1. Nov/2020/Paper_13/No.1
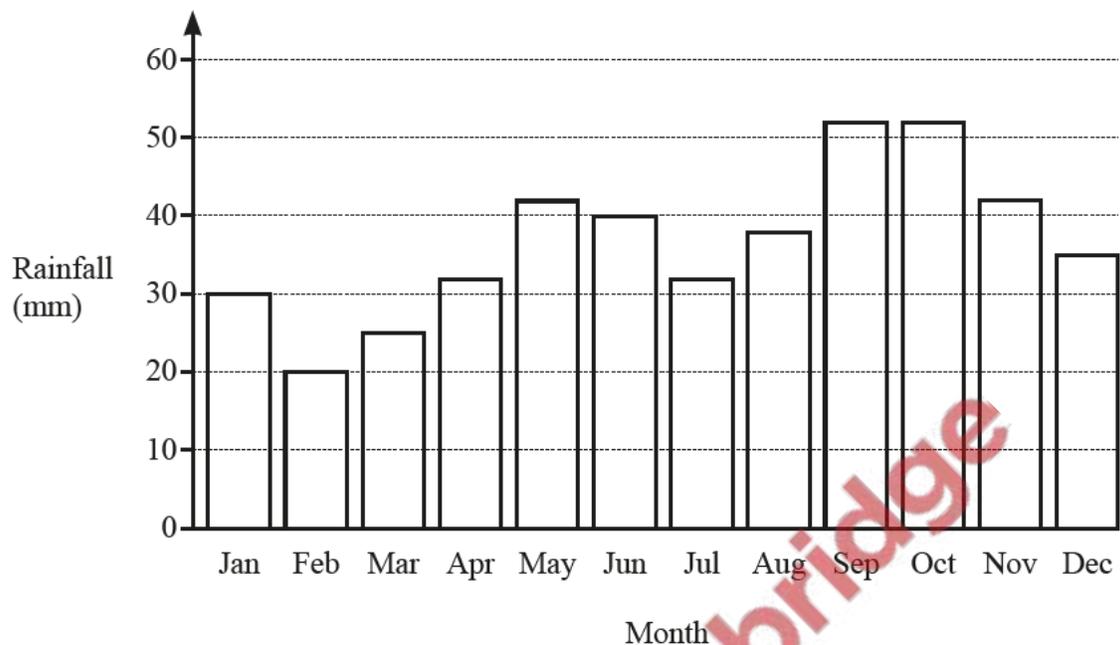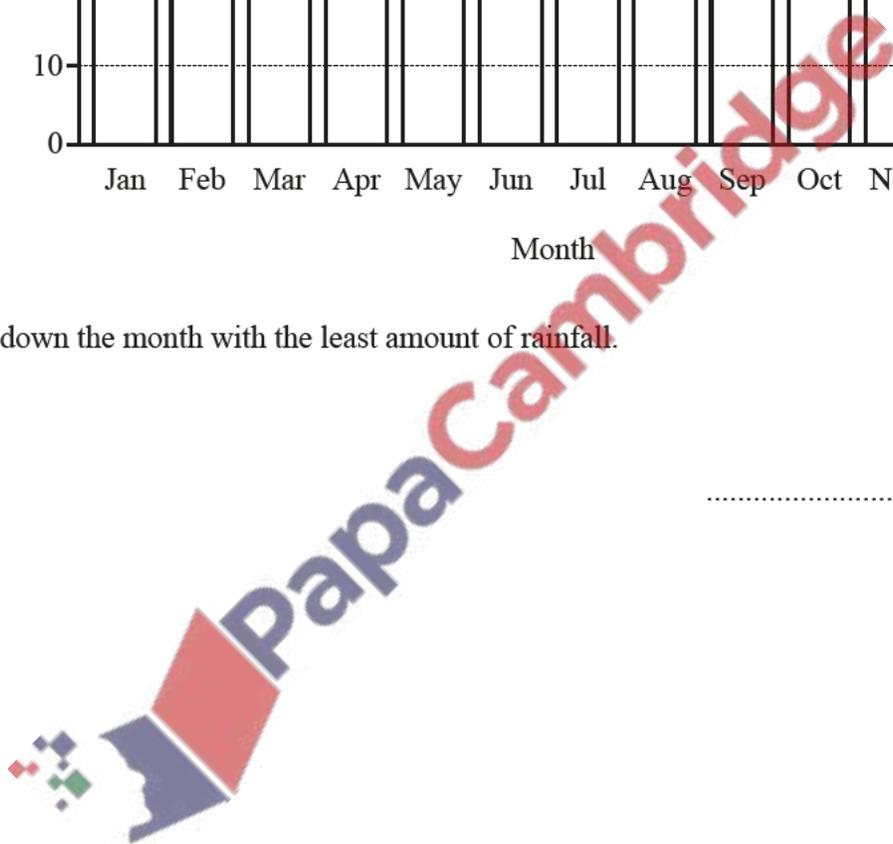
This bar chart shows the amount of rainfall, in mm, for each month of one year in a city.
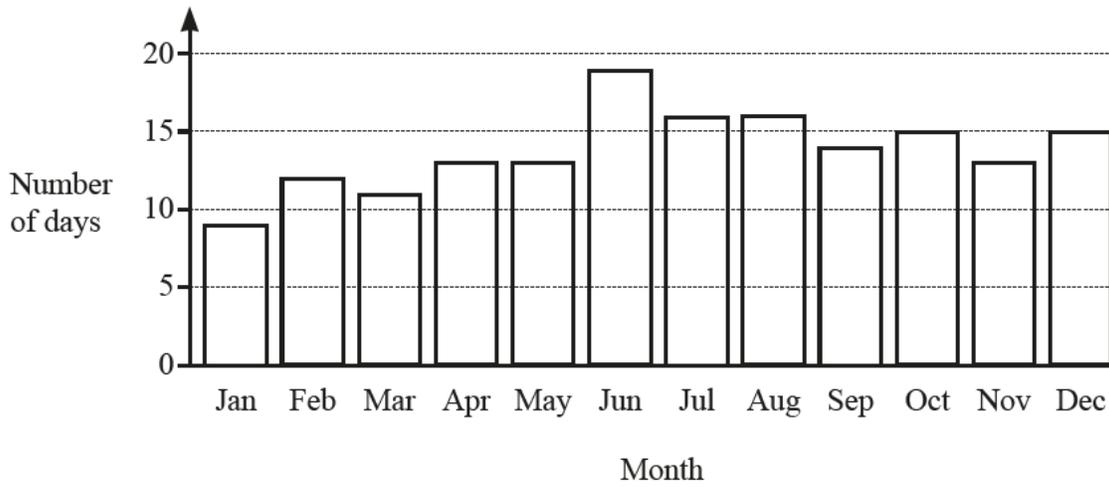

(a) Write down the month with the least amount of rainfall.

.... [1]

(b) This bar chart shows the number of days it rained each month for the same year in this city.

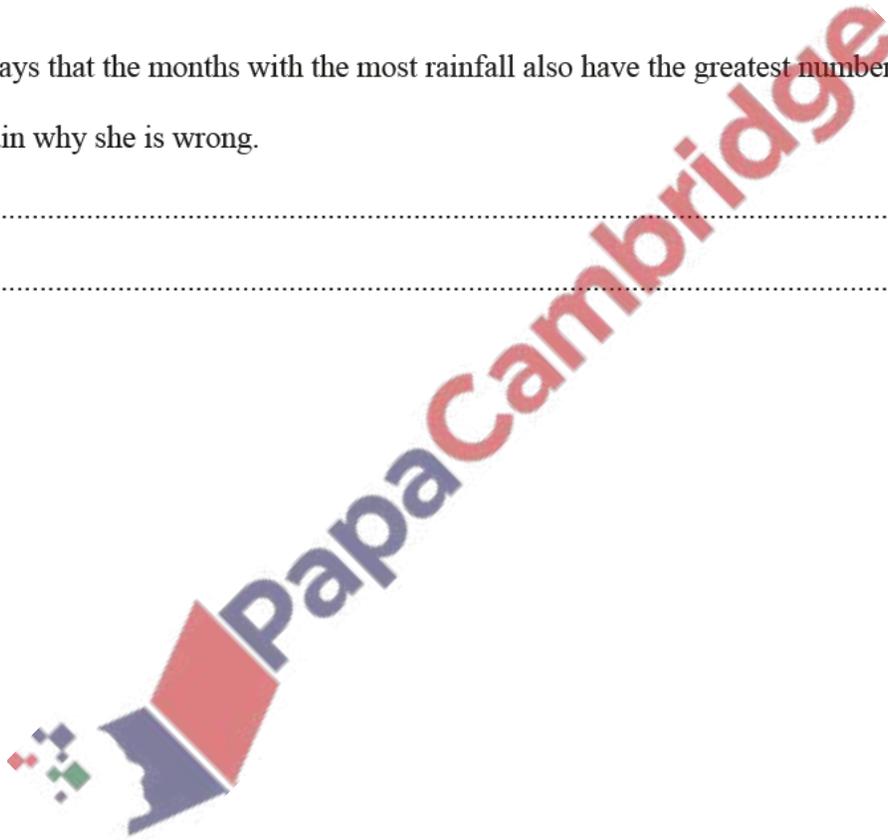Mia says that the months with the most rainfall also have the greatest number of days it rained.

