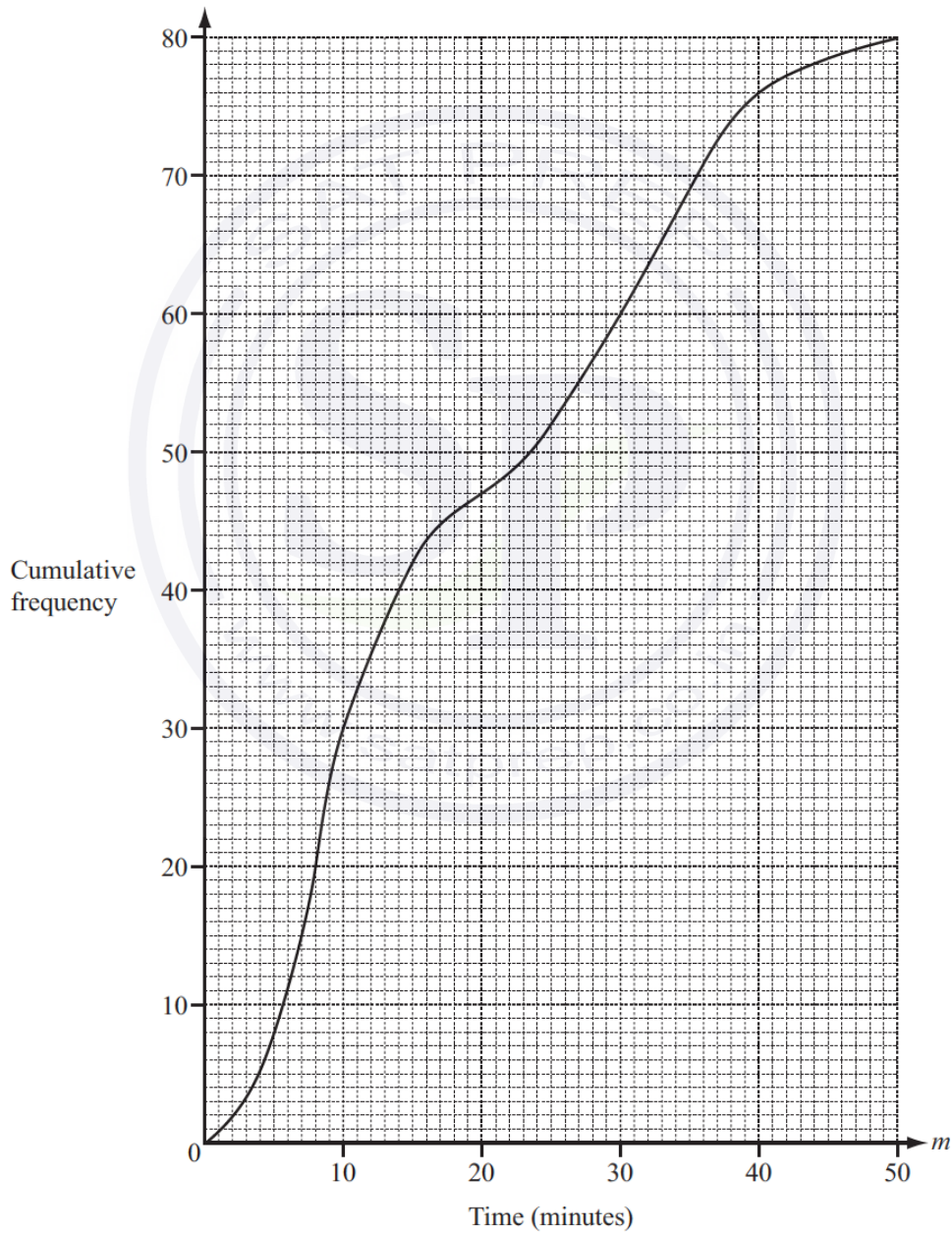


Extended Mathematics
Topic :Statistics
Year :May 2013 -May 2023
Paper -4
Questions Booklet

Question 1

Sam asked 80 people how many minutes their journey to work took on one day.
The cumulative frequency diagram shows the times taken (m minutes).



Continue on the next page..

(a) Find

(i) the median,

Answer(a)(i) min [1]

(ii) the lower quartile,

Answer(a)(ii) min [1]

(iii) the inter-quartile range.

Answer(a)(iii) min [1]

(b) One of the 80 people is chosen at random.

Find the probability that their journey to work took more than 35 minutes.

Give your answer as a fraction.

Answer(b) [2]

(c) Use the cumulative frequency diagram to complete this frequency table.

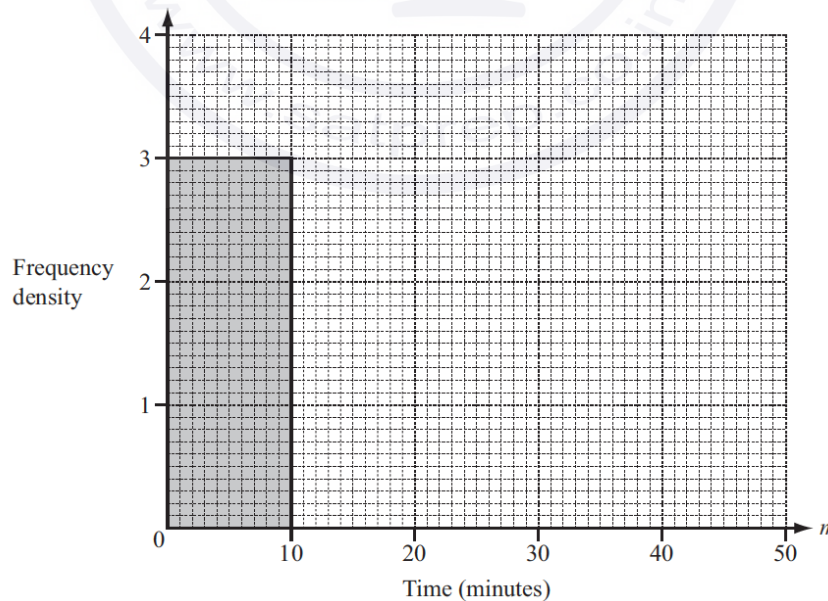
Time (m minutes)	$0 < m \leq 10$	$10 < m \leq 15$	$15 < m \leq 30$	$30 < m \leq 40$	$40 < m \leq 50$
Frequency	30	12	18		

[2]

(d) Using mid-interval values, calculate an estimate of the mean journey time for the 80 people.

Answer(d) min [3]

(e) Use the table in **part (c)** to complete the histogram to show the times taken by the 80 people. One column has already been completed for you.



[5]

Question 2

Height (h cm)	$150 < h \leq 160$	$160 < h \leq 165$	$165 < h \leq 180$	$180 < h \leq 190$
Frequency	5	9	18	10

The table shows information about the heights of a group of 42 students.

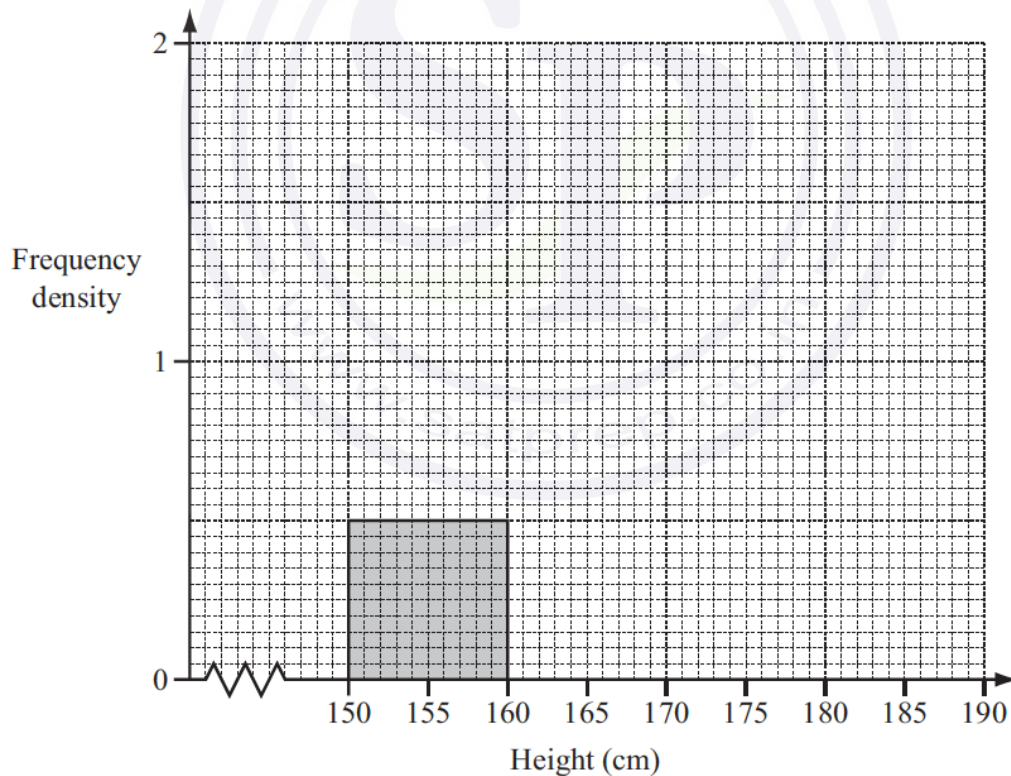
- (a) Using mid-interval values, calculate an estimate of the mean height of the students.
Show your working.

Answer(a) cm [3]

- (b) Write down the interval which contains the lower quartile.

Answer(b) [1]

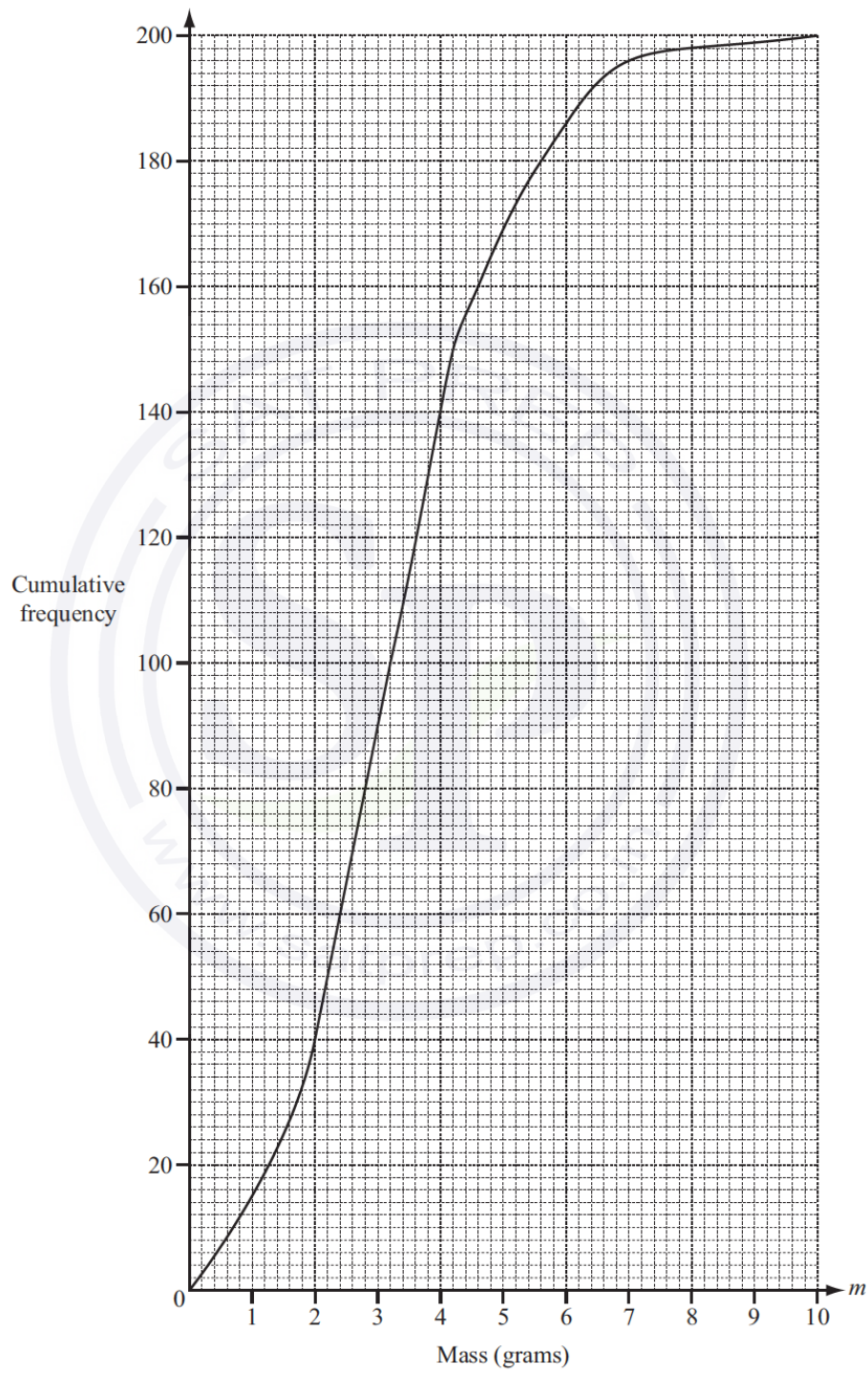
- (c) Complete the histogram to show the information in the table.
One column has already been drawn for you.



[4]

Question 3

200 students estimate the mass (m grams) of a coin.
The cumulative frequency diagram shows the results.



Continue on the next page..

(a) Find

(i) the median,

Answer(a)(i) g [1]

(ii) the upper quartile,

Answer(a)(ii) g [1]

(iii) the 80th percentile,

Answer(a)(iii) g [1]

(iv) the number of students whose estimate is 7 g or less.

Answer(a)(iv) [1]

(b) (i) Use the cumulative frequency diagram to complete the frequency table.

Mass (m grams)	$0 < m \leq 2$	$2 < m \leq 4$	$4 < m \leq 6$	$6 < m \leq 8$	$8 < m \leq 10$
Frequency	40				2

[2]

(ii) A student is chosen at random.

The probability that the student estimates that the mass is greater than M grams is 0.3.

Find the value of M .

Answer(b)(ii) $M =$ [2]

Question 4

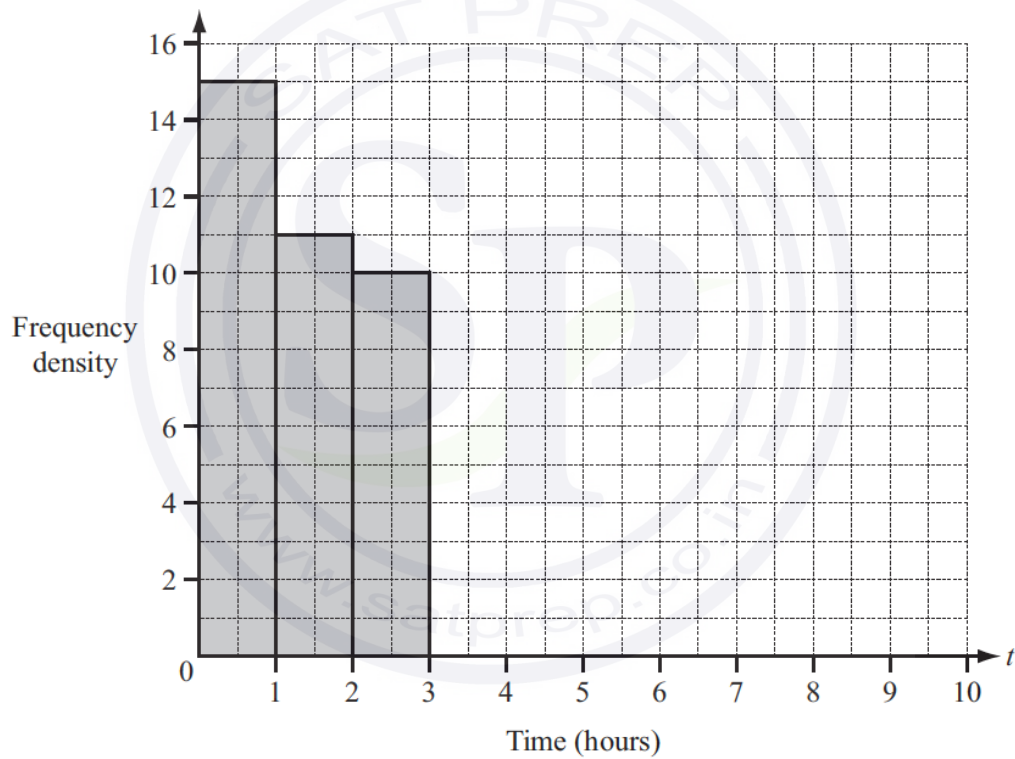
80 students were asked how much time they spent on the internet in one day.
This table shows the results.

Time (t hours)	$0 < t \leq 1$	$1 < t \leq 2$	$2 < t \leq 3$	$3 < t \leq 5$	$5 < t \leq 7$	$7 < t \leq 10$
Number of students	15	11	10	19	13	12

- (i) Calculate an estimate of the mean time spent on the internet by the 80 students.

Answer (i) hours [4]

- (ii) On the grid, complete the histogram to show this information.



[4]

Question 5

120 students are asked to answer a question.

The time, t seconds, taken by each student to answer the question is measured.

The frequency table shows the results.

Time	$0 < t \leq 10$	$10 < t \leq 20$	$20 < t \leq 30$	$30 < t \leq 40$	$40 < t \leq 50$	$50 < t \leq 60$
Frequency	6	44	40	14	10	6

(a) Calculate an estimate of the mean time.

