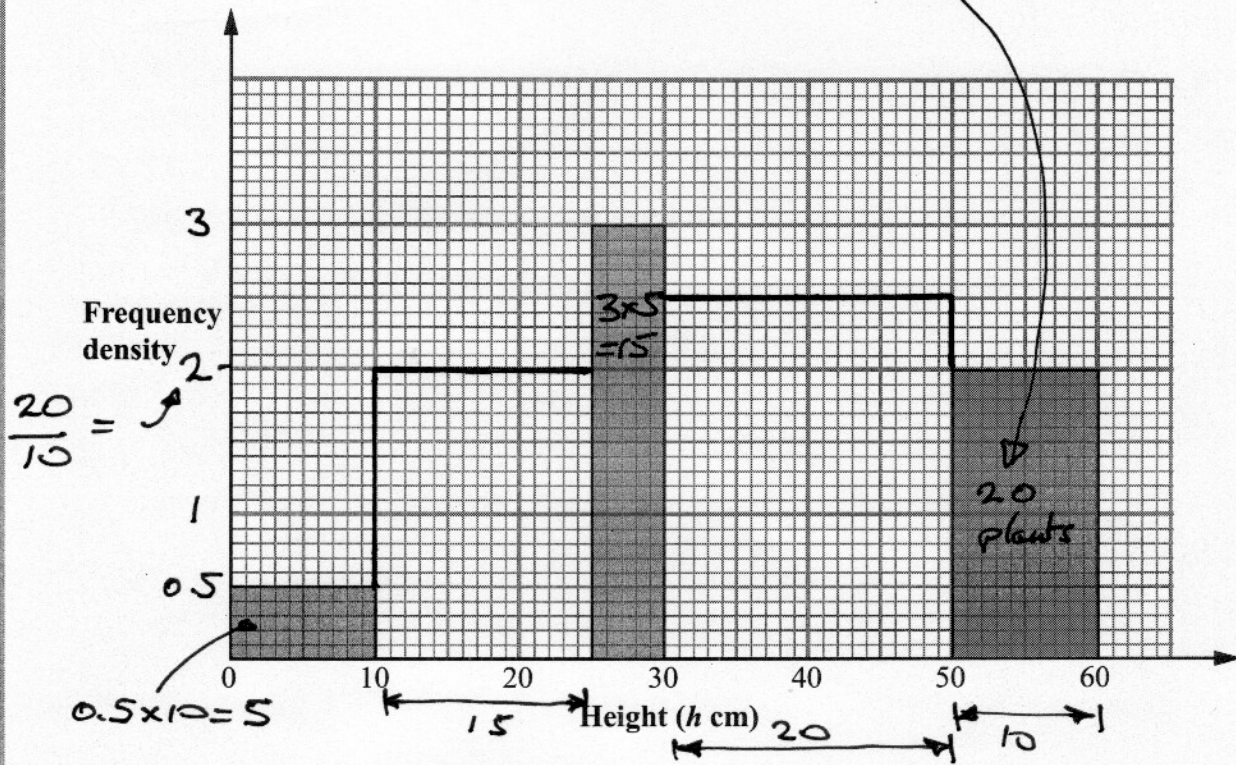
4

(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	Freq. density
$0 < h \leq 10$	5	
$10 < h \leq 25$	30	$\frac{30}{15} = 2$
$25 < h \leq 30$	15	
$30 < h \leq 50$	50	$\frac{50}{20} = 2.5$
$50 < h \leq 60$	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