Explain why she is wrong.

....

.... [1]

2.

The mean of five numbers is 16.

Four of these numbers are   12, 20, 19, and 11.
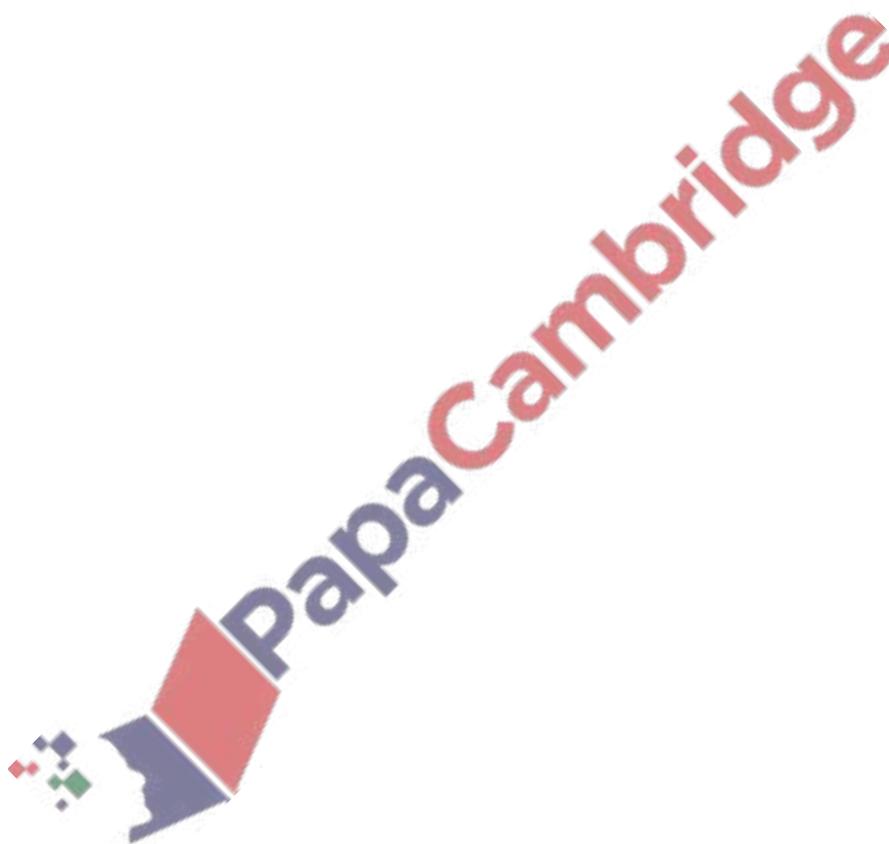
Find the fifth number.

.... [2]
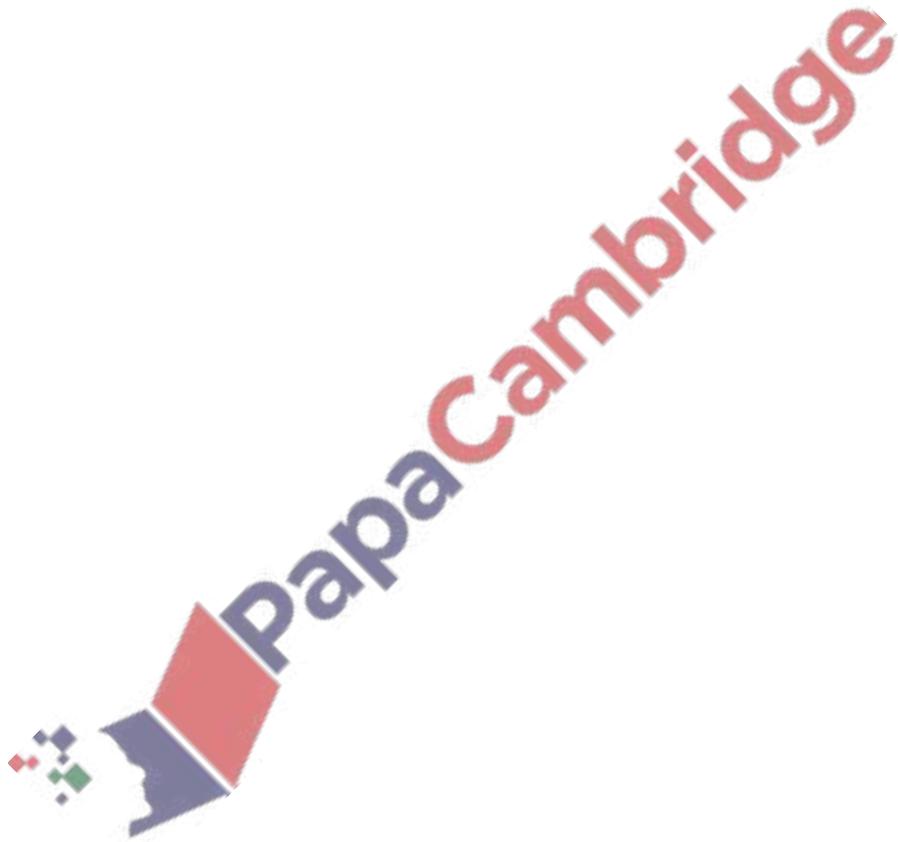
A bag contains 7 red disks, 5 green disks, and 2 pink disks.

Helen takes one disk at random, records the color, and replaces it in the bag.
She does this 140 times.

Find how many times she expects to take a green disk.

.... [2]

A bag contains 7 red disks and 5 green disks.

(a) Helen takes one disk at random, records the color, and replaces it in the bag. She does this 120 times.

Find how many times she expects to take a green disk.

.... [2]

(b) Helen adds 9 red disks and some green disks to the disks already in the bag. The probability of taking a red disk is now $\frac{2}{3}$.

Find the number of green disks that Helen added to the bag.

.... [2]

5.
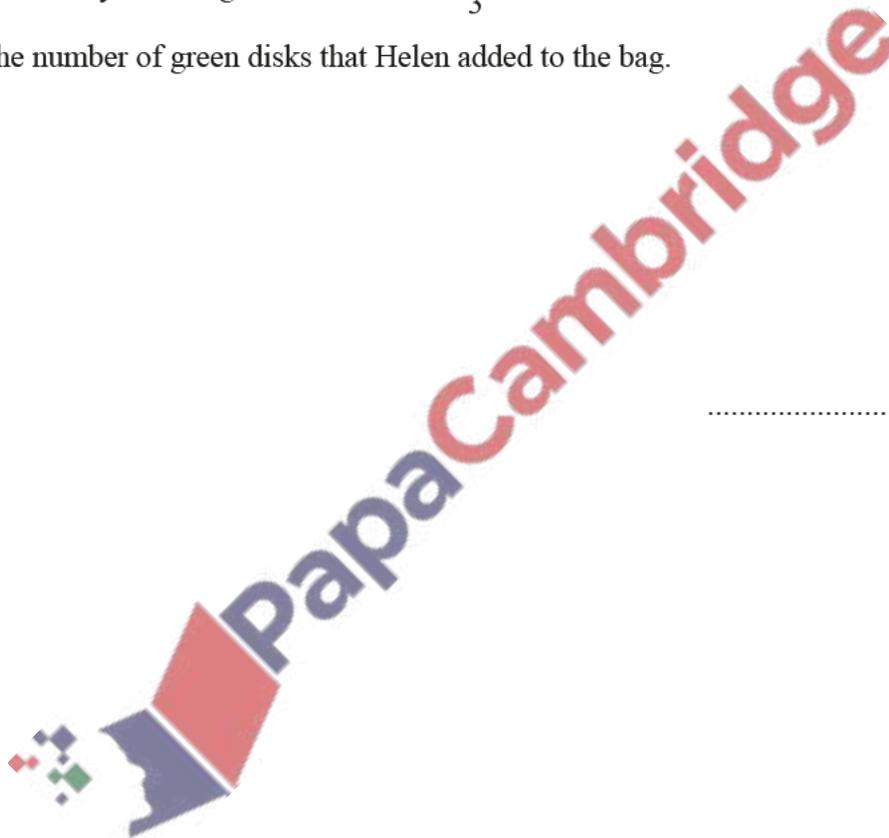
The table shows information about the times, t seconds, taken by each of 100 students to solve a puzzle.

Time (t seconds)	$0 < t \leqslant 20$	$20 < t \leqslant 30$	$30 < t \leqslant 60$
Frequency	20	30	50

(a) Calculate an estimate of the mean time.

.... s [4]

(b) Emmanuel draws a histogram to show this information.
The table shows the heights, in cm, of some of the bars for this histogram.

Complete the table.