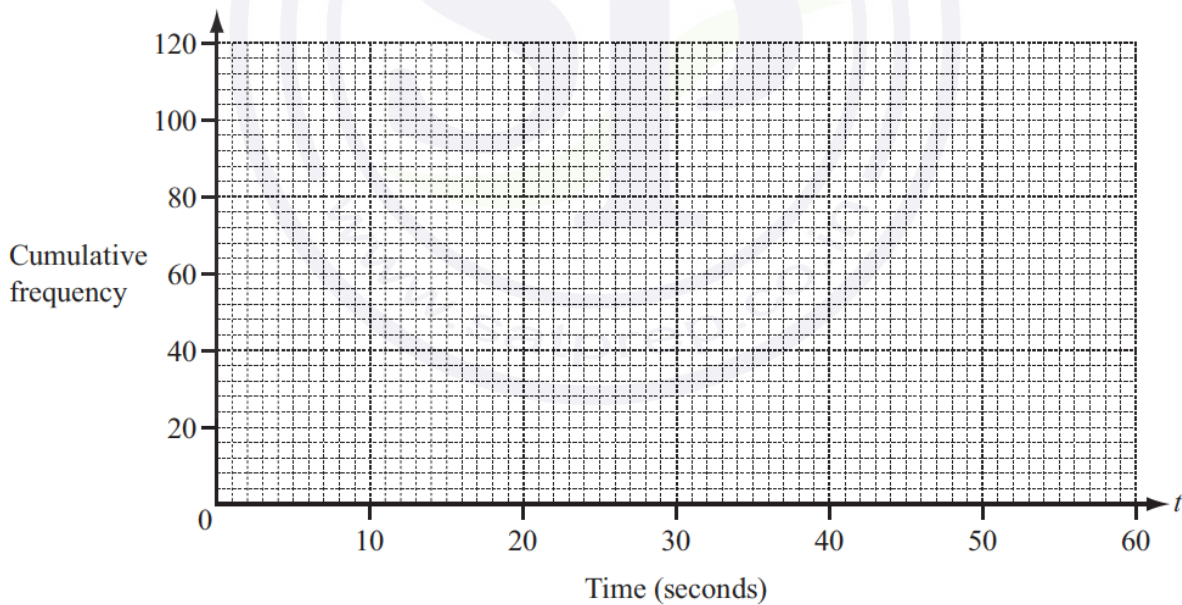
Answer(a) s [4]

(b) (i) Complete the cumulative frequency table.

Time	$t \leq 10$	$t \leq 20$	$t \leq 30$	$t \leq 40$	$t \leq 50$	$t \leq 60$
Cumulative frequency	6			104		120

[2]

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



[3]

Continue on the next pages...

- (iii) Use your cumulative frequency diagram to find the median, the lower quartile and the 60th percentile.

Answer(b)(iii) Median s
 Lower quartile s
 60th percentile s [4]

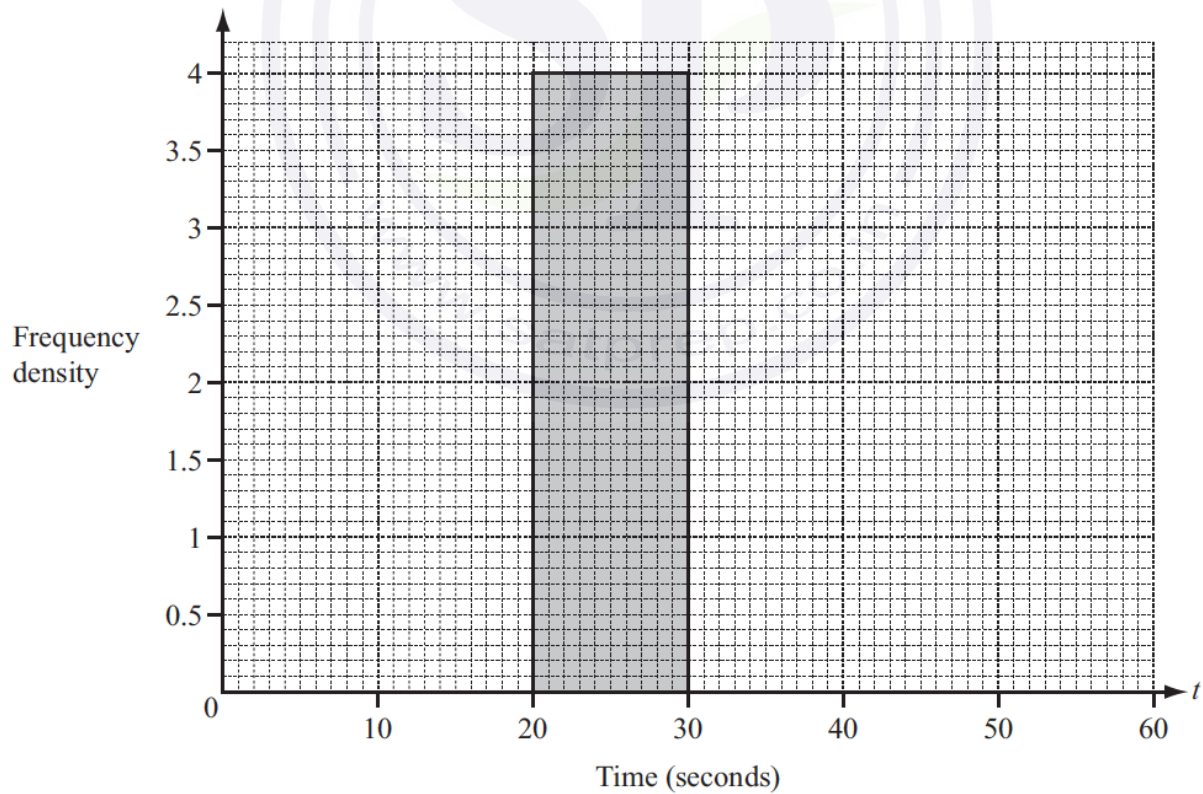
- (c) The intervals for the times taken are changed.

- (i) Use the information in the **frequency table** on the opposite page to complete this new table.

Time	$0 < t \leq 20$	$20 < t \leq 30$	$30 < t \leq 60$
Frequency		40	

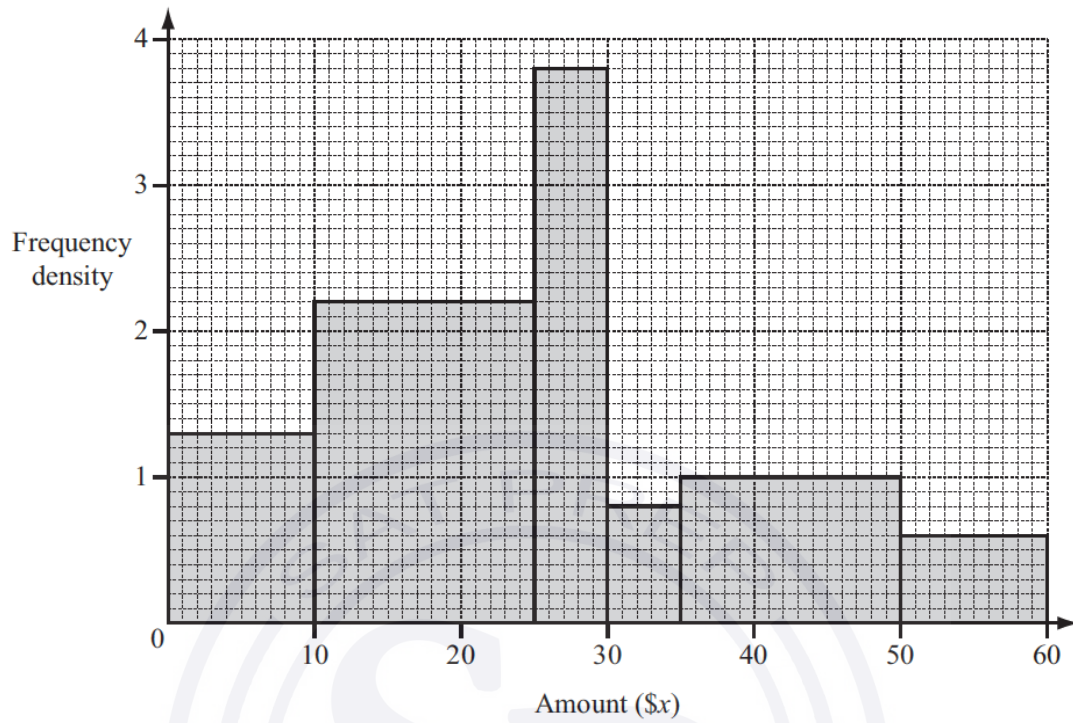
[2]

- (ii) On the grid below, complete the histogram to show the information in the new table. One column has already been drawn for you.



[3]

Question 6



A survey asked 90 people how much money they gave to charity in one month. The histogram shows the results of the survey.

(a) Complete the frequency table for the six columns in the histogram.

Amount (\$x)	$0 < x \leq 10$					
Frequency			4			

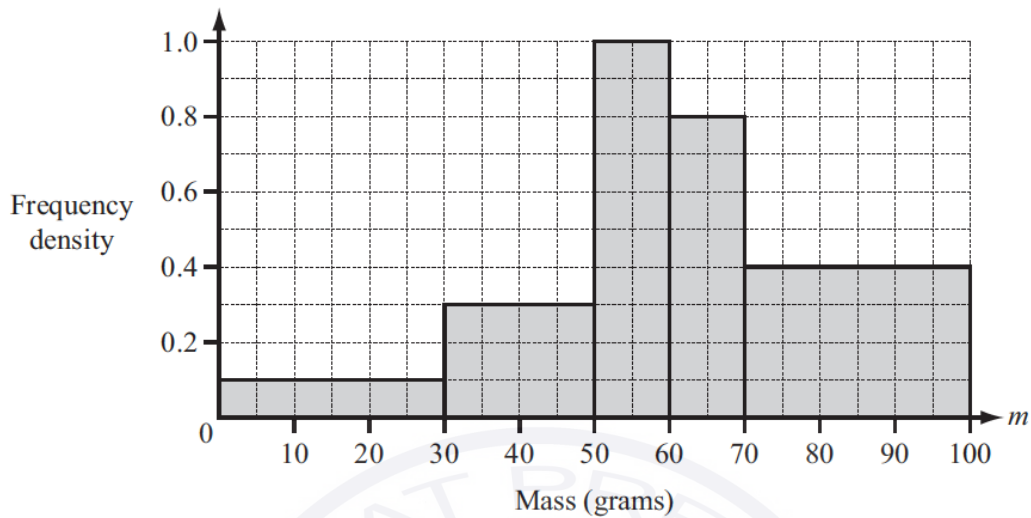
[5]

(b) Use your frequency table to calculate an estimate of the mean amount these 90 people gave to charity.

Answer(b) \$ [4]

Question 7

(a)



The histogram shows some information about the masses (m grams) of 39 apples.

(i) Show that there are 12 apples in the interval $70 < m \leq 100$.

Answer(a)(i)

[1]

(ii) Calculate an estimate of the mean mass of the 39 apples.

Continue on the next page..

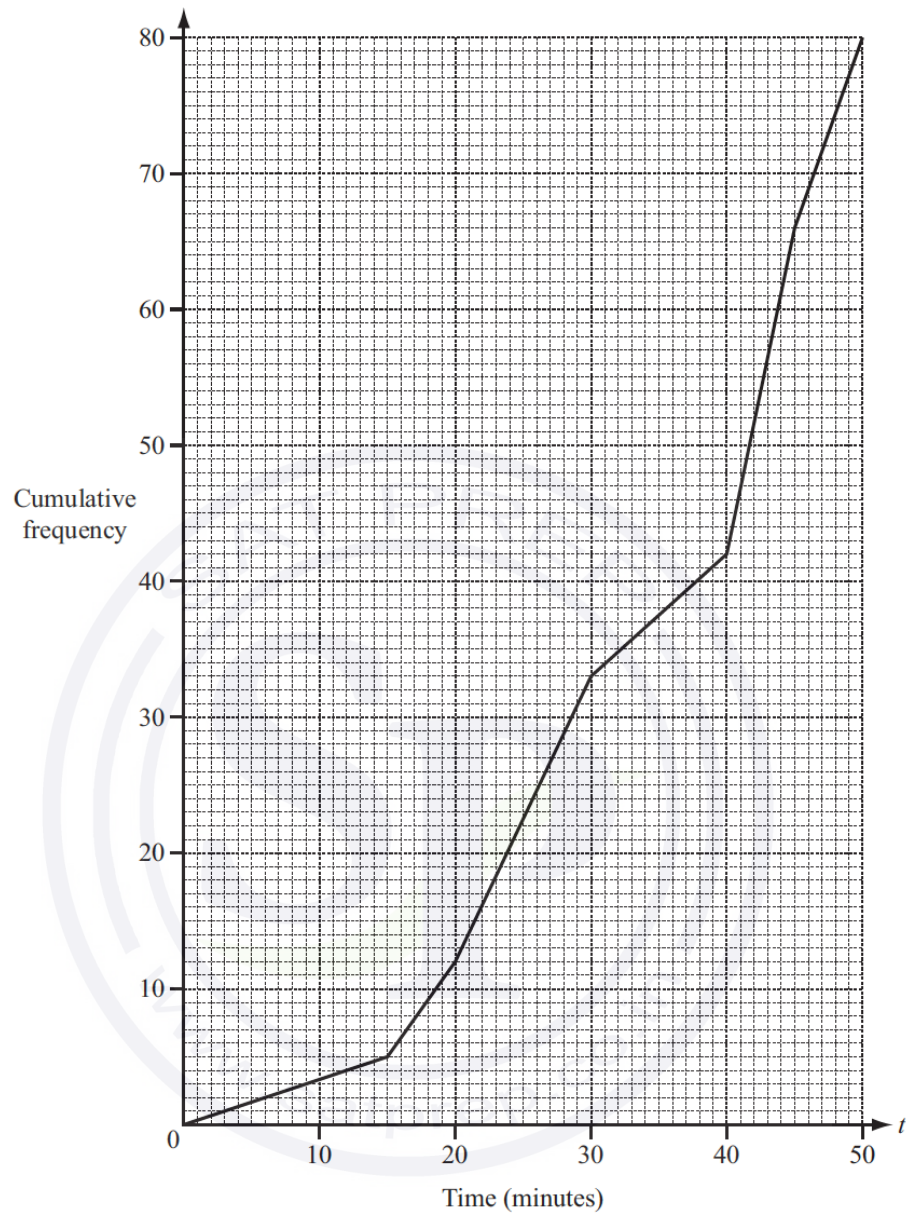
Answer(a)(ii) g [5]

(b) The mean mass of 20 oranges is 70 g.
 One orange is eaten.
 The mean mass of the remaining oranges is 70.5 g.

Find the mass of the orange that was eaten.

Answer(b) g [3]

Question 8



Continue on the next page..

The times (t minutes) taken by 80 people to complete a charity swim were recorded. The results are shown in the cumulative frequency diagram above.

(a) Find

(i) the median,

Answer(a)(i) min [1]

(ii) the inter-quartile range,

Answer(a)(ii) min [2]

(iii) the 70th percentile.

Answer(a)(iii) min [2]

(b) The times taken by the 80 people are shown in this grouped frequency table.

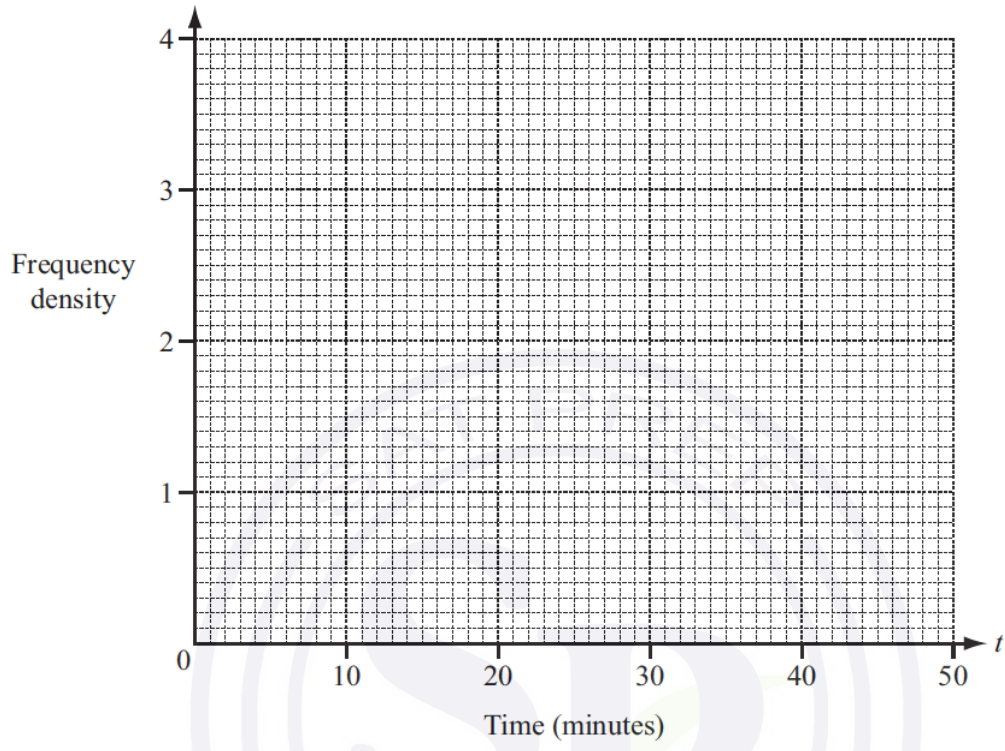
Time (t minutes)	$0 < t \leq 20$	$20 < t \leq 30$	$30 < t \leq 45$	$45 < t \leq 50$
Frequency	12	21	33	14

(i) Calculate an estimate of the mean time.