Time (t seconds)	$0 < t \leqslant 20$	$20 < t \leqslant 30$	$30 < t \leqslant 60$
Height of bar (cm)	3		

[3]

6.
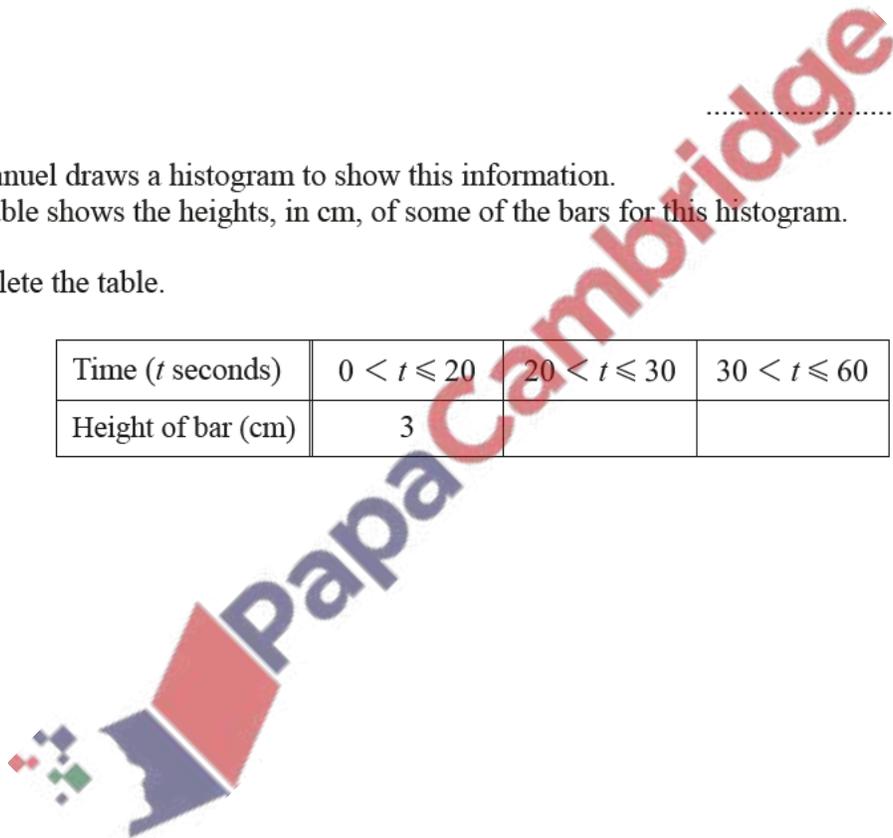
The table shows the maximum power, kW, and the time taken, in seconds, to accelerate from 0 to 100 km/h for each of 10 cars.

Maximum power (kW)	77	52	103	55	44	51	85	135	90	110
Time (seconds)	12.5	14.9	9.0	12.1	14.4	12.9	10.0	7.1	11.0	9.4

(a) (i) Find the range of the times.

.... s [1]

(ii) Find the median maximum power.

.... kW [2]

7
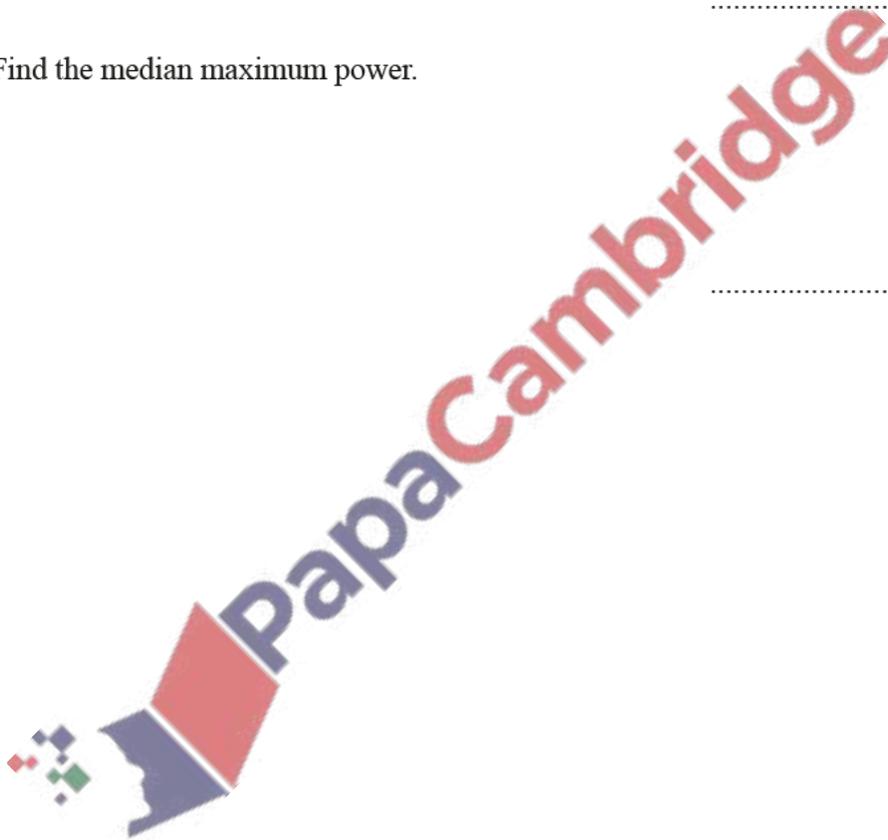
(b) (i) Complete the scatter diagram.
The first eight points have been plotted for you.

[1]

8
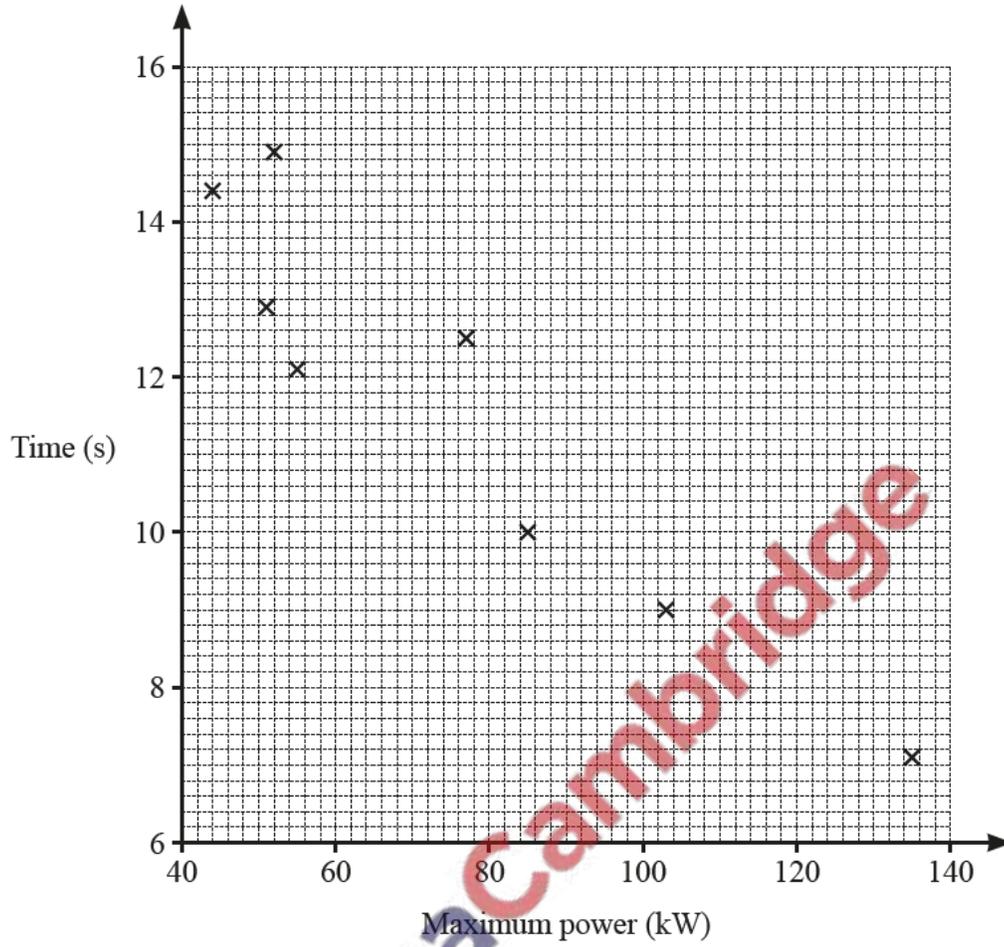
(ii) What type of correlation is shown on the scatter diagram?

.... [1]

(iii) Describe the relationship between the maximum power of a car and the time taken to accelerate from 0 to 100 km/h.

....

.... [1]

(iv) Draw a line of best fit on the scatter diagram. [1]

(v) Another car has a maximum power of 63 kW.

Use your line of best fit to estimate the time taken for this car to accelerate from 0 to 100 km/h.

.... s [1]

(c) Robert buys a car for $18 160.

He pays a deposit of $6460.
He pays the rest of the money in 24 equal monthly payments.

Work out the amount of each monthly payment.

$ .... [3]

(d) A fuel tank holds 52 liters when full.
The tank is a quarter full.
Jim fills the tank with fuel that costs $0.85 per liter.

Work out how much Jim pays.

$ .... [3]

| P | O | S | S | I | B | I | L | I | T | Y |

Morgan picks two of these letters, at random, **without** replacement.

(a) Find the probability that he picks

    (i) the letter Y first,

.... [1]

    (ii) the letter B then the letter Y,

.... [2]

    (iii) two letters that are the same.

.... [3]
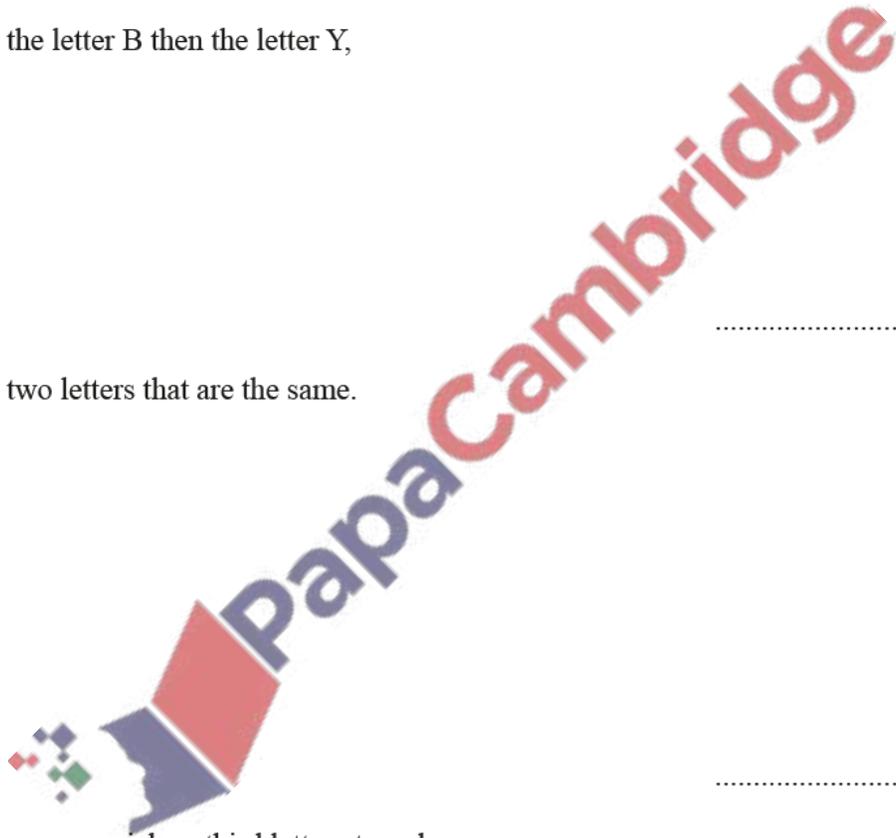
(b) Morgan now picks a third letter at random.

Find the probability that

    (i) all three letters are the same,

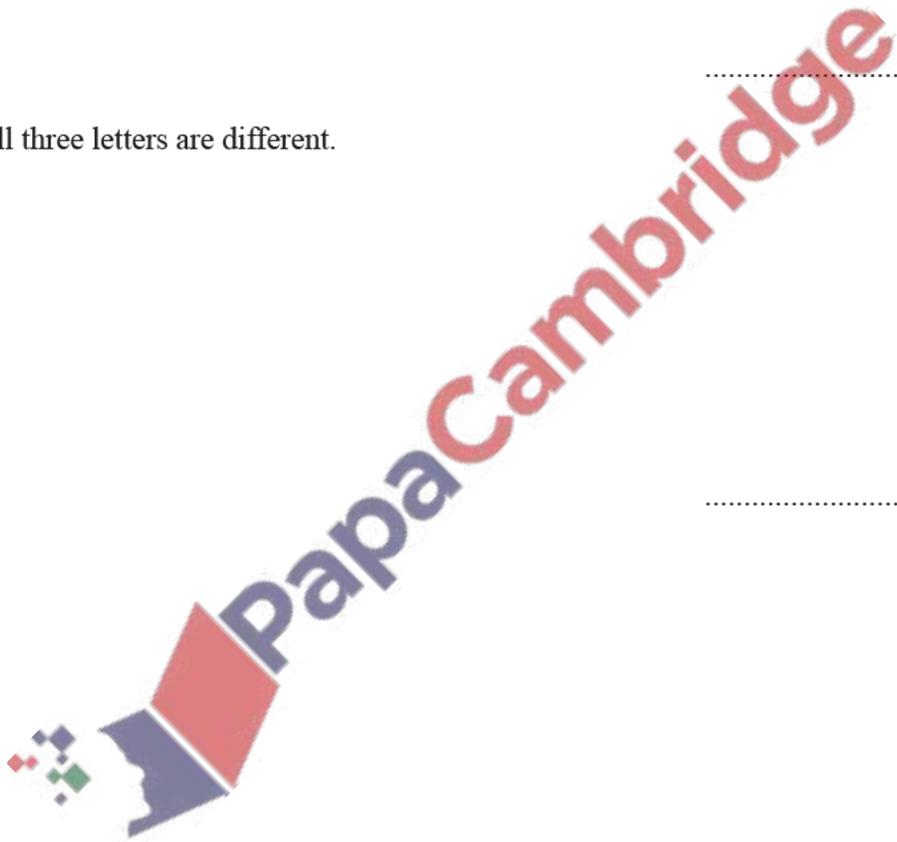.. [2]

(ii) exactly two of the three letters are the same,

.... [5]

(iii) all three letters are different.

.... [2]

(a) The average speeds, in km/h, of cars traveling along a road are recorded.
The box plot shows this information.
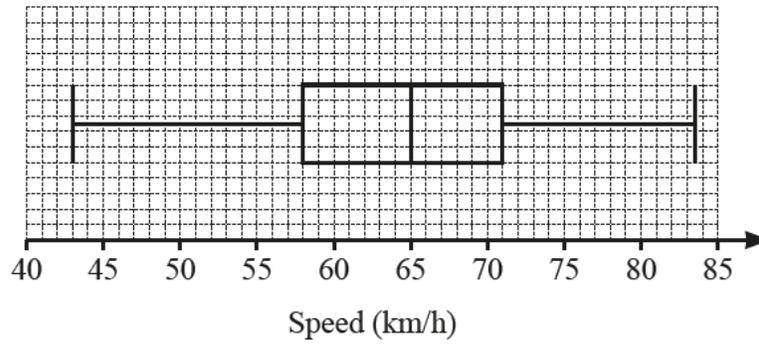
Speed (km/h)

Find

(i) the lowest speed recorded,

.... km/h [1]

(ii) the median,

.... km/h [1]

(iii) the interquartile range.

.... km/h [1]

(b) Another car takes 18 seconds to travel 400 m along this road.
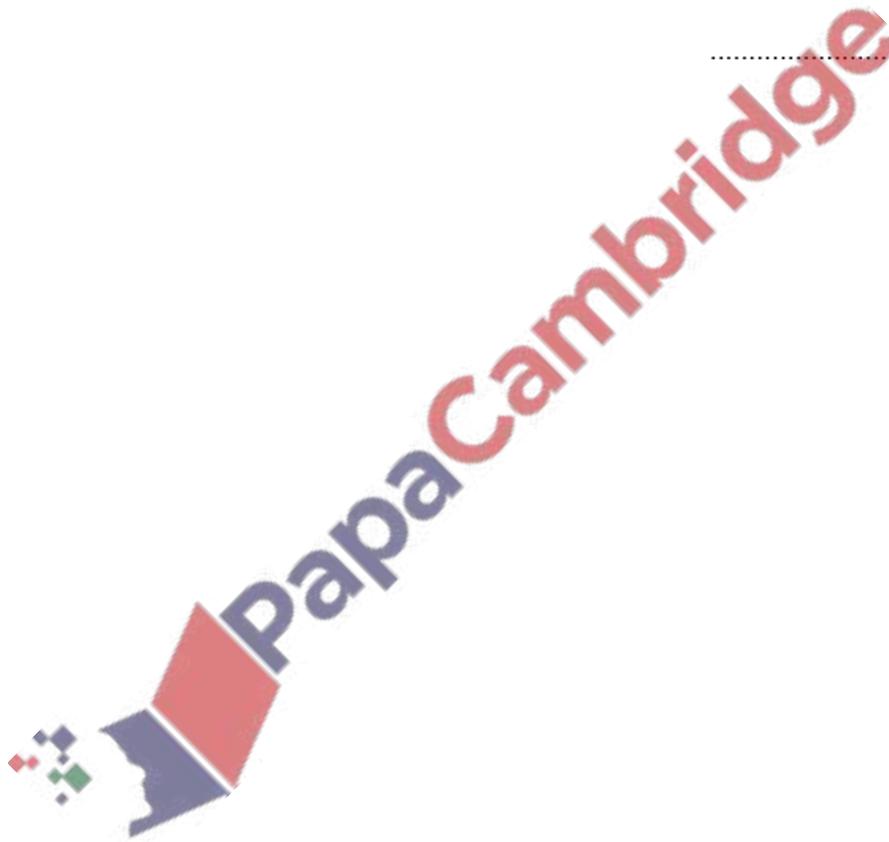
Calculate the average speed of this car in km/h.

.... km/h [3]

Marlon takes a test every month for five months.
The table shows his results.

Jan	Feb	Mar	Apr	May
52	48	74	66	60

Work out the mean.