Continue on the next page..

Answer(b)(i) min [4]

(ii) Draw a histogram to represent the grouped frequency table.



[4]

Question 9

- (a) Ricardo asks some motorists how many litres of fuel they use in one day. The numbers of litres, correct to the nearest litre, are shown in the table.

Number of litres	16	17	18	19	20
Number of motorists	11	10	p	4	8

- (i) For this table, the mean number of litres is 17.7 .

Calculate the value of p .

Answer(a)(i) $p =$ [4]

- (ii) Find the median number of litres.

Answer(a)(ii) litres [1]

Question 10

The time, t seconds, taken for each of 50 chefs to cook an omelette is recorded.

Time (t seconds)	$20 < t \leq 25$	$25 < t \leq 30$	$30 < t \leq 35$	$35 < t \leq 40$	$40 < t \leq 45$	$45 < t \leq 50$
Frequency	2	6	7	19	9	7

- (a) Write down the modal time interval.

Answer(a) s [1]

- (b) Calculate an estimate of the mean time.
Show all your working.

Answer(b) s [4]

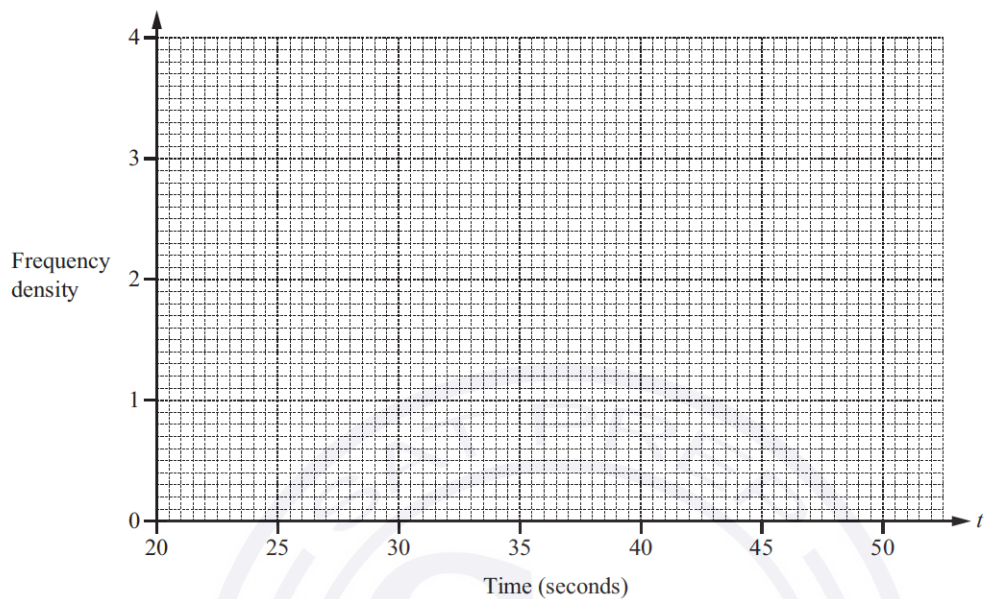
- (c) A new frequency table is made from the results shown in the table opposite.

Time (t seconds)	$20 < t \leq 35$	$35 < t \leq 40$	$40 < t \leq 50$
Frequency			

Continue on the next page..

(i) Complete the table. [1]

(ii) On the grid, draw a histogram to show the information in this new table.



[3]

Question 11

The table shows the height, h cm, of 40 children in a class.

Height (h cm)	$120 < h \leq 130$	$130 < h \leq 140$	$140 < h \leq 144$	$144 < h \leq 150$	$150 < h \leq 170$
Frequency	3	14	4	6	13

(a) Write down the class interval containing the median.

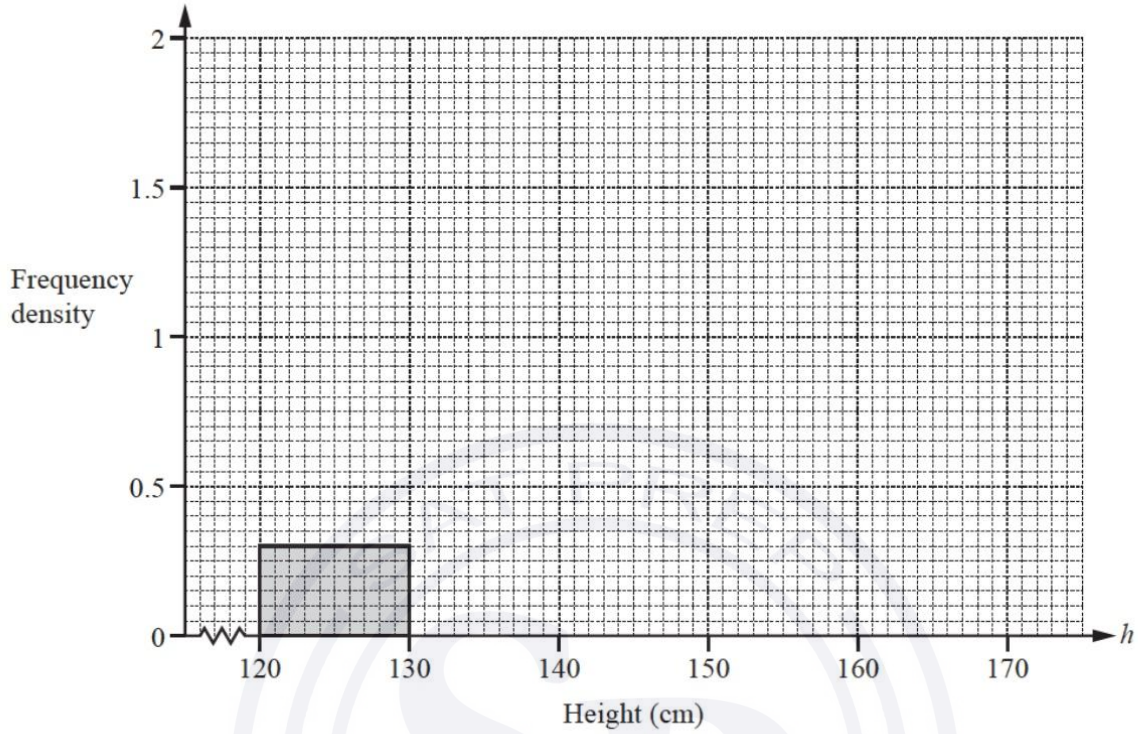
Answer(a) $< h \leq$ [1]

(b) Calculate an estimate of the mean height.

Answer(b) cm [4]

Continue on the next page..

(c) Complete the histogram.



[4]

Question 12

The table shows the times, t minutes, taken by 200 students to complete an IGCSE paper.

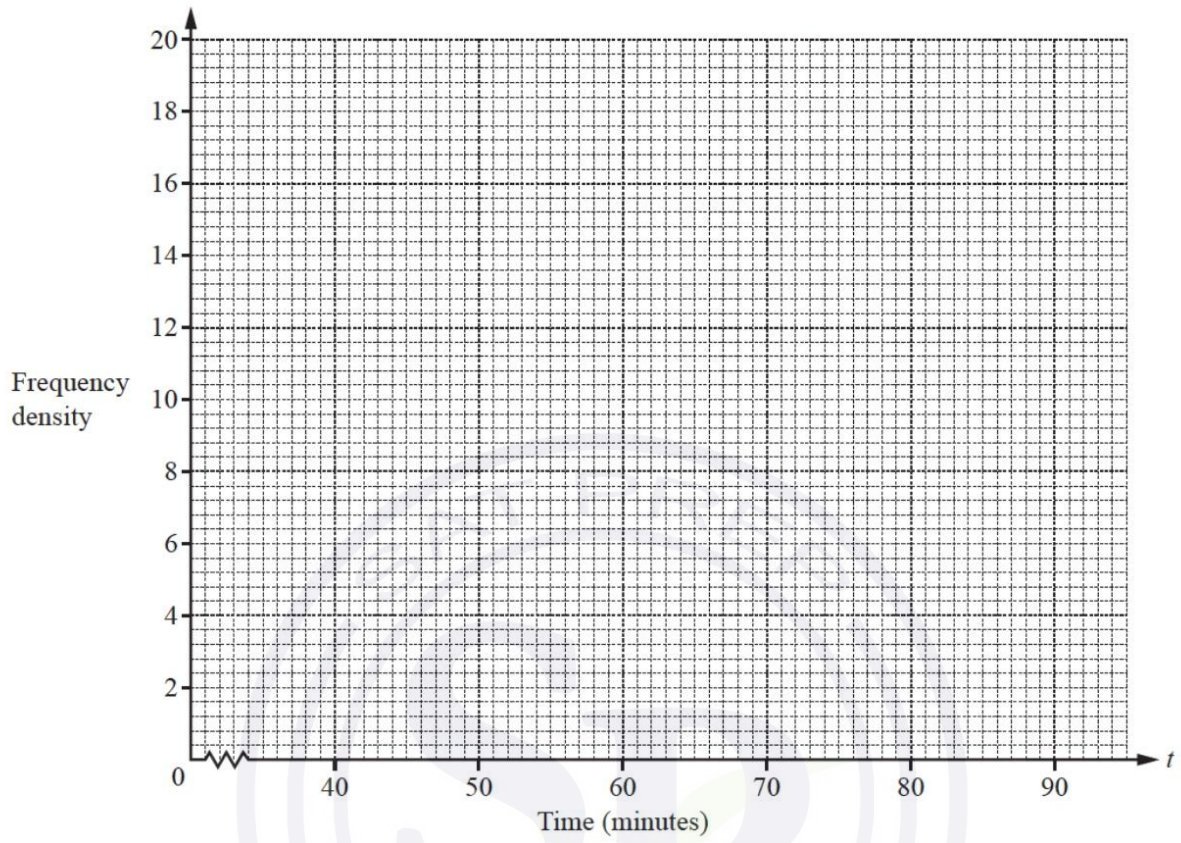
Time (t minutes)	$40 < t \leq 60$	$60 < t \leq 70$	$70 < t \leq 75$	$75 < t \leq 90$
Frequency	10	50	80	60

(a) By using mid-interval values, calculate an estimate of the mean time.

Answer(a) min [3]

Continue on the next page..

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



[4]

Question 13

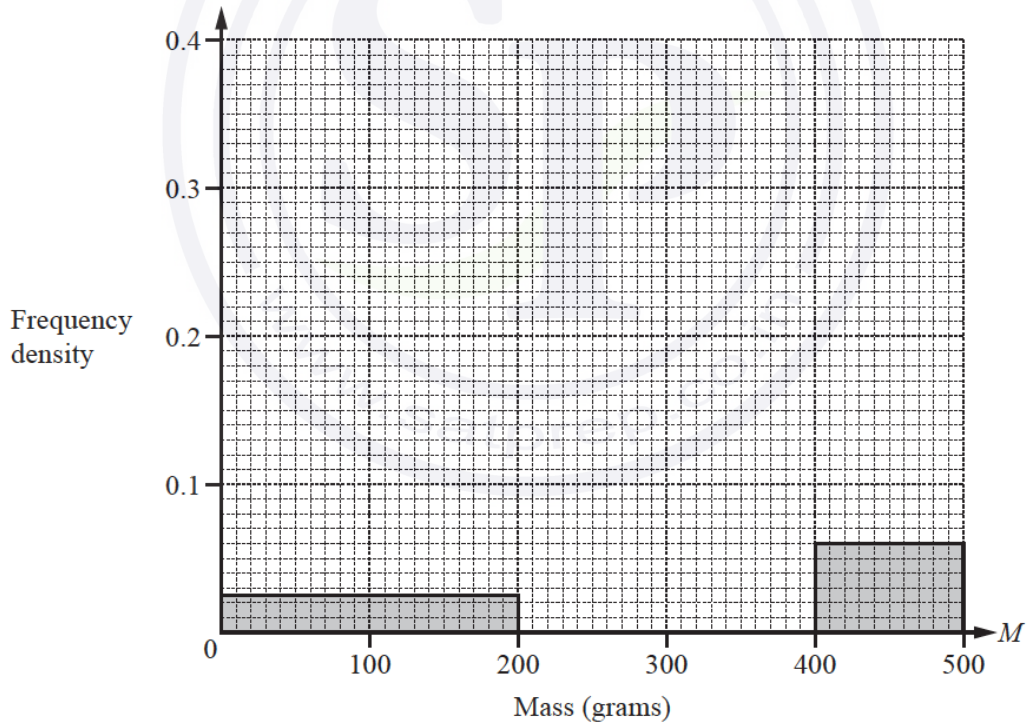
- (a) A group of 50 students estimated the mass, M grams, of sweets in a jar. The results are shown in the table.

Mass (M grams)	Number of students
$0 < M \leq 200$	5
$200 < M \leq 300$	9
$300 < M \leq 350$	18
$350 < M \leq 400$	12
$400 < M \leq 500$	6

- (i) Calculate an estimate of the mean.

Answer(a)(i) grams [4]

- (ii) Complete this histogram to show the information in the table.

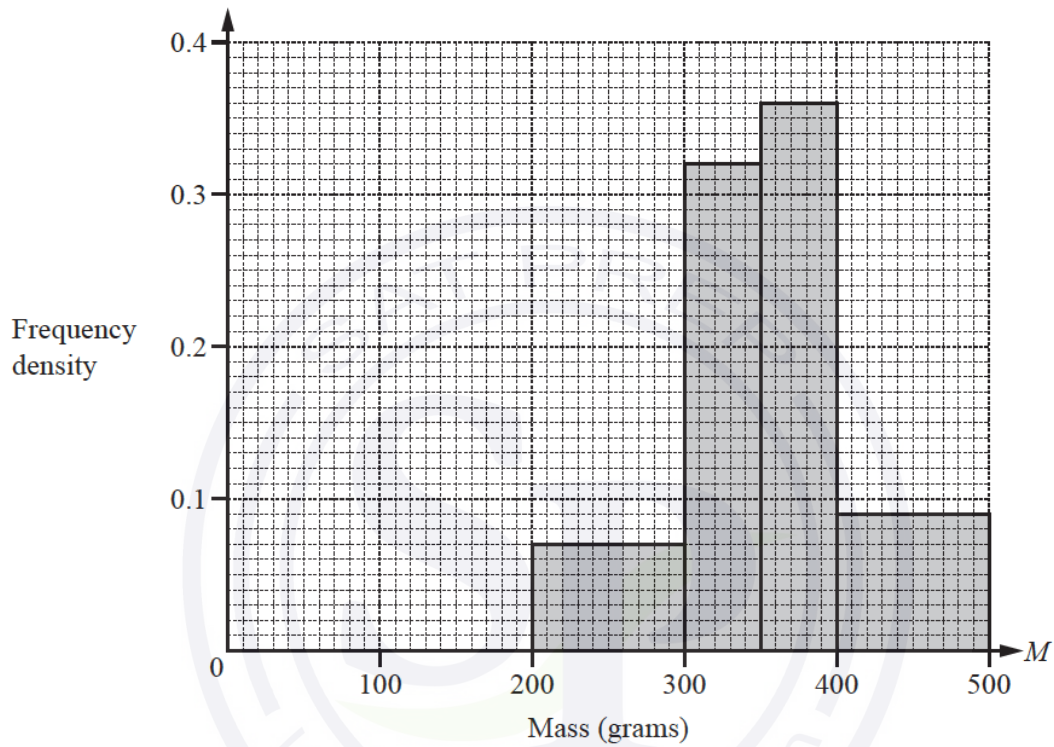


[3]

Continue on the next page..

- (b) A group of 50 adults also estimated the mass, M grams, of the sweets in the jar. The histogram below shows information about their estimates.

Use the histograms to make two comparisons between the distributions of the estimates of the students and the adults.



Answer(b)

1

.....

2

.....

[2]

Question 14

The table shows the time, t minutes, that 400 people take to complete a test.

Time taken (t mins)	$0 < t \leq 10$	$10 < t \leq 24$	$24 < t \leq 30$	$30 < t \leq 40$	$40 < t \leq 60$	$60 < t \leq 70$
Frequency	10	90	135	85	70	10

(a) (i) Write down the modal time interval.

Answer(a)(i) min [1]

(ii) Calculate an estimate of the mean time taken to complete the test.