.... [2]
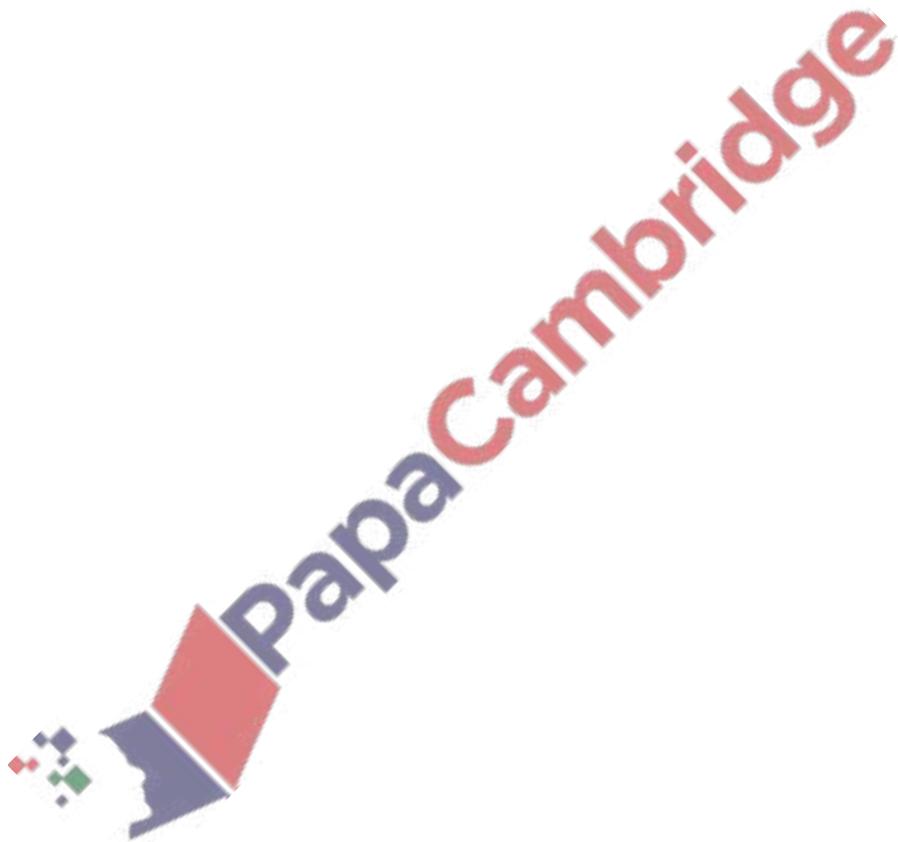
Elmer has a bag of candy.
Each candy is green, red, black, yellow, or orange.
He takes a candy from the bag at random.

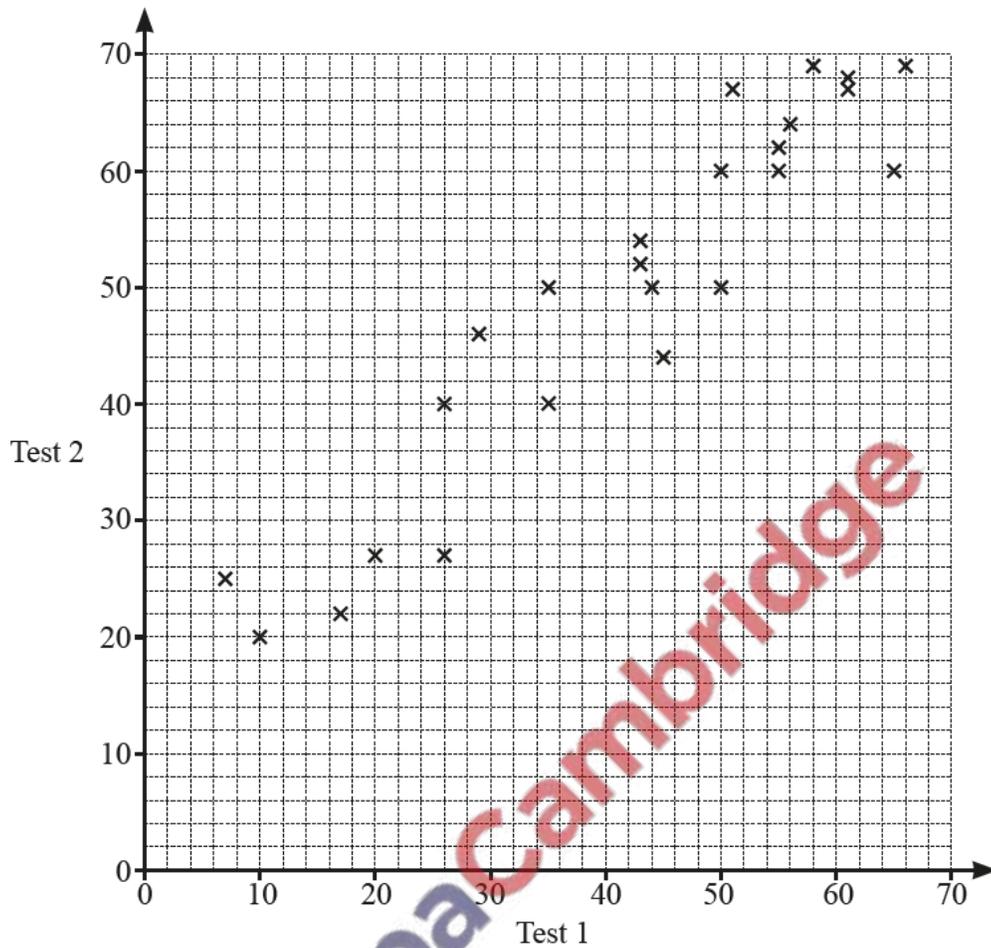| Color	Green	Red	Black	Yellow	Orange
Probability	0.3	0.25	0.1		0.2

Complete the table. [2]

Mrs Salaman gives her class two mathematics tests.
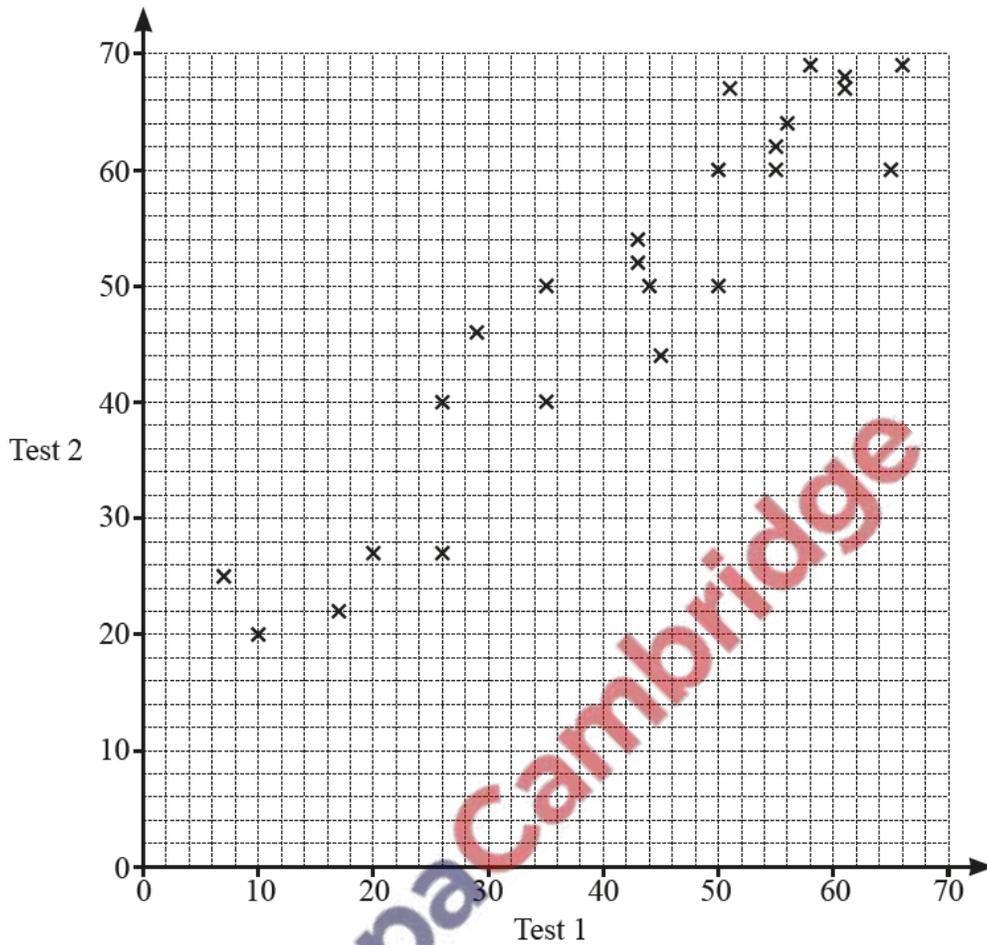The scatter diagram shows information about the marks each student scored.

(a) Write down the highest mark scored on test 1.

.... [1]

(b) Write down the type of correlation shown in the scatter diagram.

.... [1]

(c) Draw a line of best fit on the scatter diagram. [1]

(d) Hamish scored a mark of 40 on test 1.
He was absent for test 2.

Use your line of best fit to find an estimate for his mark on test 2.