Answer(a)(ii) min [4]

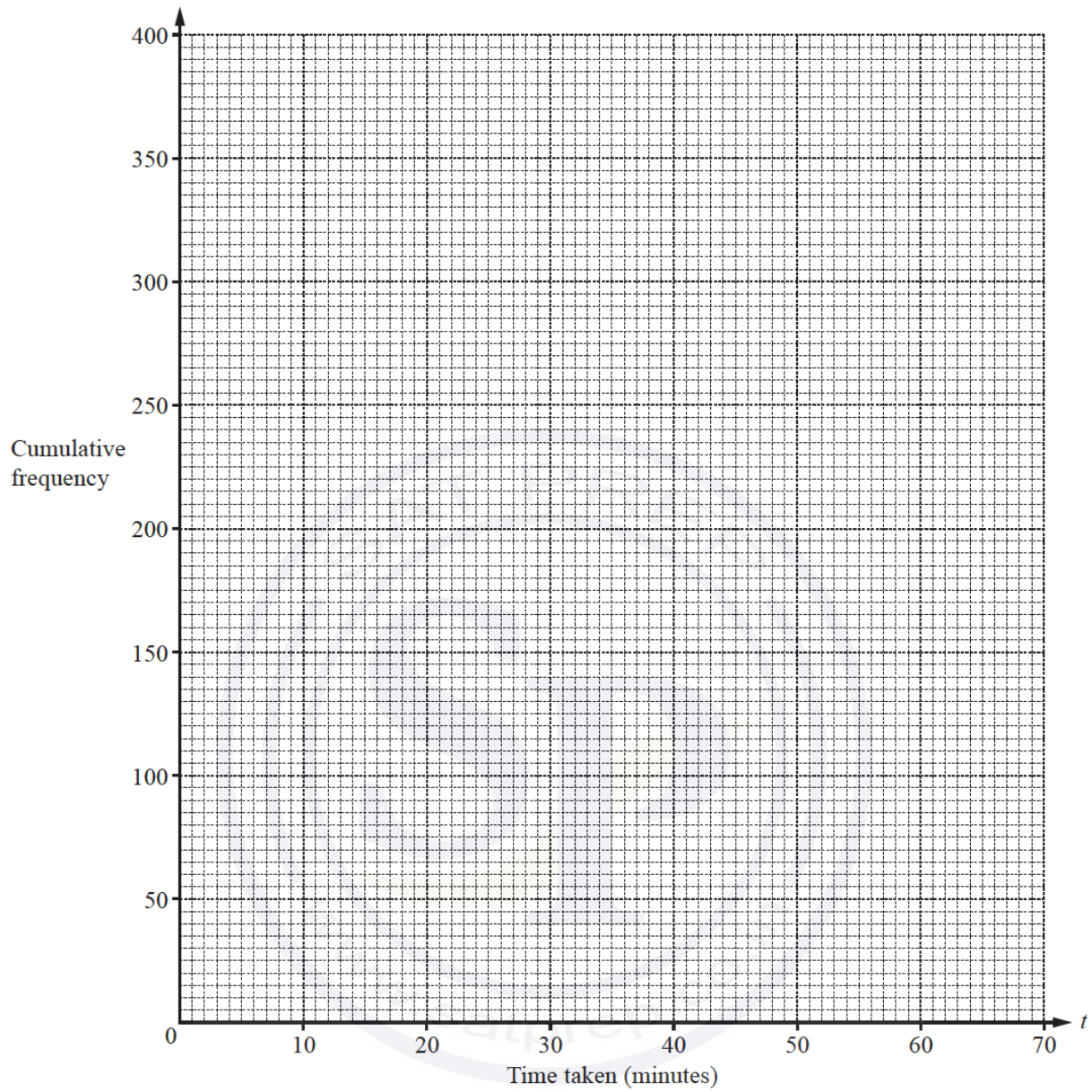
(b) (i) Complete the table of cumulative frequencies.

Time taken (t mins)	$t \leq 10$	$t \leq 24$	$t \leq 30$	$t \leq 40$	$t \leq 60$	$t \leq 70$
Cumulative frequency	10	100				400

[2]

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

Continue on the next page..



[3]

Continue on the next page..

(c) Use your graph to estimate

(i) the median time,

Answer(c)(i) min [1]

(ii) the inter-quartile range,

Answer(c)(ii) min [2]

(iii) the 15th percentile,

Answer(c)(iii) min [2]

(iv) the number of people who took more than 50 minutes.

Answer(c)(iv) [2]

Question 15

The table shows information about the masses, m grams, of 160 apples.

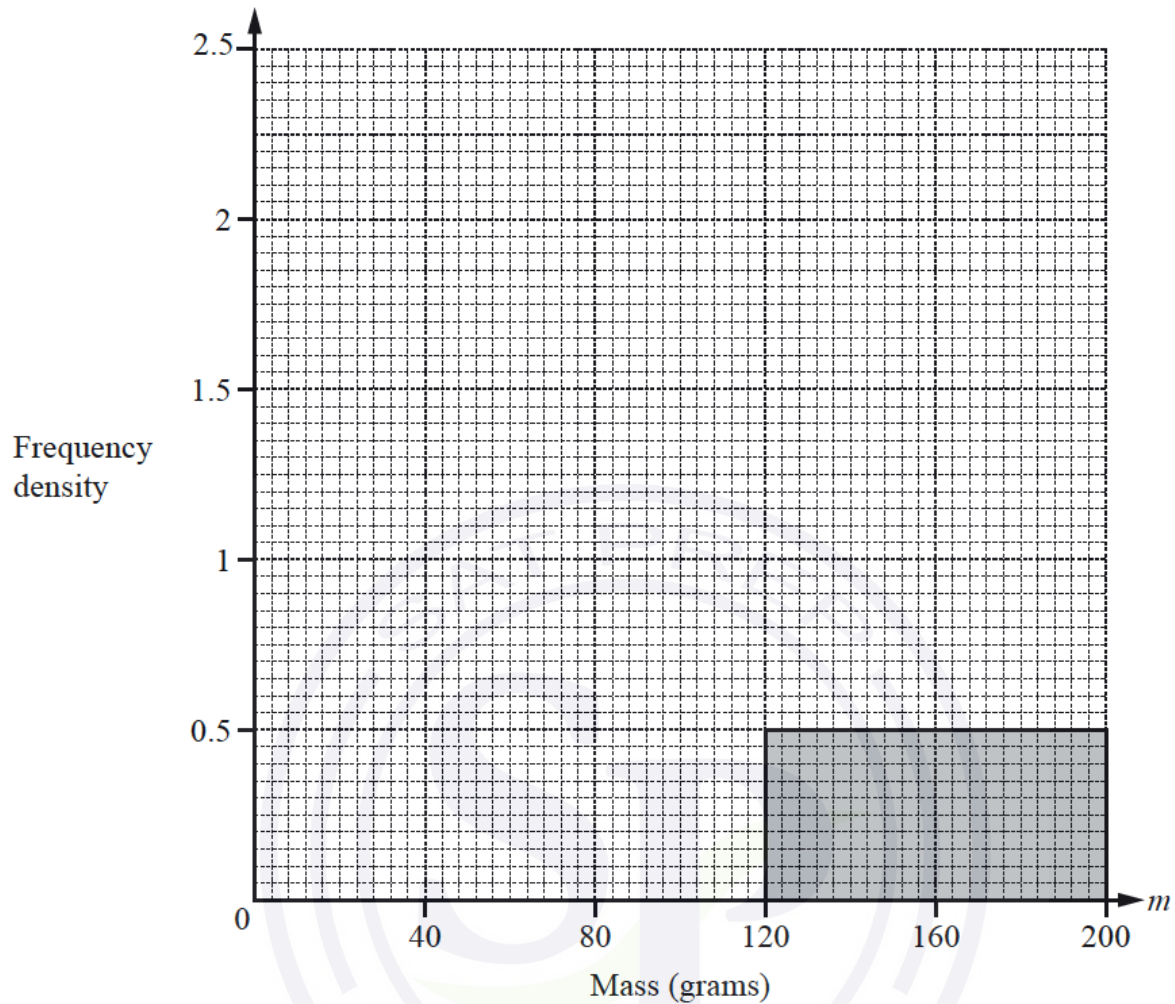
Mass (m grams)	$30 < m \leq 80$	$80 < m \leq 100$	$100 < m \leq 120$	$120 < m \leq 200$
Frequency	50	30	40	40

(a) Calculate an estimate of the mean.

Answer(a) g [4]

(b) On the grid, complete the histogram to show the information in the frequency table.

Continue on the next page..



[3]

(c) An apple is chosen at random from the 160 apples.

Find the probability that its mass is more than 120 g.

Answer(c) [1]

(d) Two apples are chosen at random from the 160 apples, without replacement.

Find the probability that

(i) they both have a mass of more than 120 g,

Answer(d)(i) [2]

(ii) one has a mass of more than 120 g and one has a mass of 80 g or less.

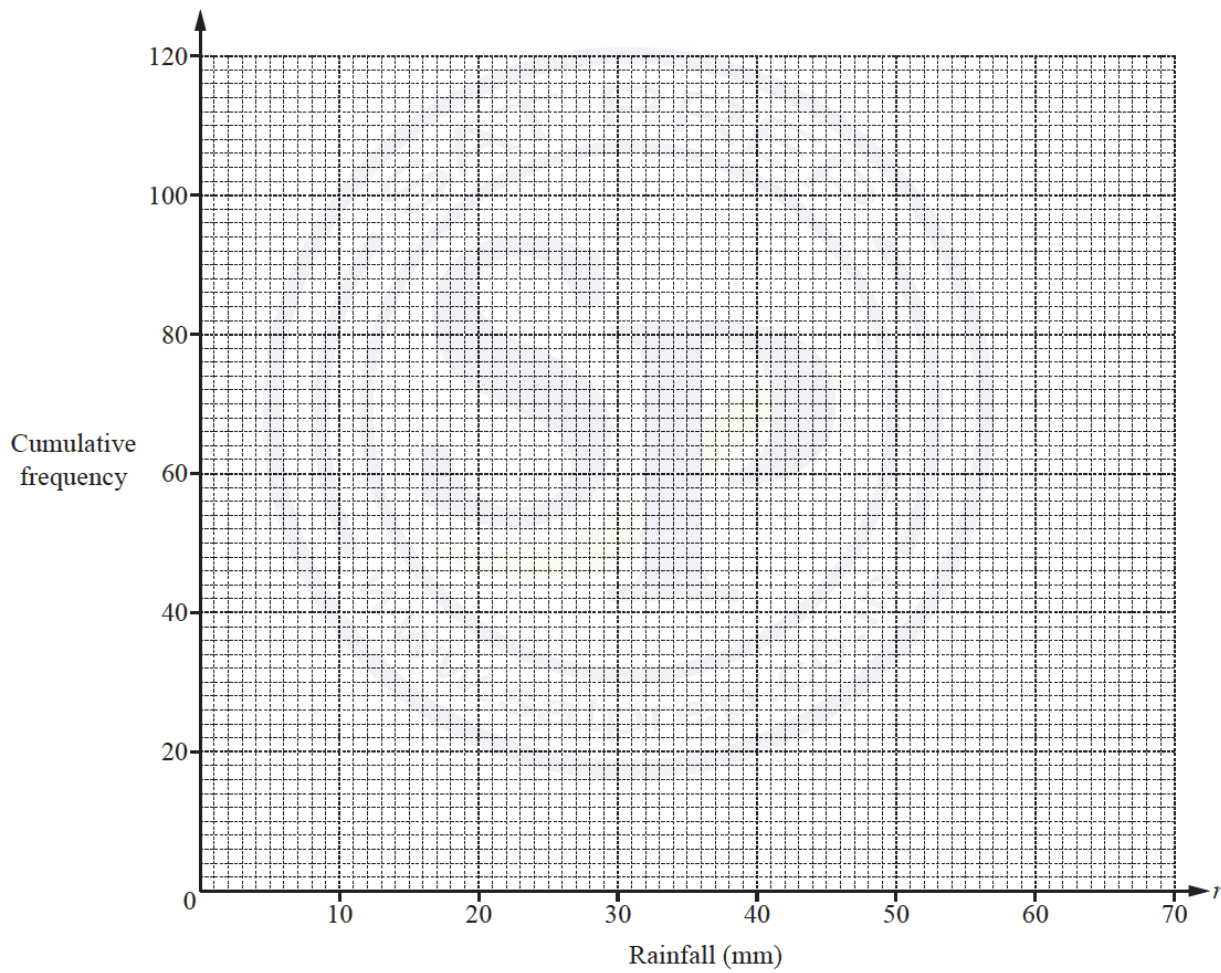
Answer(d)(ii) [3]

Question 16

Leo measured the rainfall each day, in millimetres, for 120 days.
The cumulative frequency table shows the results.

Rainfall (r mm)	$r \leq 20$	$r \leq 25$	$r \leq 35$	$r \leq 40$	$r \leq 60$	$r \leq 70$
Cumulative frequency	5	13	72	90	117	120

(a) On the grid below, draw a cumulative frequency diagram to show these results.



Continue on the next page..

[3]

(b) (i) Find the median.

Answer(b)(i)mm [1]

(ii) Use your diagram to find the number of days when the rainfall was more than 50 mm.

Answer(b)(ii) [2]

(c) Use the information in the cumulative frequency table to complete the frequency table below.

Rainfall (r mm)	$0 < r \leq 20$	$20 < r \leq 25$	$25 < r \leq 35$	$35 < r \leq 40$	$40 < r \leq 60$	$60 < r \leq 70$
Frequency	5		59			3

[2]

(d) Use your frequency table to calculate an estimate of the mean.
You must show all your working.

Answer(d)mm [4]

(e) In a histogram drawn to show the information in the table in **part (c)**, the frequency density for the interval $25 < r \leq 35$ is 5.9 .

Calculate the frequency density for the intervals $20 < r \leq 25$, $40 < r \leq 60$ and $60 < r \leq 70$.

Answer(e) $20 < r \leq 25$

$40 < r \leq 60$

$60 < r \leq 70$ [4]

Question 17

6 120 students take a mathematics examination.

(a) The time taken, m minutes, for each student to answer question 1 is shown in this table.

Time (m minutes)	$0 < m \leq 1$	$1 < m \leq 2$	$2 < m \leq 3$	$3 < m \leq 4$	$4 < m \leq 5$	$5 < m \leq 6$
Frequency	72	21	9	11	5	2

Calculate an estimate of the mean time taken.

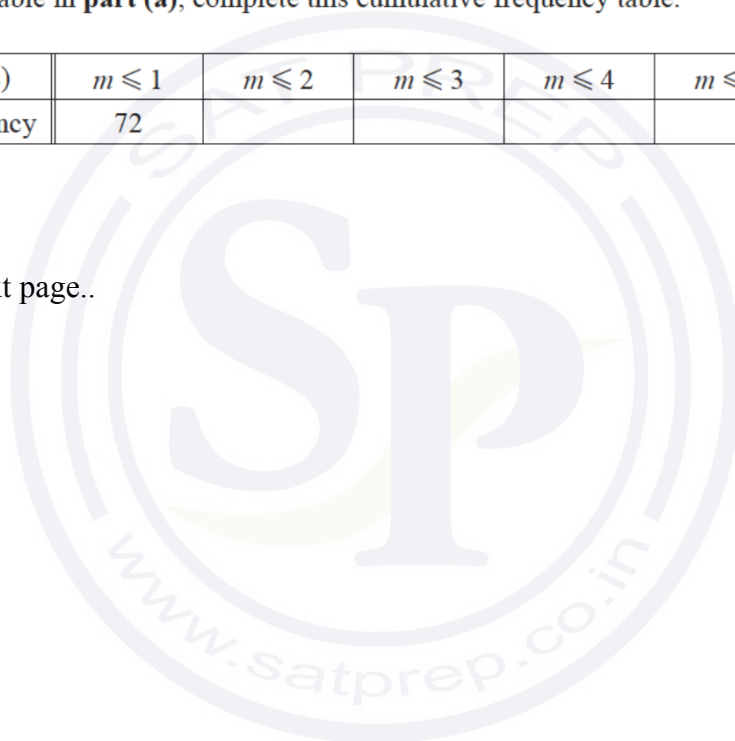
Answer(a)min [4]

(b) (i) Using the table in part (a), complete this cumulative frequency table.

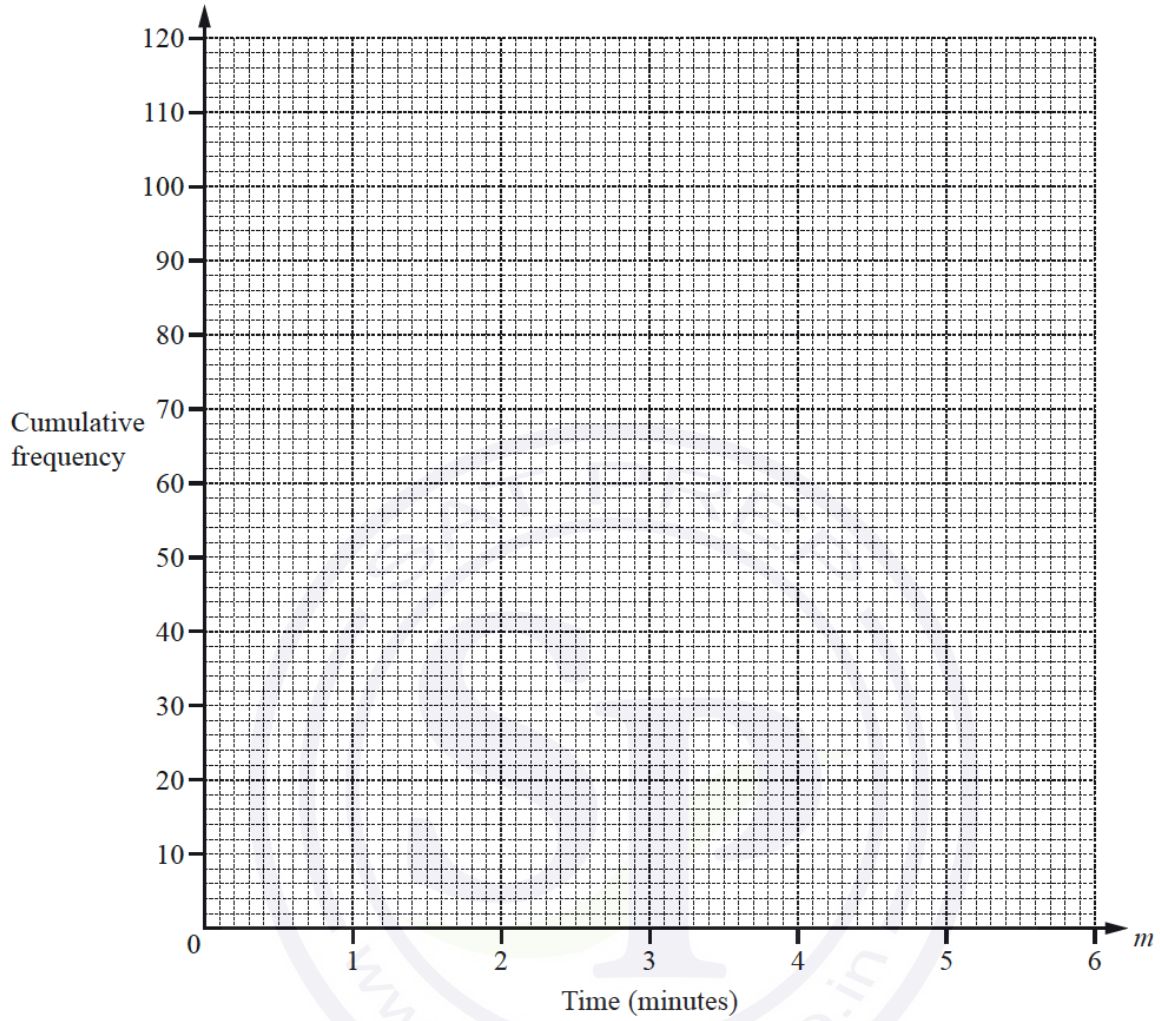
Time (m minutes)	$m \leq 1$	$m \leq 2$	$m \leq 3$	$m \leq 4$	$m \leq 5$	$m \leq 6$
Cumulative frequency	72					120

[2]

Continue on the next page..



(ii) Draw a cumulative frequency diagram to show the time taken.



[3]

(iii) Use your cumulative frequency diagram to find

(a) the median,

Answer(b)(iii)(a) min [1]

(b) the inter-quartile range,

Answer(b)(iii)(b) min [2]

(c) the 35th percentile.

Answer(b)(iii)(c) min [2]

Continue on the next page..

(c) A new frequency table is made from the table shown in part (a).

Time (m minutes)	$0 < m \leq 1$	$1 < m \leq 3$	$3 < m \leq 6$
Frequency	72		

(i) Complete the table above. [2]

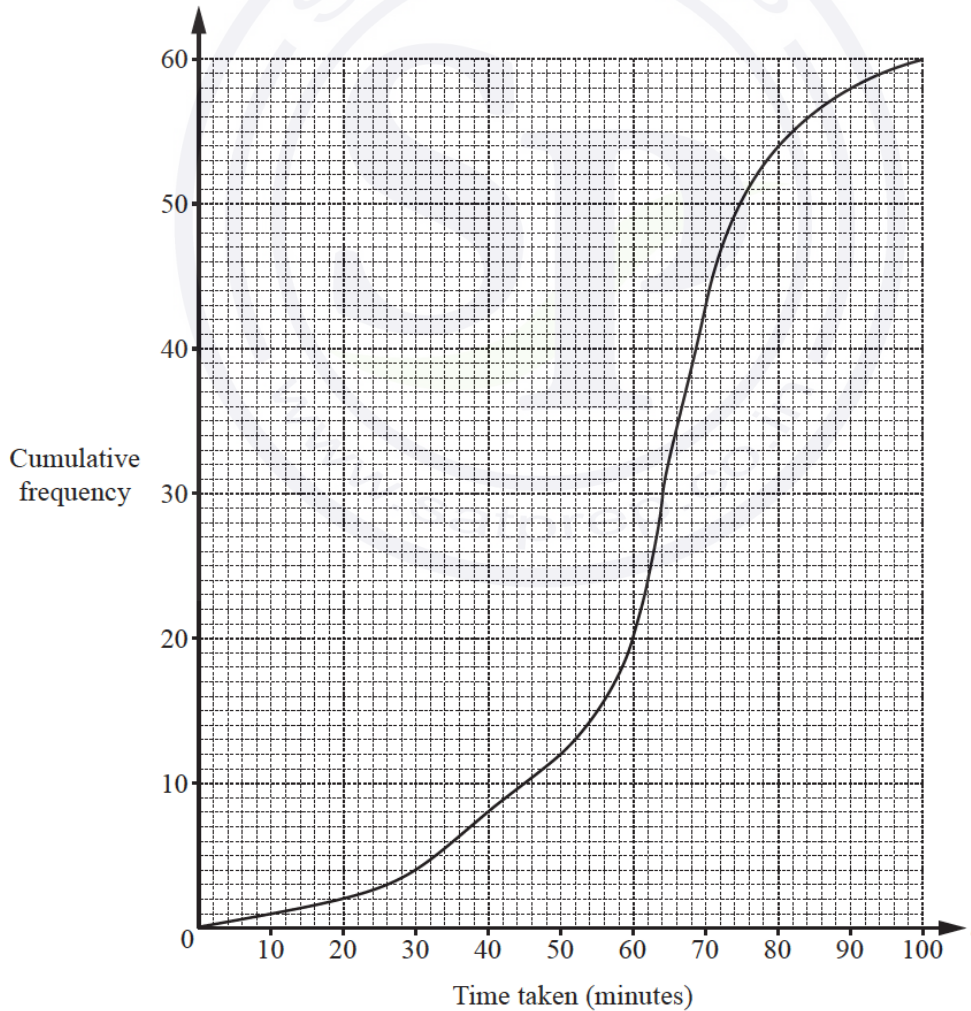
(ii) A histogram was drawn and the height of the first block representing the time $0 < m \leq 1$ was 3.6 cm.

Calculate the heights of the other two blocks.

Answer(c)(ii) cm and cm [3]

Question 18

The cumulative frequency diagram shows information about the time taken, t minutes, by 60 students to complete a test.



Continue on the next page..

(a) Find

(i) the median,

..... min [1]

(ii) the inter-quartile range,

..... min [2]

(iii) the 40th percentile,

..... min [2]

(iv) the number of students who took more than 80 minutes to complete the test.

..... [2]

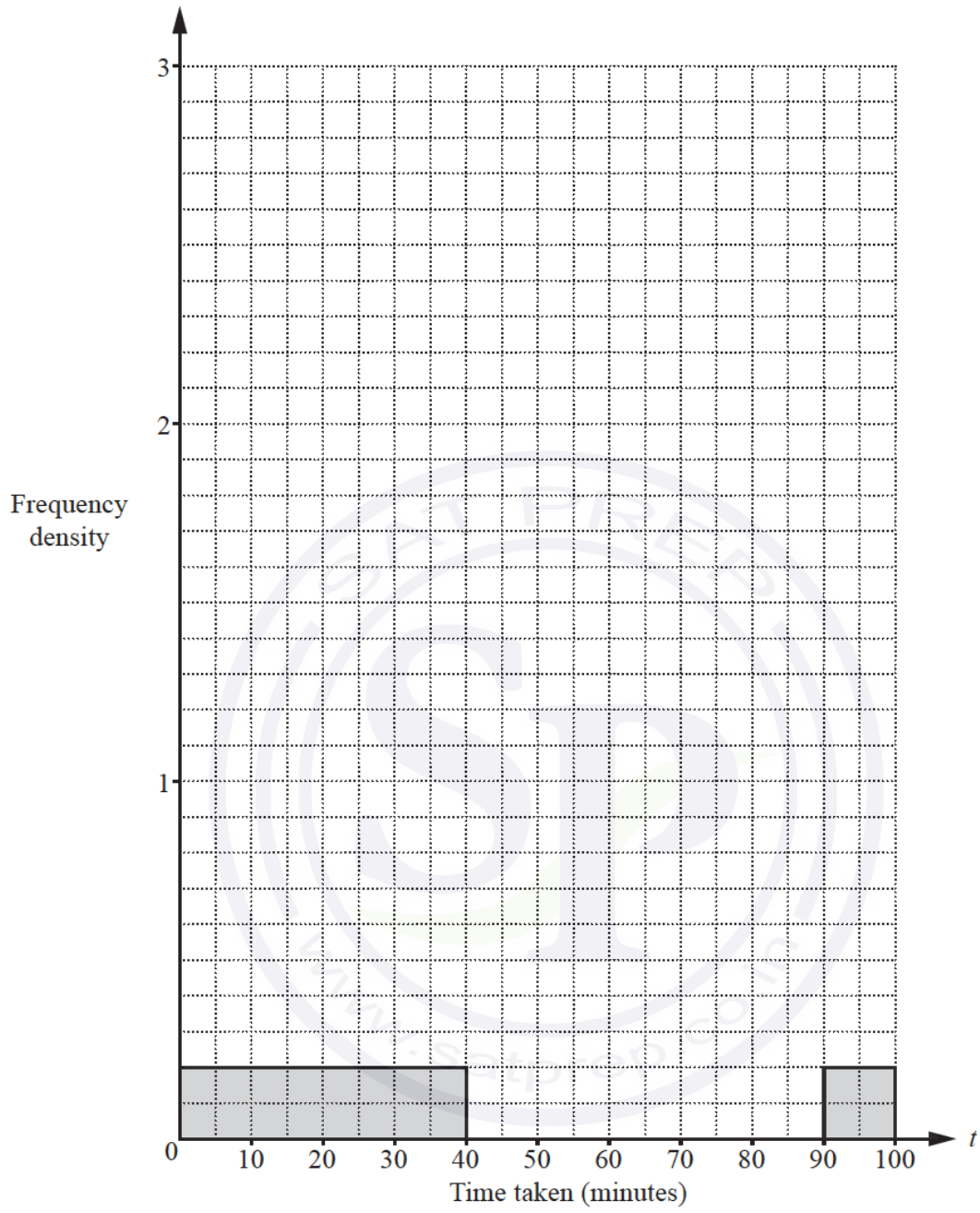
(b) Use the cumulative frequency diagram to complete the frequency table below.

Time taken (t minutes)	$0 < t \leq 40$	$40 < t \leq 60$	$60 < t \leq 70$	$70 < t \leq 80$	$80 < t \leq 90$	$90 < t \leq 100$
Frequency	8				4	

[3]

(c) On the grid below, complete the histogram to show the information in the table in part (b).

Continue on the next page..



[4]

Question 19

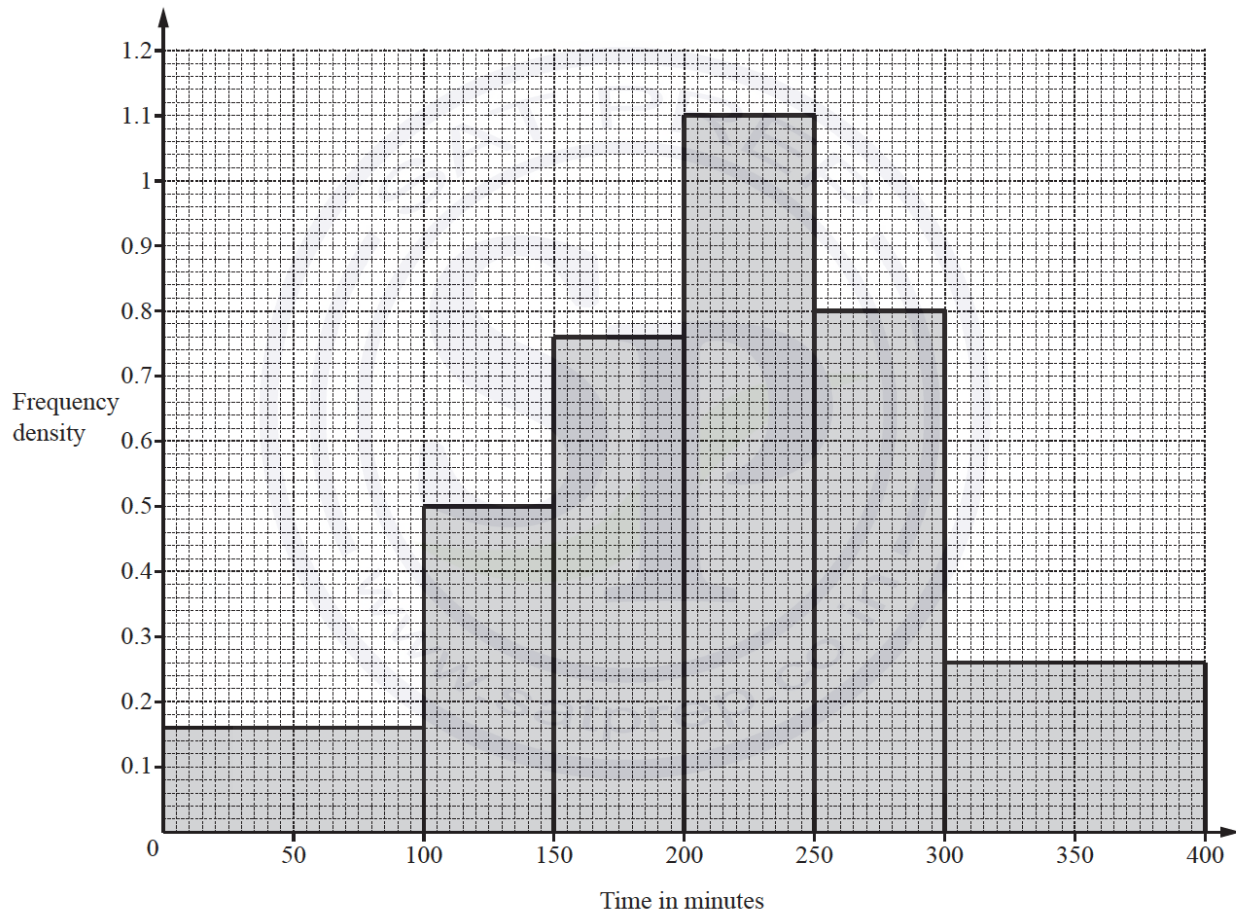
The table shows the amount of money, \$ a , received for parking each day for 200 days.

Amount (\$ a)	$200 < a \leq 250$	$250 < a \leq 300$	$300 < a \leq 350$	$350 < a \leq 400$	$400 < a \leq 450$	$450 < a \leq 500$
Frequency	13	19	27	56	62	23

Calculate an estimate of the mean amount of money received each day.

\$..... [4]

(d) The histogram shows the length of time that 200 cars were parked.



(i) Calculate the number of cars that were parked for 100 minutes or less.

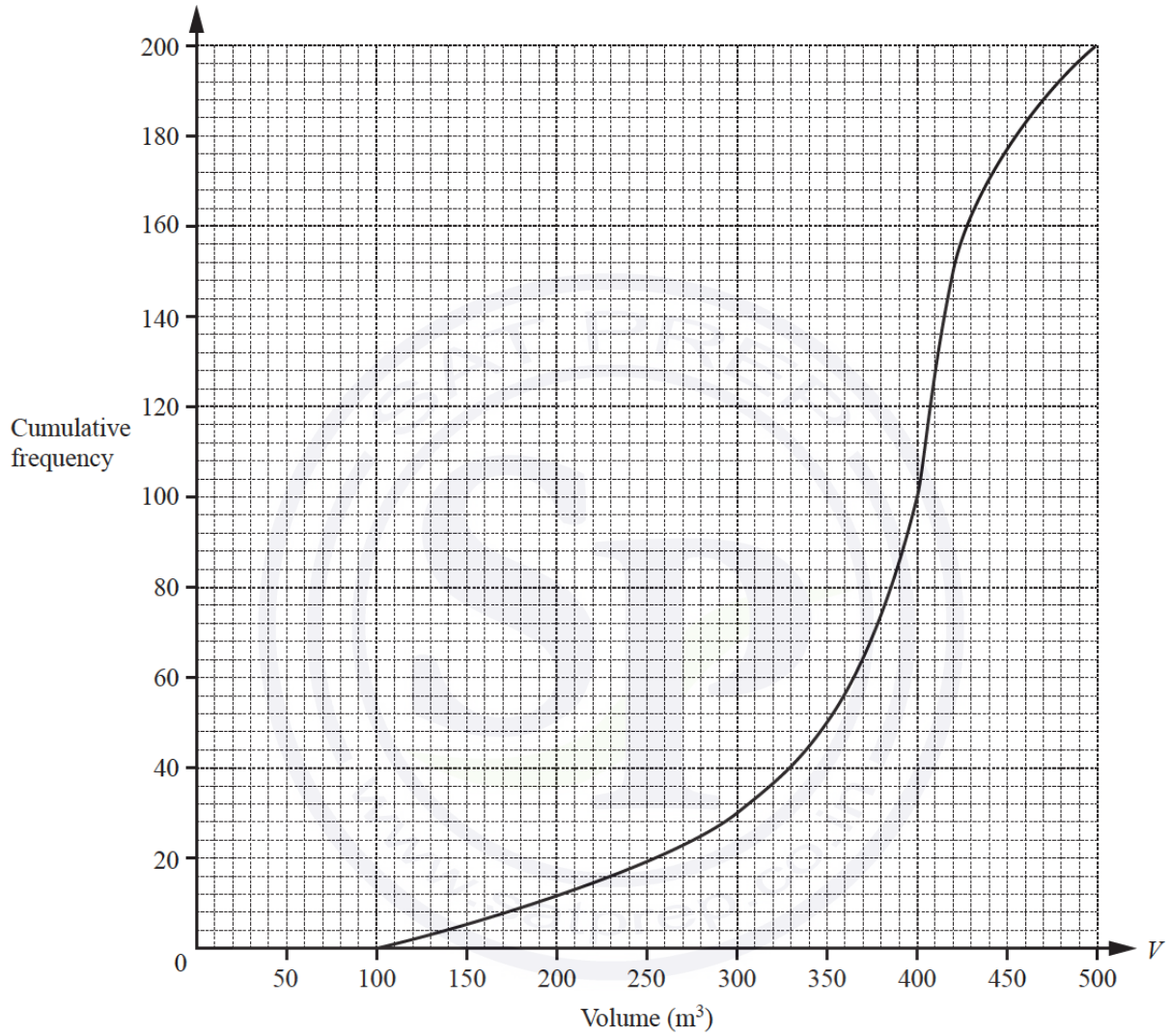
..... [1]

(ii) Calculate the percentage of cars that were parked for more than 250 minutes.