.... [1]

15

Mrs Salaman gives her class two mathematics tests.
The scatter diagram shows information about the marks each student scored.
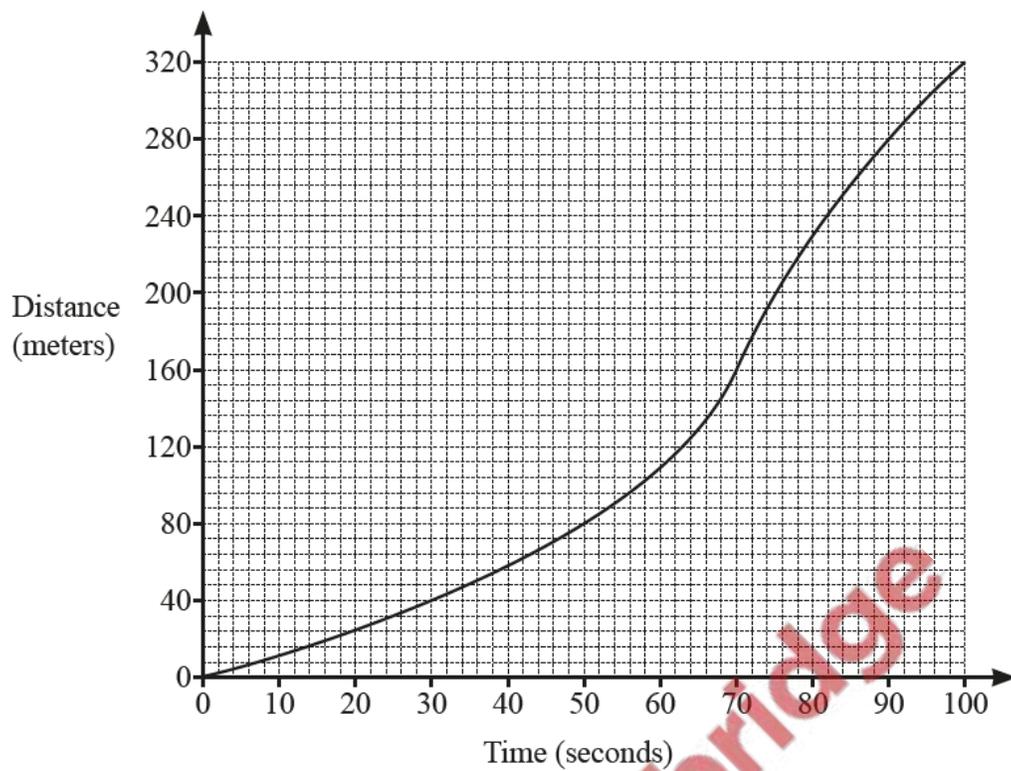

(a) Write down the highest mark scored on test 1.

.... [1]

(b) Write down the type of correlation shown in the scatter diagram.

.... [1]

(c) Draw a line of best fit on the scatter diagram.   [1]

(d) Hamish scored a mark of 40 on test 1.
He was absent for test 2.

Use your line of best fit to find an estimate for his mark on test 2.

.... [1]
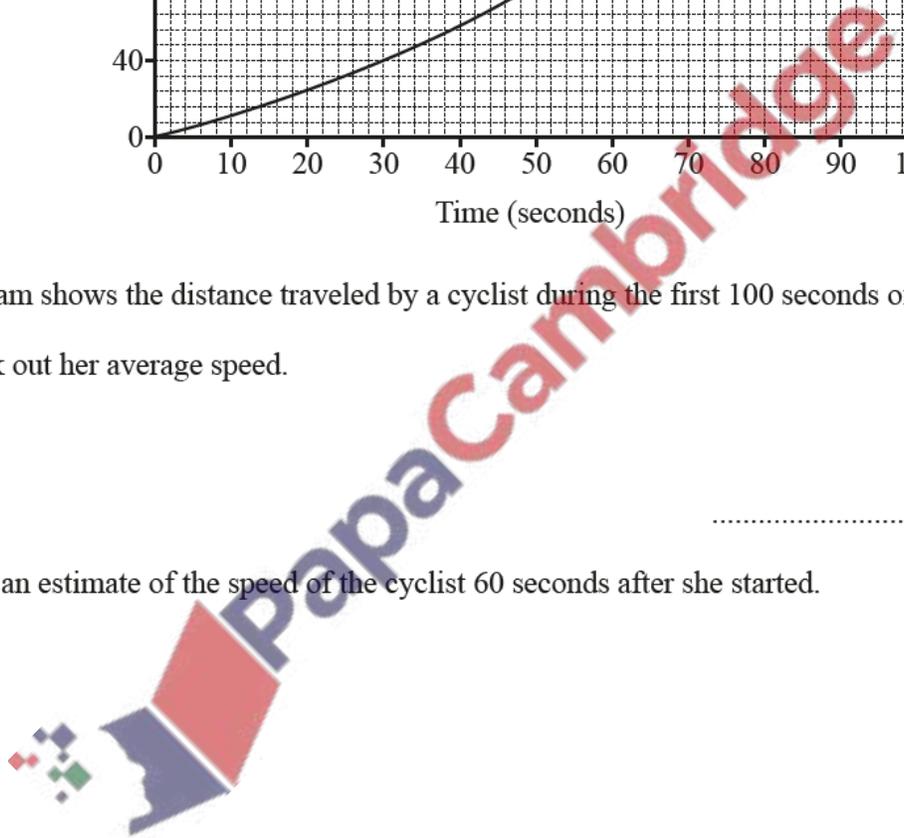
The diagram shows the distance traveled by a cyclist during the first 100 seconds of her journey.

(a) Work out her average speed.

.... m/s [1]

(b) Find an estimate of the speed of the cyclist 60 seconds after she started.

.... m/s [3]

| 19 | 11 | 13 | 10 | 12 | 19 | 14 | 15 | 19 | 13 |

The list shows 10 test scores.

Find

(a) the mode,

.... [1]

(b) the median.

.... [2]
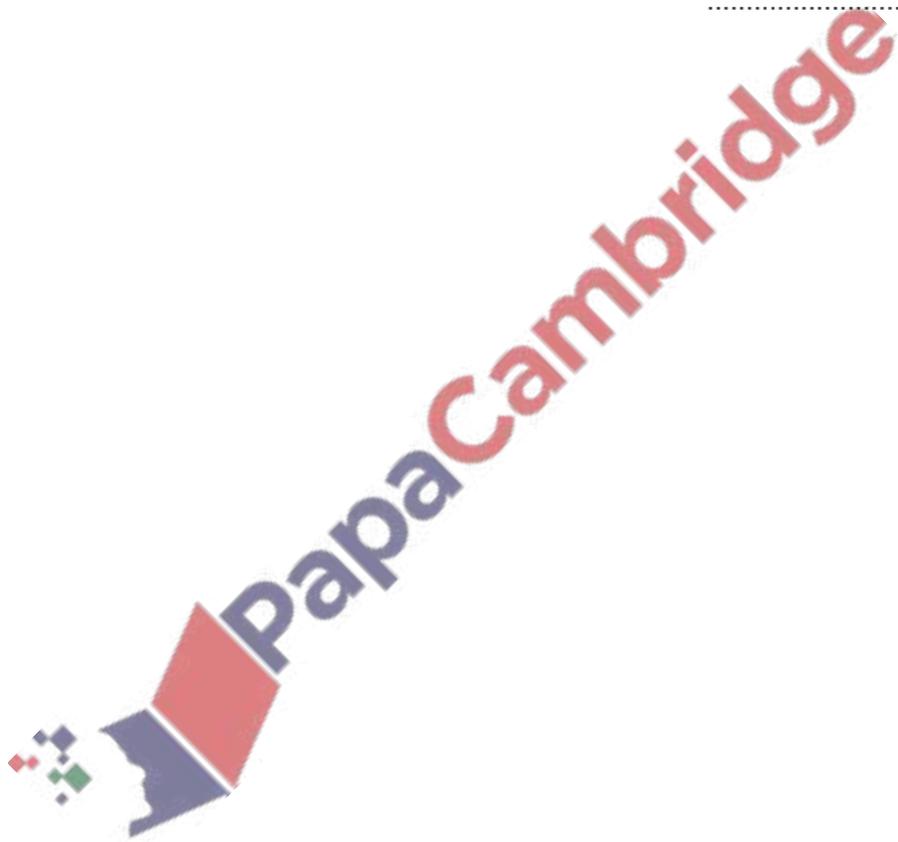
(a) 20 students from College A each run 5 km.
The times, correct to the nearest minute, are recorded.

32	51	25	40	47	21	37	32	48	36
46	39	30	29	44	39	53	35	40	31

(i) Find the median of the times.

.... min [1]

(ii) Explain why mode is not a suitable measure of average in this case.

.... [1]

(iii) Find the probability that a student, chosen at random, took less than 33 minutes.

.... [1]

(iv) Complete the frequency table.

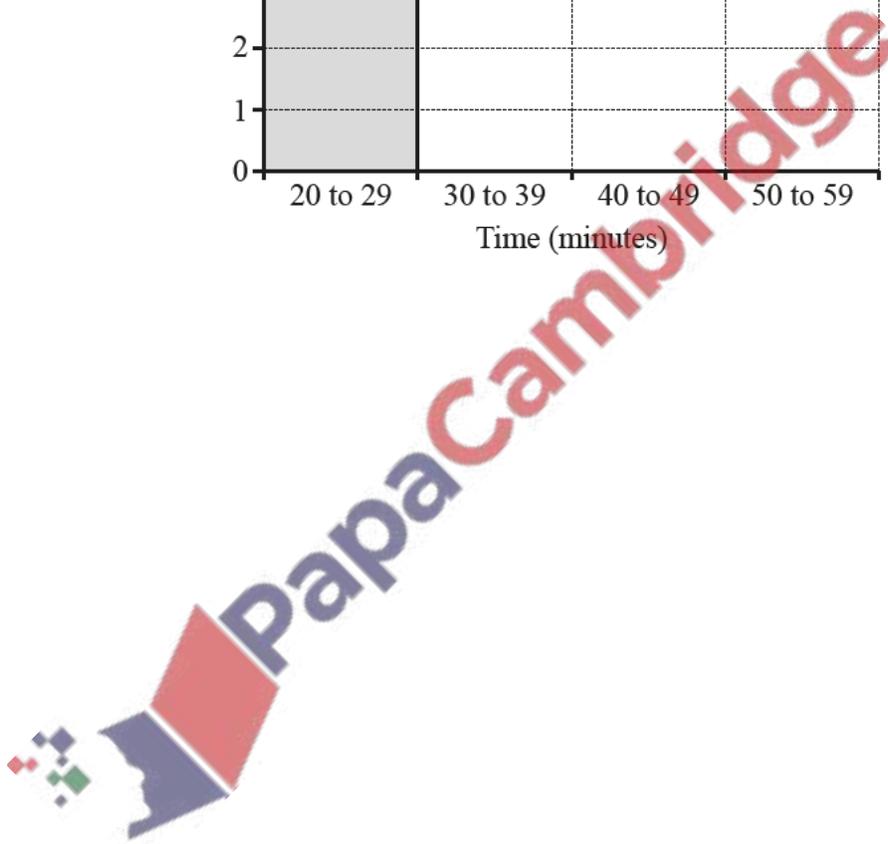| Time (minutes)	Frequency
20 to 29	3
30 to 39	
40 to 49	
50 to 59	

[1]
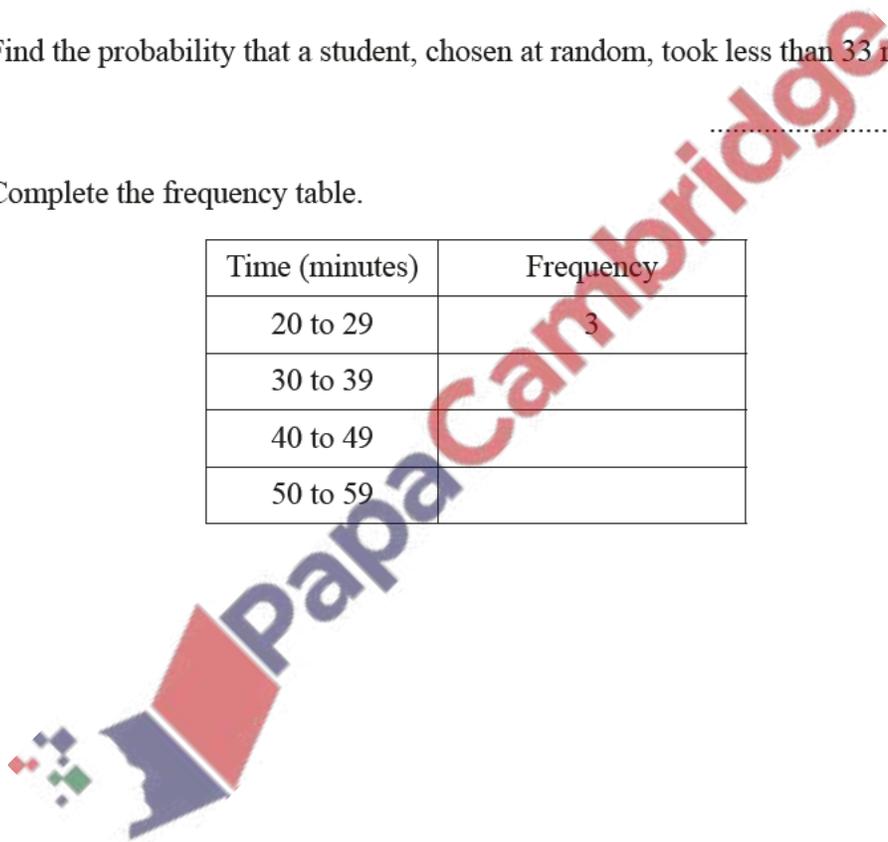
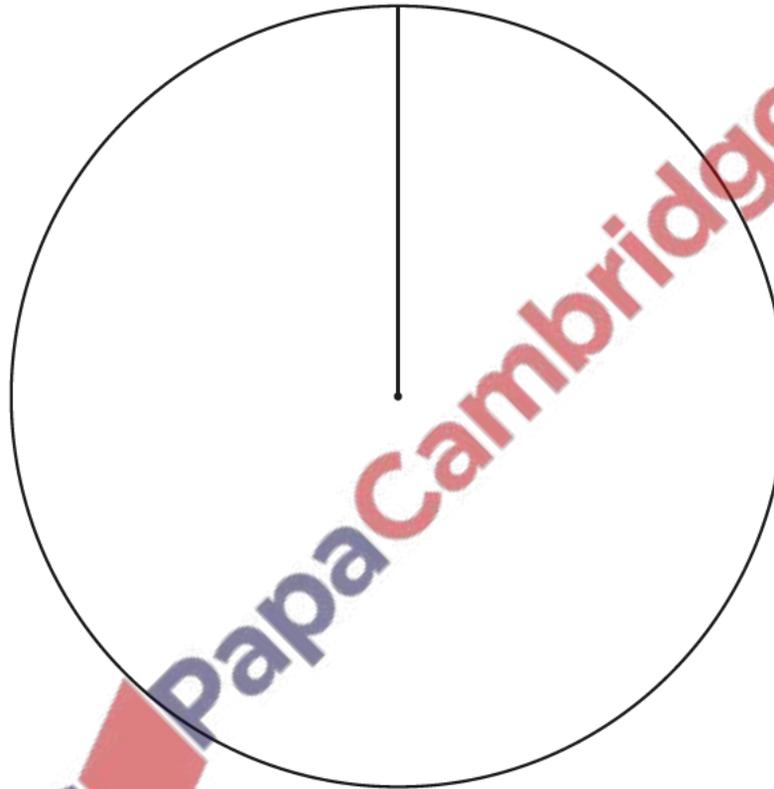**(v)** Complete the bar chart for the times of the students.
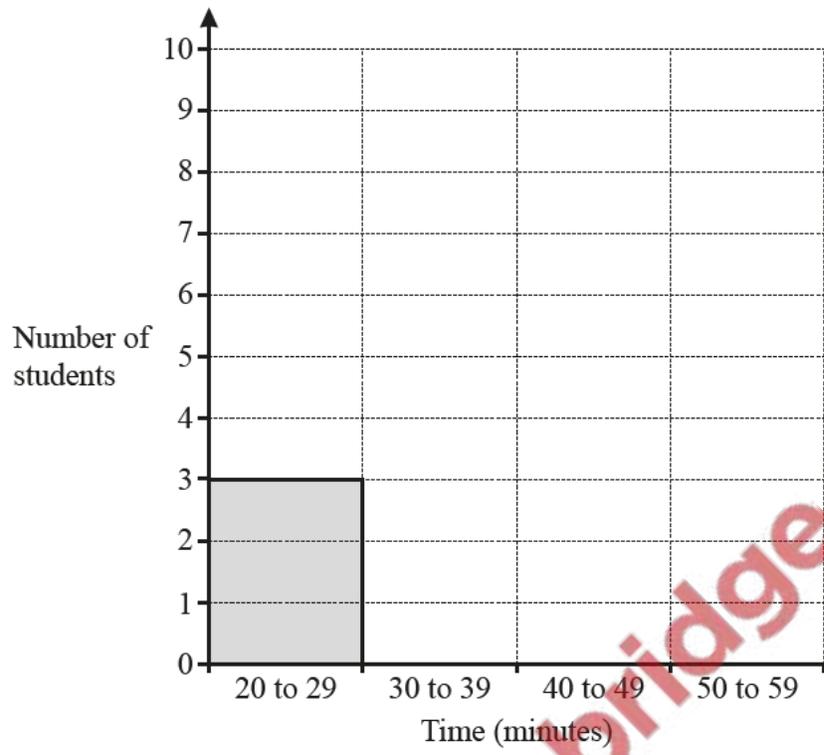
[2]

(b) 20 students from College B each run 5 km.

Their times, correct to the nearest minute, are recorded and the results are shown in the table.

Time (minutes)	Number of students	Pie chart sector angle
30 to 39	5	90°
40 to 49	8	
50 to 59	7	

    (i) Complete the table. [2]

    (ii) Complete the pie chart. [2]

(c) Write down two comments comparing the times of students from College A with the times of students from College B.

1 ....

....

2 ....

.... [2]

21

The heights, h meters, of the 120 boys in an athletics club are recorded.
The table shows information about the heights of the boys.

Height (h meters)	$1.3 < h \leqslant 1.4$	$1.4 < h \leqslant 1.5$	$1.5 < h \leqslant 1.6$	$1.6 < h \leqslant 1.7$	$1.7 < h \leqslant 1.8$	$1.8 < h \leqslant 1.9$
Frequency	7	18	30	24	27	14

(a) (i) Write down the modal class.

.... $< h \leqslant$ .... [1]

(ii) Calculate an estimate of the mean height.

.... m [4]

(b) (i) One boy is chosen at random from the club.

Find the probability that this boy has a height greater than 1.8 m.