.....% [2]

Question 20

- 3 (a) 200 students estimate the volume, V m³, of a classroom. The cumulative frequency diagram shows their results.



Continue on the next page..

Find

(i) the median,

..... m^3 [1]

(ii) the lower quartile,

..... m^3 [1]

(iii) the inter-quartile range,

..... m^3 [1]

(iv) the number of students who estimate that the volume is greater than 300m^3 .

..... [2]

(b) The 200 students also estimate the total area, $A\text{m}^2$, of the windows in the classroom.
The results are shown in the table.

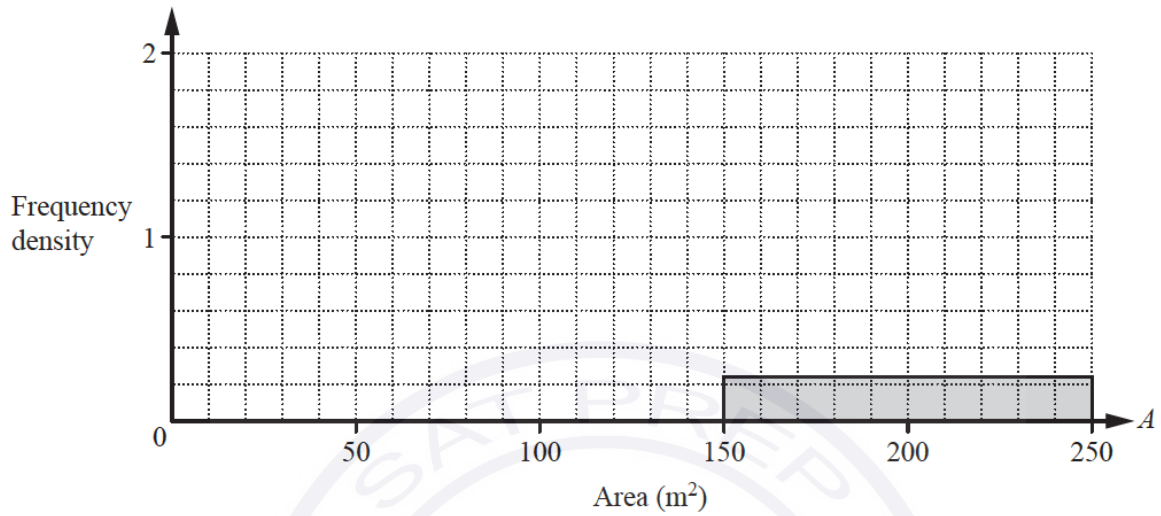
Area ($A\text{m}^2$)	$20 < A \leq 60$	$60 < A \leq 100$	$100 < A \leq 150$	$150 < A \leq 250$
Frequency	32	64	80	24

(i) Calculate an estimate of the mean.
Show all your working.

Continue on the next page..

..... m² [4]

(ii) Complete the histogram to show the information in the table.



[4]

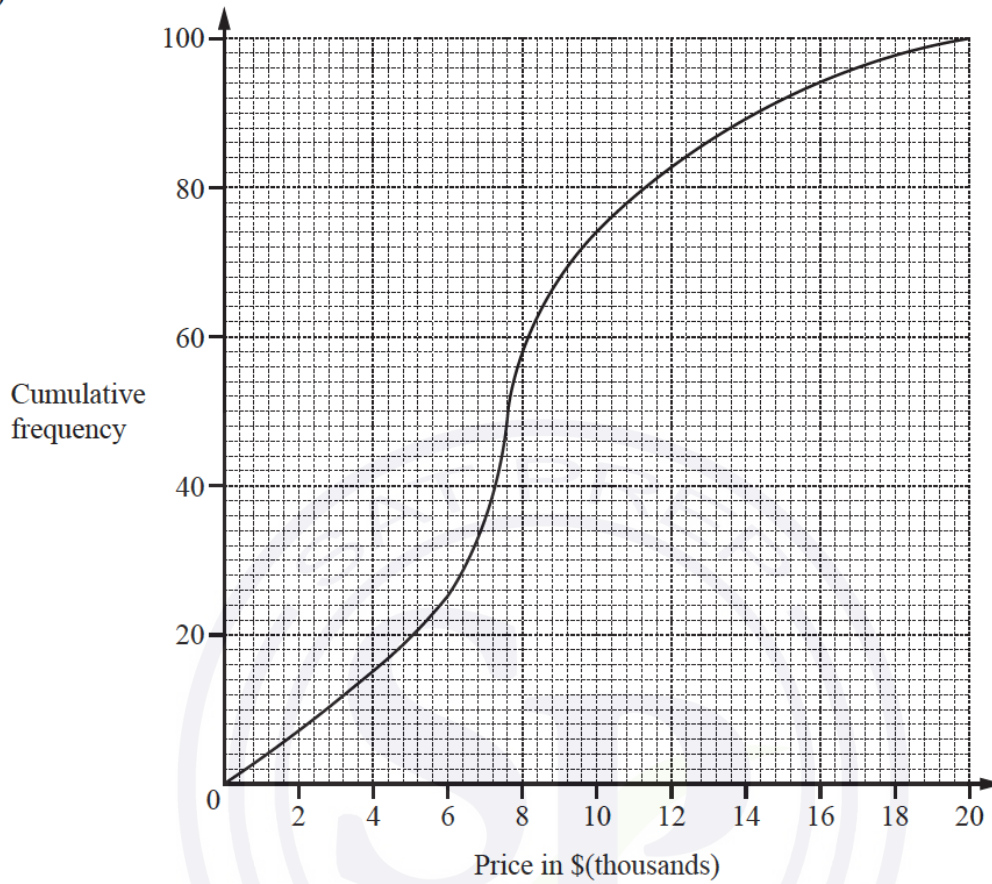
(iii) Two of the 200 students are chosen at random.

Find the probability that they both estimate that the area is greater than 100m².

..... [2]

Question 21

(a) (i)



The cumulative frequency diagram shows information about the prices of 100 cars on Website A. Use the information to complete this table.

Lower quartile	Median	Upper quartile	Inter-quartile range
\$	\$7600	\$	\$

[2]

(ii) This table shows information about the prices of cars on Website B.

Lower quartile	Median	Upper quartile	Inter-quartile range
\$7600	\$10 800	\$13 600	\$6000

Continue on the next page..

Here are two statements comparing the distributions of the prices of cars on Website A and Website B.

- (a) The prices of cars on Website A are lower than the prices of cars on Website B.

..... because

..... [1]

- (b) A greater percentage of cars have a price more than \$13 600 on Website A compared to Website B.

..... because

..... [1]

- (b) The table shows the prices of cars on Website B.

Price (\$ P)	Number of cars
$0 < P \leq 6\,000$	9
$6\,000 < P \leq 8\,000$	29
$8\,000 < P \leq 10\,000$	20
$10\,000 < P \leq 12\,000$	14
$12\,000 < P \leq 14\,000$	21
$14\,000 < P \leq 22\,000$	27

Calculate an estimate of the mean price of the 120 cars.

\$..... [4]

- (c) The price of a car is \$8760.

Bryan pays a deposit of 25% of this price and then 24 equal monthly payments.

After 24 months, he will have paid a total of \$9948.

Calculate the cost of one monthly payment.

\$..... [3]

Question 22

200 people run 10 km.

The table shows some information about the times, t minutes, taken to run the 10 km.

Time (t minutes)	$30 < t \leq 40$	$40 < t \leq 45$	$45 < t \leq 50$	$50 < t \leq 55$	$55 < t \leq 60$	$60 < t \leq 80$
Frequency	8	22	95	55	14	6

(a) Howard takes 40 minutes to run the 10 km.

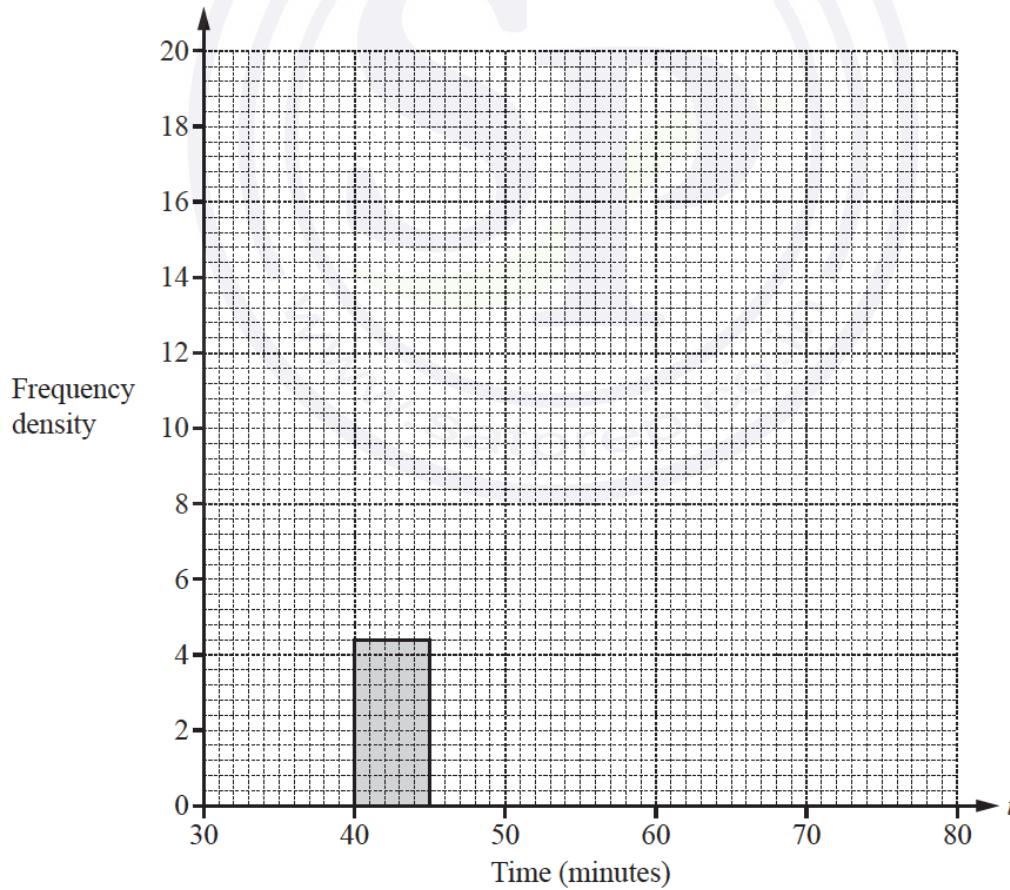
Calculate his average speed in kilometres per hour.

..... km/h [2]

(b) Calculate an estimate of the mean time.

..... min [4]

(c) Complete the histogram to show the information in the table.



[4]

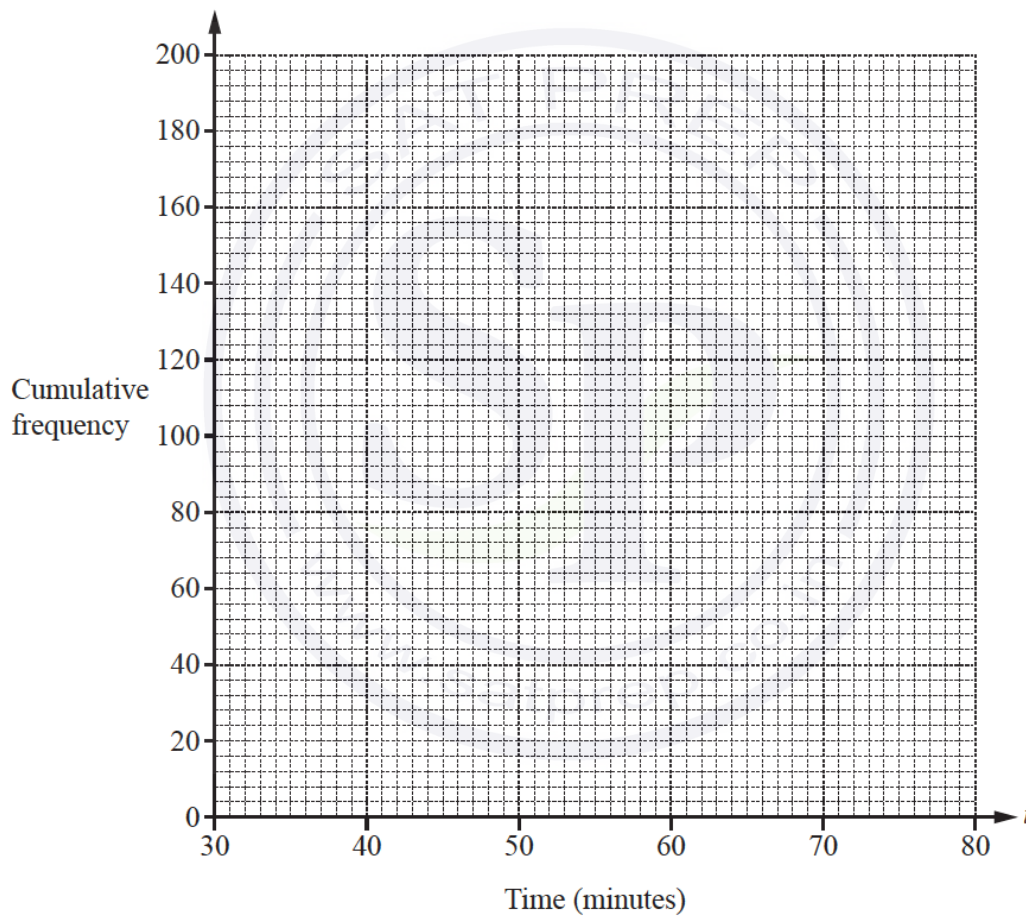
Continue on the next page..

(d) (i) Use the frequency table opposite to complete the cumulative frequency table.

Time (t minutes)	$t \leq 40$	$t \leq 45$	$t \leq 50$	$t \leq 55$	$t \leq 60$	$t \leq 80$
Cumulative frequency	8	30			194	200

[1]

(ii) Draw a cumulative frequency diagram to show the information in the table above.



[3]

Continue on the next page..

(iii) Use your diagram to find

(a) the median,

..... min [1]

(b) the 90th percentile,

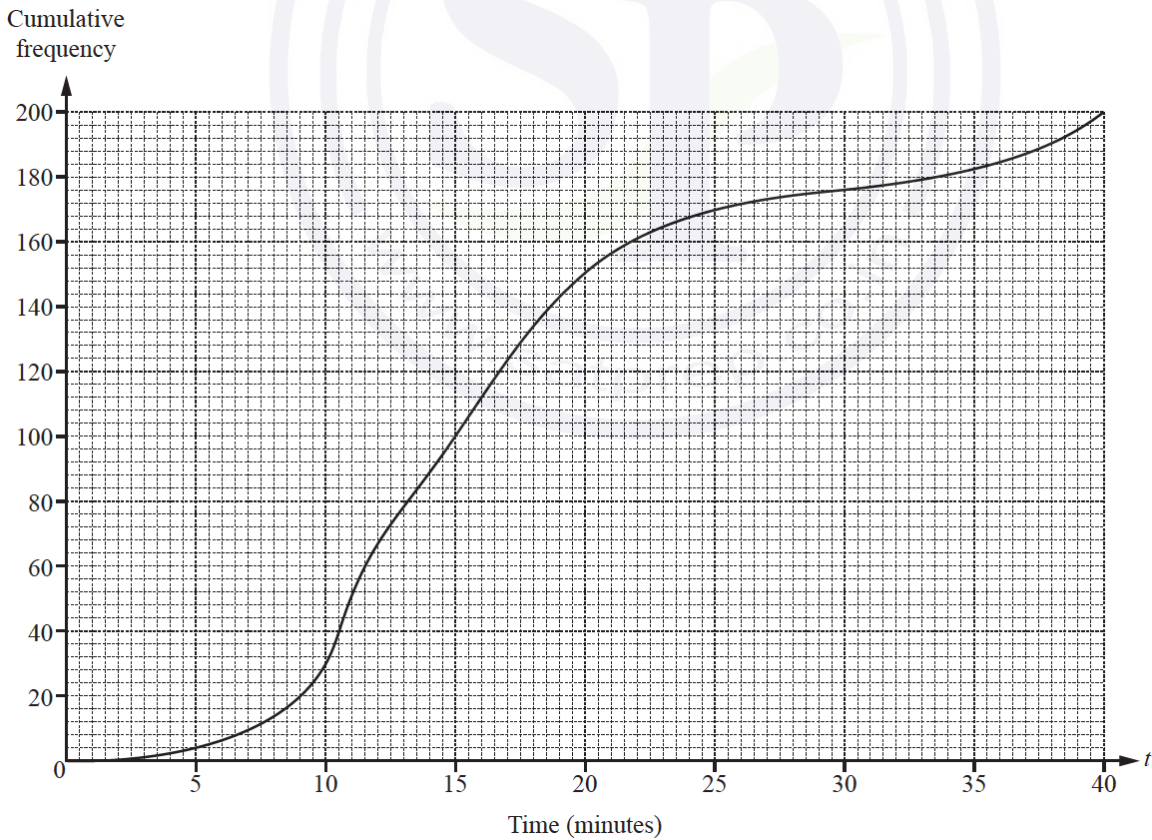
..... min [1]

(c) the number of people who took more than 58 minutes to run the 10 km.

..... [2]

Question 23

(a) 200 students record the time, t minutes, for their journey from home to school.
The cumulative frequency diagram shows the results.



Continue on the next page..

Find

(i) the median,

..... min [1]

(ii) the lower quartile,

..... min [1]

(iii) the inter-quartile range,

..... min [1]

(iv) the 15th percentile,

..... min [1]

(v) the number of students whose journey time was more than 30 minutes.

..... [2]

(b) The 200 students record the time, t minutes, for their journey from school to home.
The frequency table shows the results.

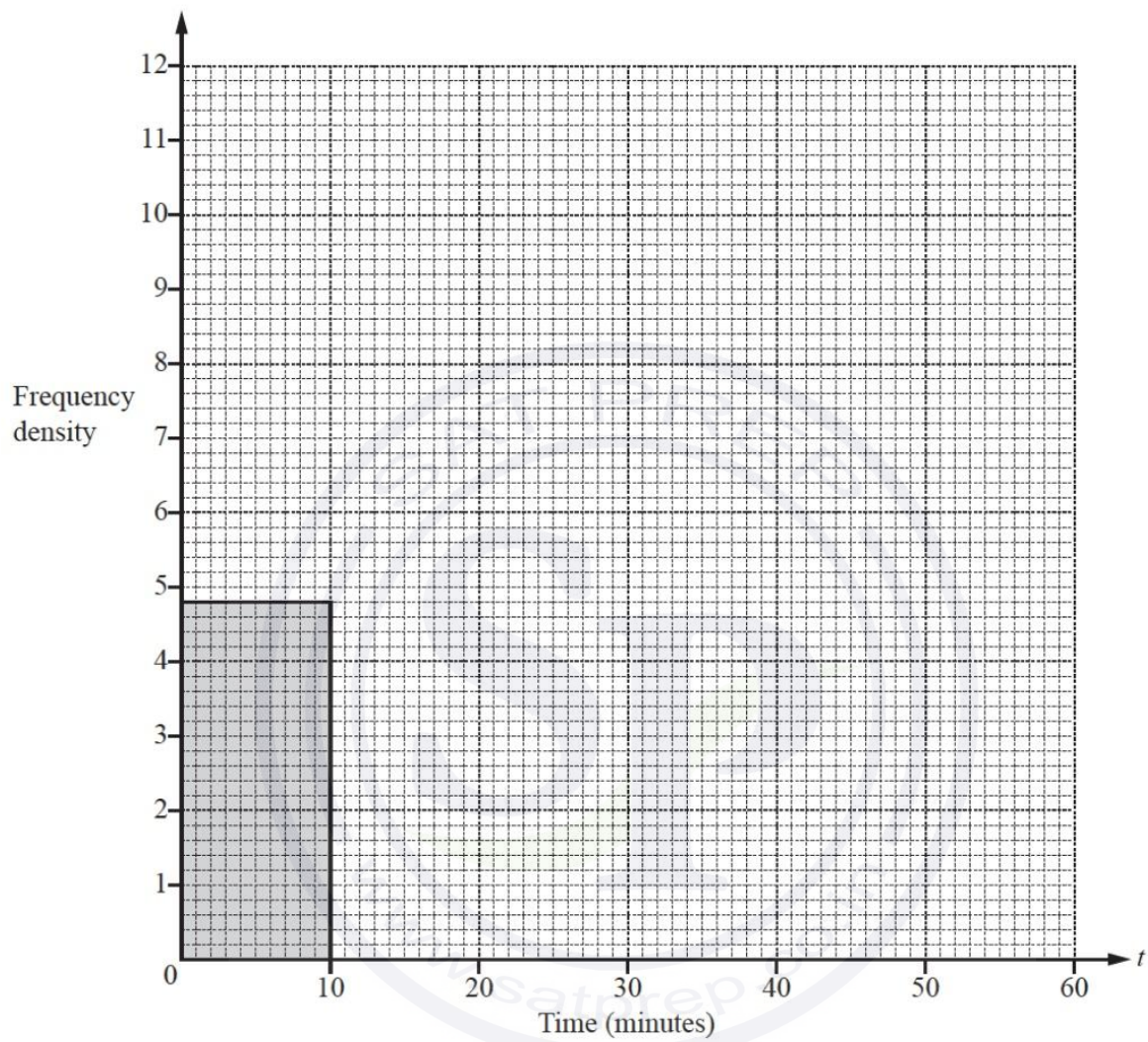
Time (t minutes)	$0 < t \leq 10$	$10 < t \leq 15$	$15 < t \leq 20$	$20 < t \leq 30$	$30 < t \leq 60$
Frequency	48	48	60	26	18

(i) Calculate an estimate of the mean.

..... min [4]

Continue on the next page..

(ii) On the grid, complete the histogram to show the information in the frequency table.



[4]

Question 24

The table shows information about the time taken by 400 people to complete a race.

Time taken (m minutes)	$45 < m \leq 50$	$50 < m \leq 60$	$60 < m \leq 70$	$70 < m \leq 90$	$90 < m \leq 100$	$100 < m \leq 120$
Frequency	23	64	122	136	26	29

(a) Calculate an estimate of the mean time taken.

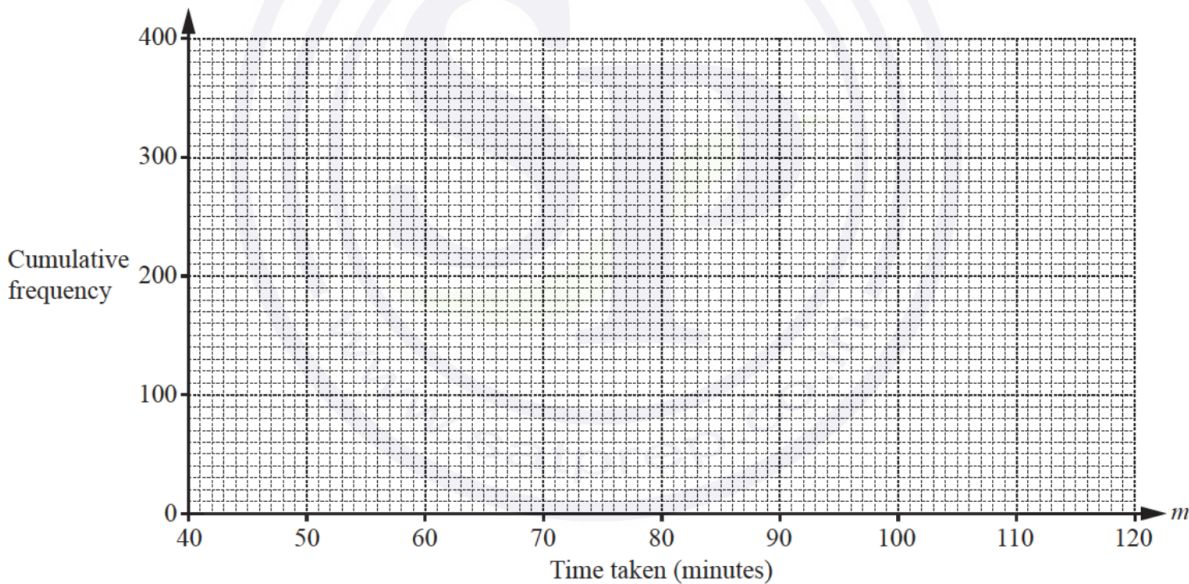
..... min [4]

(b) (i) Complete the cumulative frequency table.

Time taken (m minutes)	$m \leq 50$	$m \leq 60$	$m \leq 70$	$m \leq 90$	$m \leq 100$	$m \leq 120$
Cumulative frequency	23					400

[2]

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



(iii) Use your diagram to estimate

(a) the median,

..... min [1]

(b) the inter-quartile range,

..... min [2]

(c) the 60th percentile.

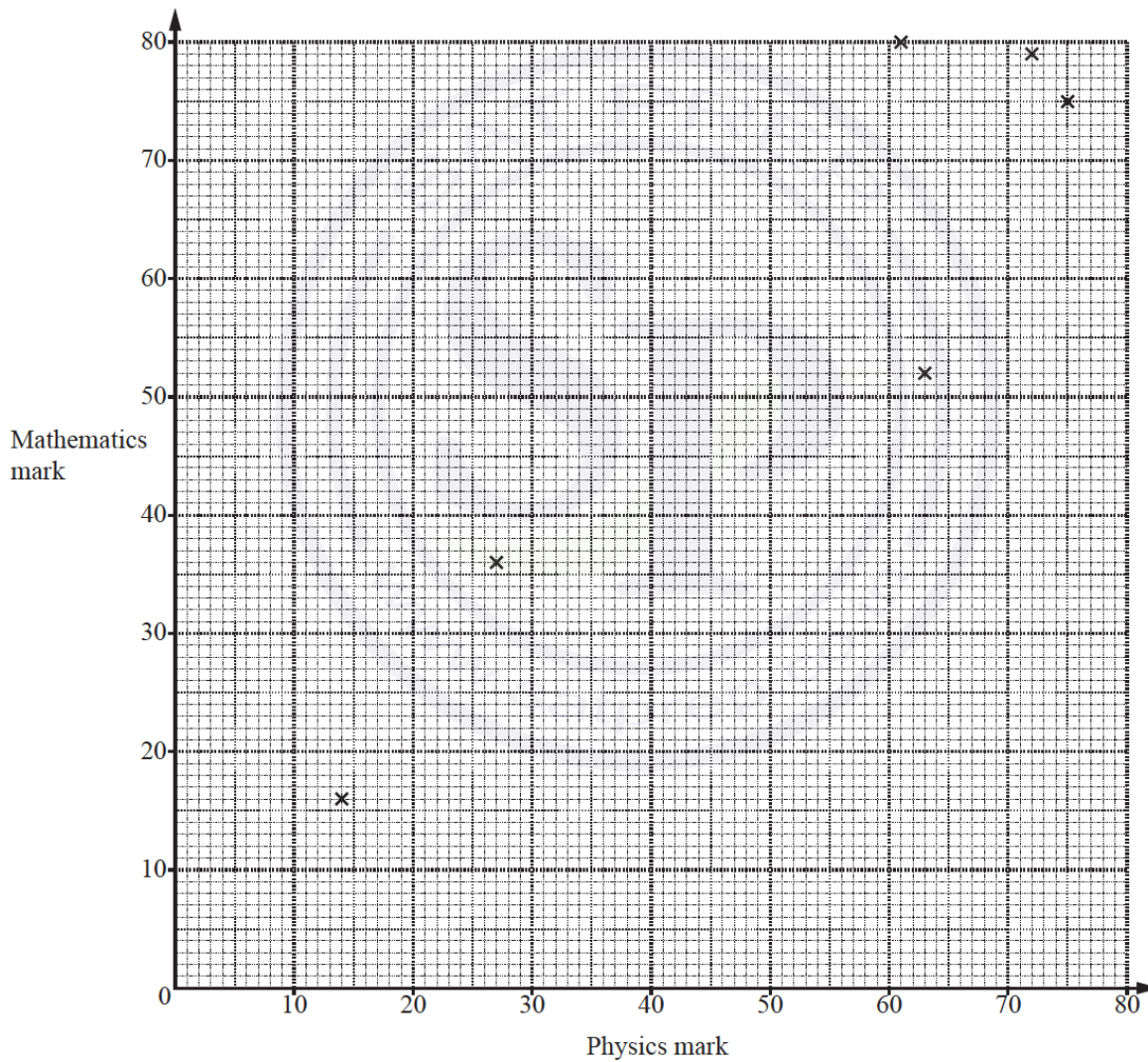
..... min [2]

Question 25

(a) The table shows the marks gained by 10 students in their physics test and their mathematics test.

Physics mark	63	61	14	27	72	75	44	40	28	50
Mathematics mark	52	80	16	36	79	75	51	35	24	63

(i) Complete the scatter diagram below.
The first six points have been plotted for you.



Continue on the next page..

[2]

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

..... [1]

(b) The marks of 30 students in a spelling test are shown in the table below.

Mark	0	1	2	3	4	5
Frequency	2	4	5	5	6	8

Find the mean, median, mode and range of these marks.

Mean =

Median =

Mode =

Range = [7]

(c) The table shows the marks gained by some students in their English test.

Mark	52	75	91
Number of students	x	45	11

The mean mark for these students is 70.3 .

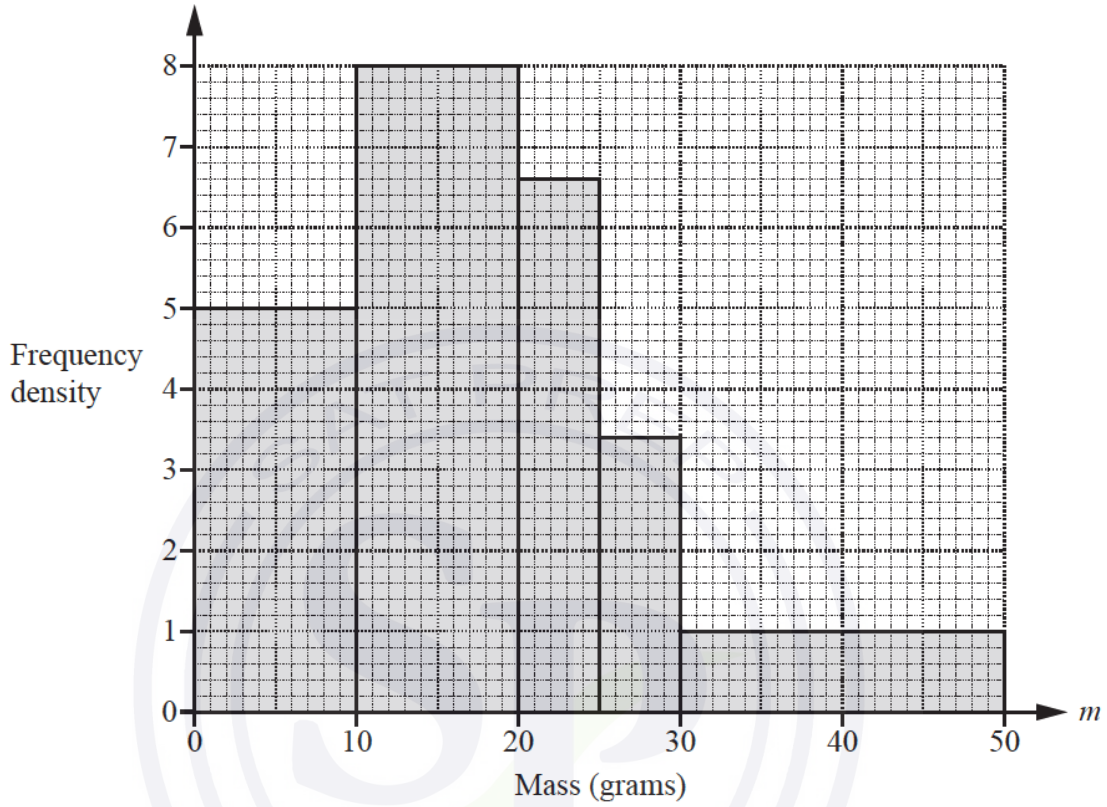
Find the value of x .

x = [3]

Question 26

(a) Haroon has 200 letters to post.

The histogram shows information about the masses, m grams, of the letters.



(i) Complete the frequency table for the 200 letters.

Mass (m grams)	$0 < m \leq 10$	$10 < m \leq 20$	$20 < m \leq 25$	$25 < m \leq 30$	$30 < m \leq 50$
Frequency	50			17	

[3]

(ii) Calculate an estimate of the mean mass.

..... g [4]

Continue on the next page..

- (b) Haroon has 15 parcels to post.
The table shows information about the sizes of these parcels.

Size	Small	Large
Frequency	9	6

Two parcels are selected at random.

Find the probability that

- (i) both parcels are large,

..... [2]

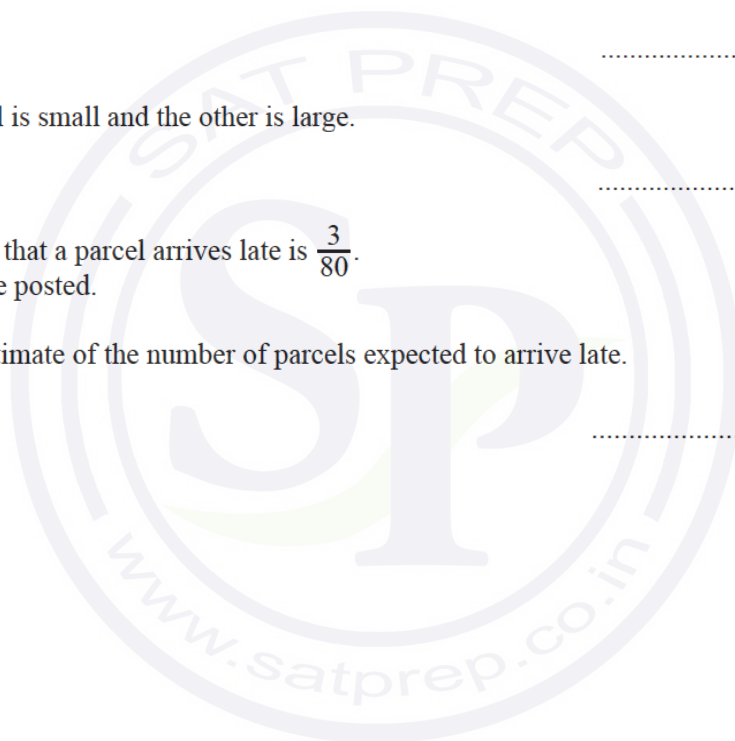
- (ii) one parcel is small and the other is large.