.... [1]
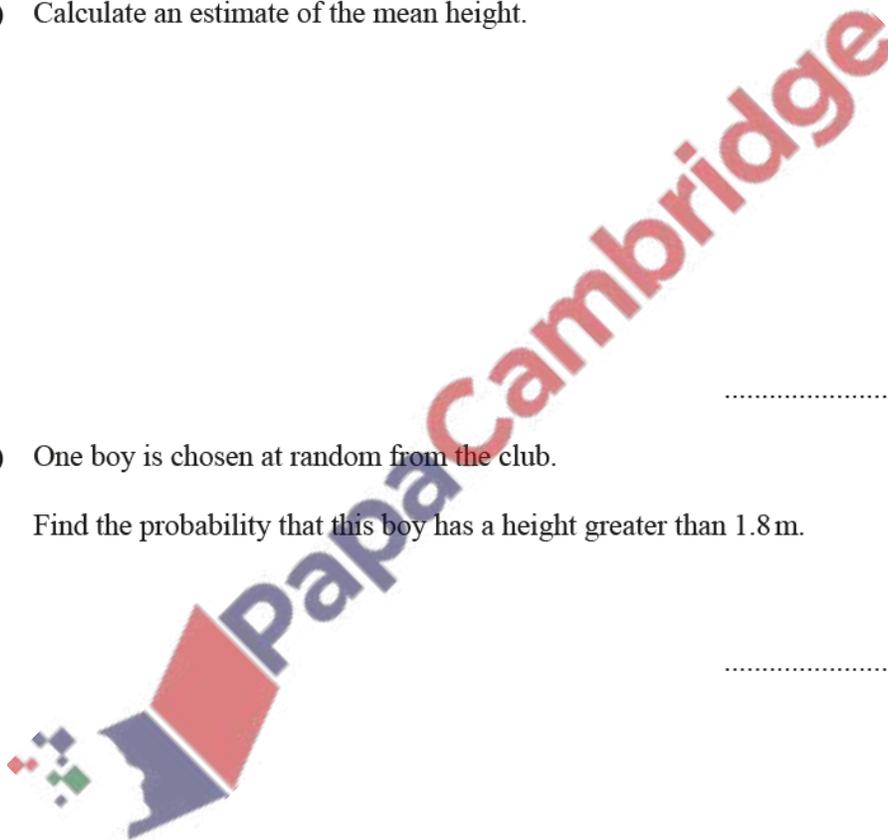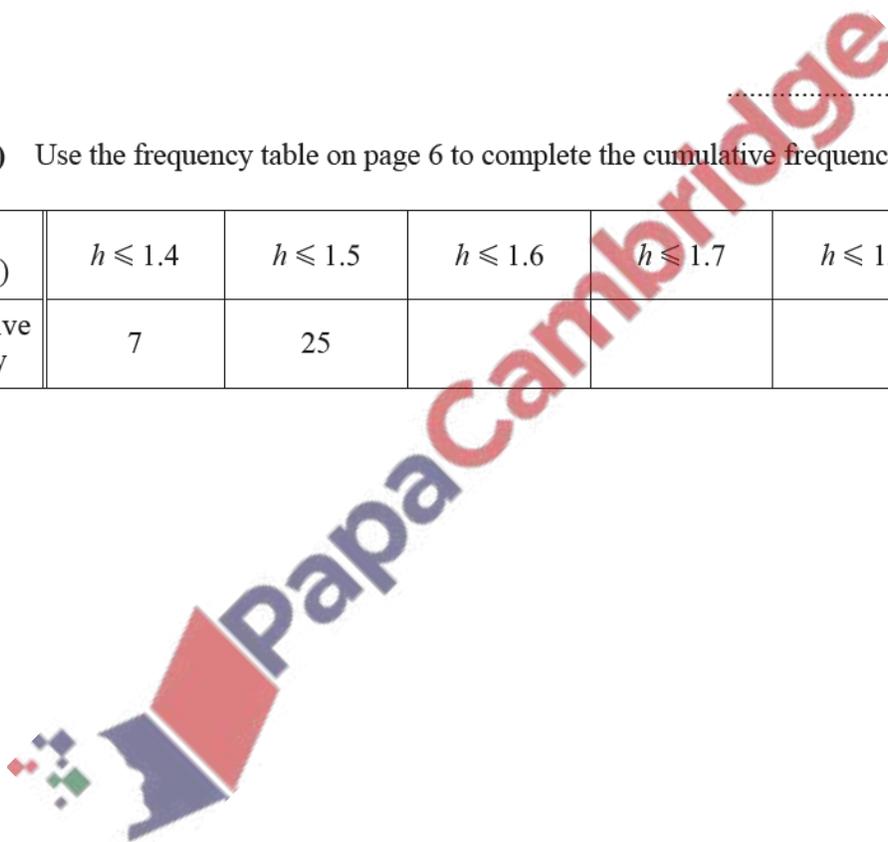
(ii) Three boys are chosen at random from the club.

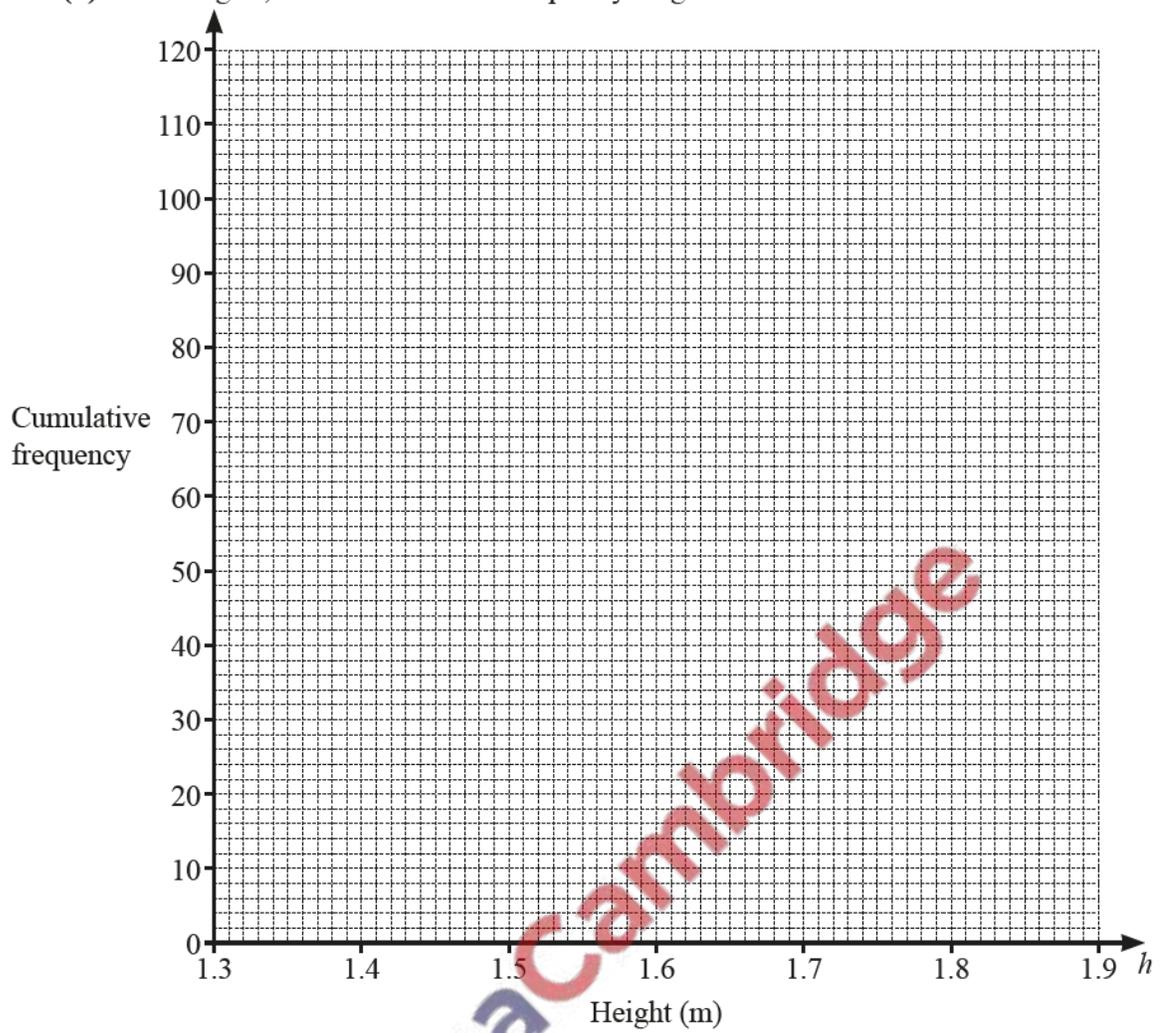Calculate the probability that one of the boys has a height greater than $1.8\,\text{m}$ and the other two boys each have a height of $1.4\,\text{m}$ or less.

.... [4]

(c) (i) Use the frequency table on page 6 to complete the cumulative frequency table.

Height (h meters)	$h \leqslant 1.4$	$h \leqslant 1.5$	$h \leqslant 1.6$	$h \leqslant 1.7$	$h \leqslant 1.8$	$h \leqslant 1.9$
Cumulative frequency	7	25				

[2]

(ii) On the grid, draw a cumulative frequency diagram to show this information.

[3]

(d) Use your diagram to find an estimate for

(i) the median height,

.... m [1]

(ii) the 40th percentile.

.... m [2]