..... [3]

- (c) The probability that a parcel arrives late is $\frac{3}{80}$.
4000 parcels are posted.

Calculate an estimate of the number of parcels expected to arrive late.

..... [1]



Question 27

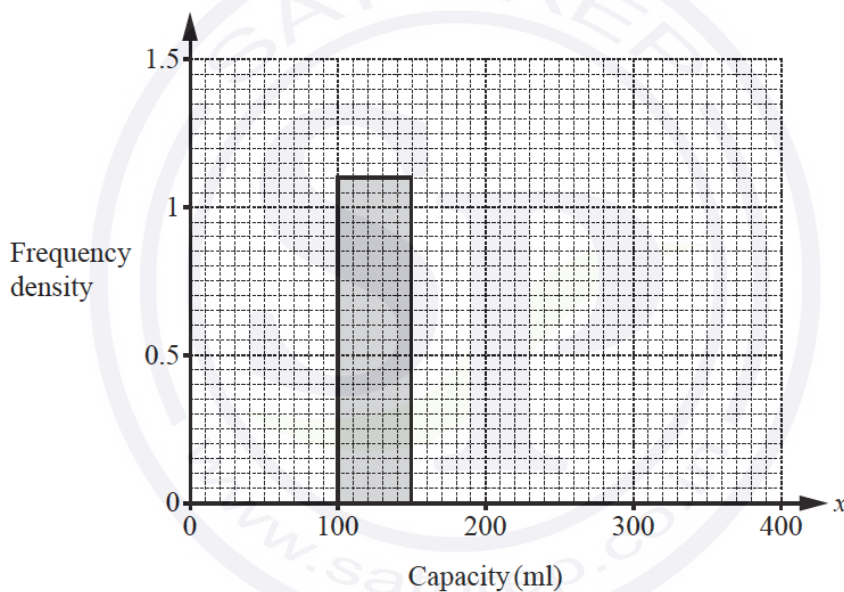
- (a) 200 students estimate the capacity, x millilitres, of a cup.
The results are shown in the frequency table.

Capacity (x ml)	$0 < x \leq 100$	$100 < x \leq 150$	$150 < x \leq 200$	$200 < x \leq 250$	$250 < x \leq 400$
Frequency	20	55	66	35	24

- (i) Calculate an estimate of the mean.

..... ml [4]

- (ii) Complete the histogram.



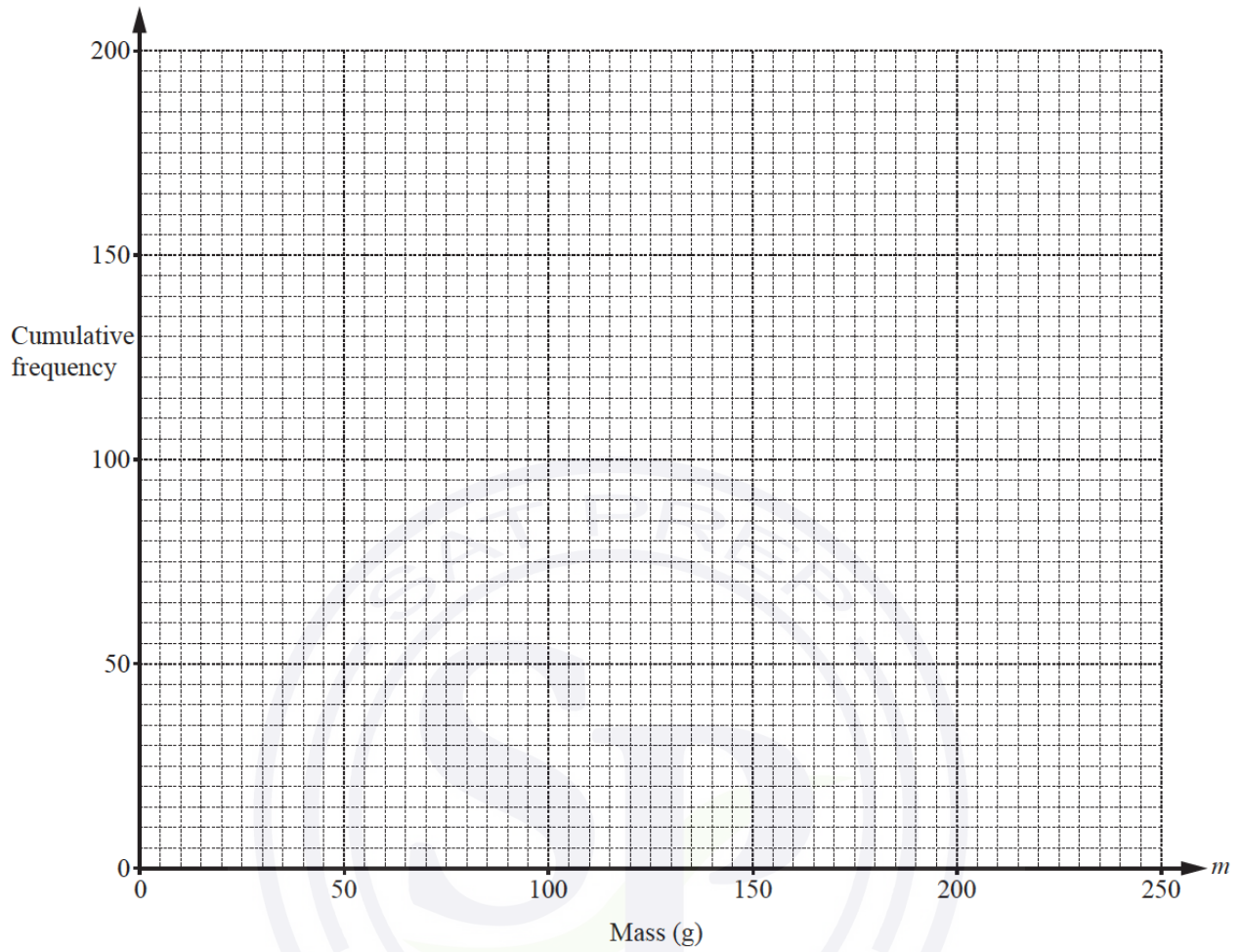
[4]

- (b) The 200 students also estimate the mass, m grams, of a small rock.
The results are shown in the cumulative frequency table.

Mass (m grams)	$m \leq 50$	$m \leq 100$	$m \leq 150$	$m \leq 200$	$m \leq 250$
Cumulative frequency	28	64	104	168	200

- (i) On the grid, draw a cumulative frequency diagram.

Continue on the next page..



(ii) Find

(a) the 65th percentile,

..... g [1]

(b) the number of students who estimated more than 75 g.

..... [2]

Question 28

The time taken for each of 90 cars to complete one lap of a race track is shown in the table.

Time (t seconds)	$70 < t \leq 71$	$71 < t \leq 72$	$72 < t \leq 73$	$73 < t \leq 74$	$74 < t \leq 75$
Frequency	17	24	21	18	10

(a) Write down the modal time interval.

..... $< t \leq$ [1]

(b) Calculate an estimate of the mean time.

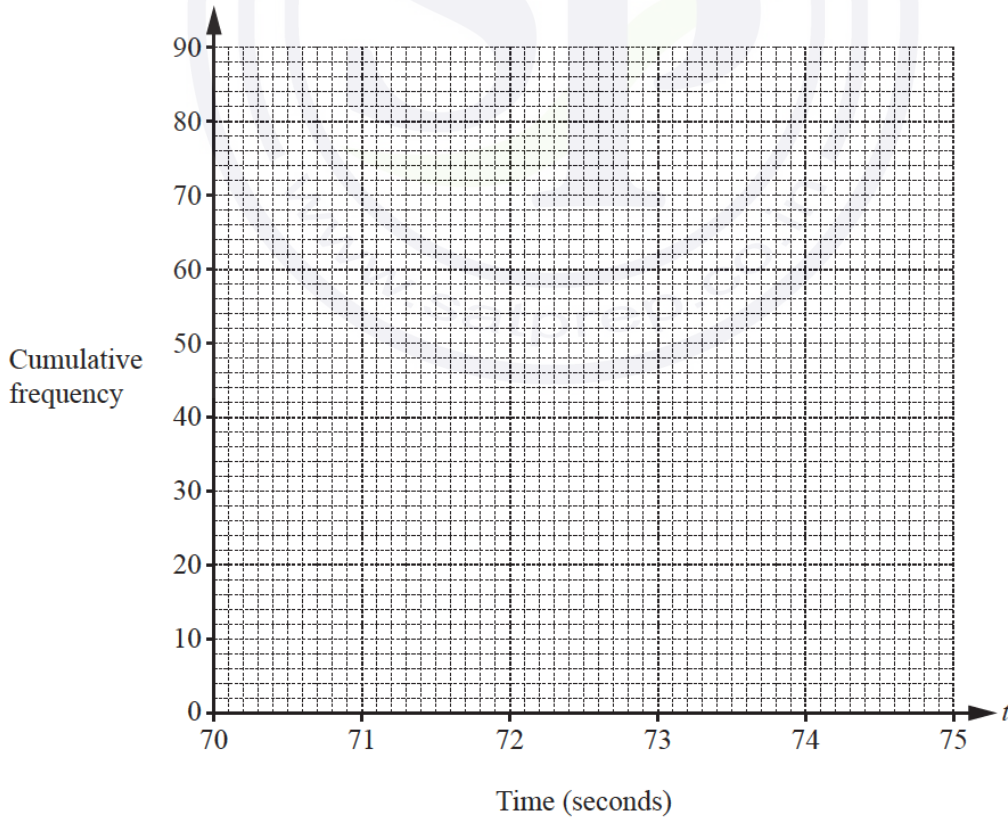
..... s [4]

(c) (i) Complete the cumulative frequency table.

Time (t seconds)	$t \leq 71$	$t \leq 72$	$t \leq 73$	$t \leq 74$	$t \leq 75$
Cumulative frequency	17				

[2]

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



Continue on the next page..

(iii) Find the median time.

..... s [1]

(iv) Find the inter-quartile range.

..... s [2]

(d) One lap of the race track measures 3720 metres, correct to the nearest 10 metres.
A car completed the lap in 75 seconds, correct to the nearest second.

Calculate the upper bound for the average speed of this car.
Give your answer in kilometres per hour.

..... km/h [4]

Question 29

The table shows information about the time, t minutes, taken for each of 150 girls to complete an essay.

Time (t minutes)	$60 < t \leq 65$	$65 < t \leq 70$	$70 < t \leq 80$	$80 < t \leq 100$	$100 < t \leq 150$
Frequency	10	26	34	58	22

(a) Write down the interval that contains the median time.

..... $< t \leq$ [1]

(b) Calculate an estimate of the mean time.

..... min [4]

(c) Rafay looks at the frequency table.

(i) He says that it is not possible to work out the range of the times.

Explain why he is correct.

.....
..... [1]

Continue on the next page..

(ii) He draws a pie chart to show this information.

Calculate the sector angle for the interval $65 < t \leq 70$ minutes.

..... [2]

(d) A girl is chosen at random.

Work out the probability that she took more than 100 minutes to complete the essay.

..... [1]

(e) Two girls are chosen at random.

Work out the probability that, to complete the essay,

(i) they both took 65 minutes or less,

..... [2]

(ii) one took 65 minutes or less and the other took more than 100 minutes.

..... [3]

(f) The information in the frequency table is shown in a histogram.

The height of the block for the $60 < t \leq 65$ interval is 5 cm.

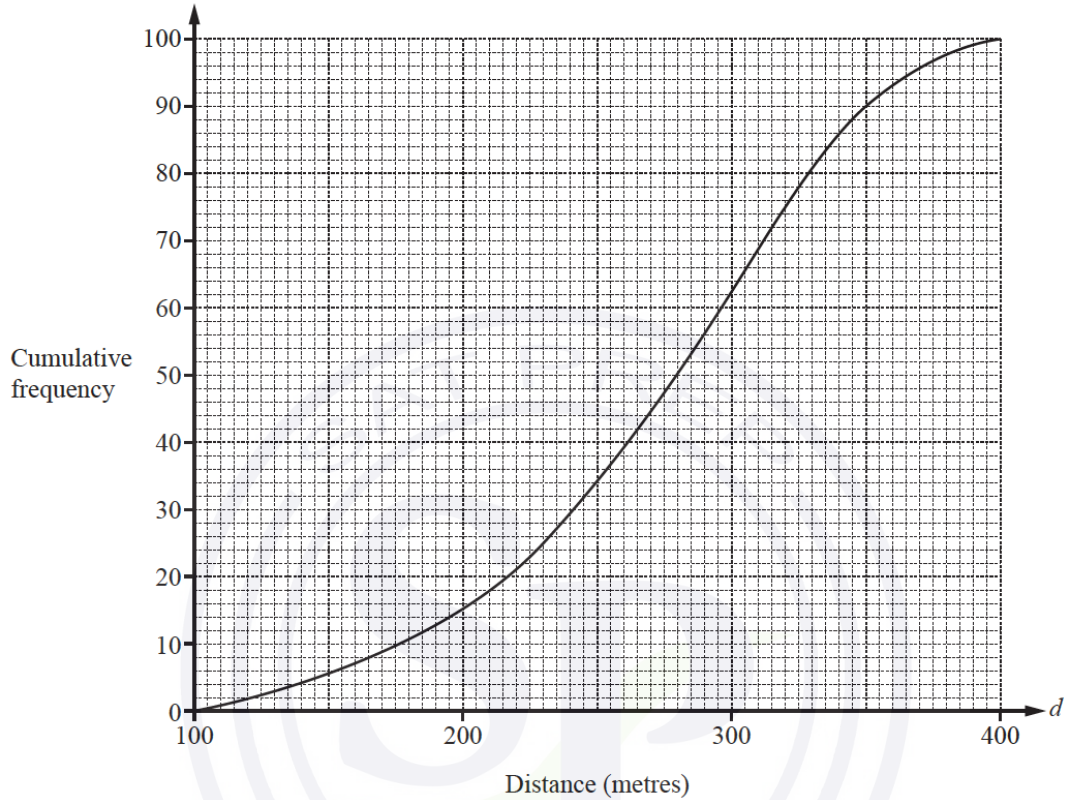
Complete the table.

Time (t minutes)	$60 < t \leq 65$	$65 < t \leq 70$	$70 < t \leq 80$	$80 < t \leq 100$	$100 < t \leq 150$
Height of block (cm)	5				

[3]

Question 30

- (a) There are 100 students in group *A*.
 The teacher records the distance, d metres, each student runs in one minute.
 The results are shown in the cumulative frequency diagram.



Find

- (i) the median,

..... m [1]

- (ii) the upper quartile,

..... m [1]

- (iii) the inter-quartile range,

..... m [1]

- (iv) the number of students who run more than 350 m.

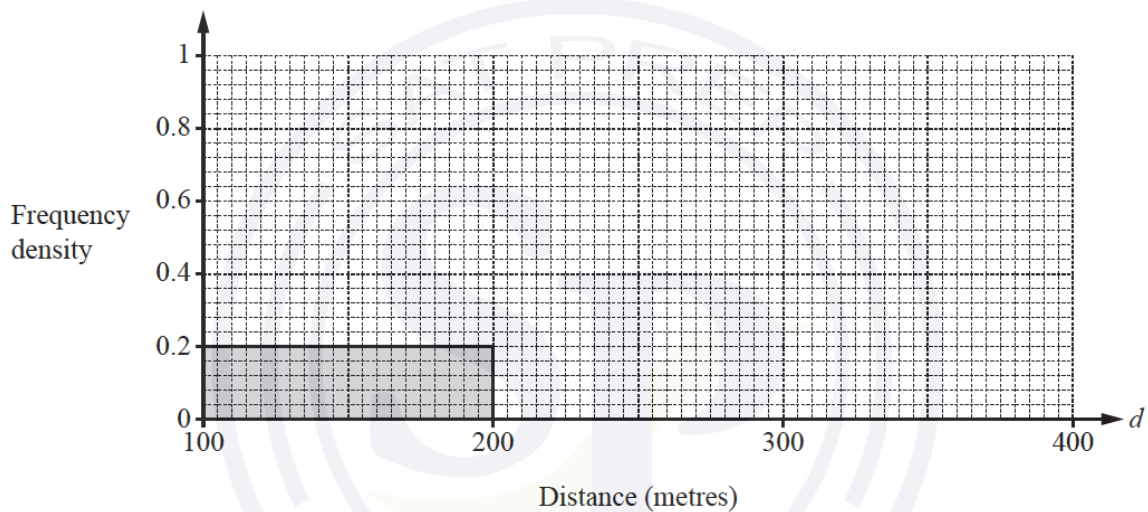
..... [2]

Continue on the next page..

- (b) There are 100 students in group *B*.
 The teacher records the distance, d metres, each of these students runs in one minute.
 The results are shown in the frequency table.

Distance (d metres)	$100 < d \leq 200$	$200 < d \leq 250$	$250 < d \leq 280$	$280 < d \leq 320$	$320 < d \leq 400$
Number of students	20	22	30	16	12

- (i) Calculate an estimate of the mean distance for group *B*.
- (ii) Complete the histogram to show the information in the frequency table.



[4]

- (c) For the 100 students in group *B*, the median is 258 m.

Complete the statement.

On average, the students in group *A* run than the students in group *B*.

[1]

Question 31

7 The frequency table shows information about the time, m minutes, that each of 160 people spend in a library.

Time (m minutes)	$0 < m \leq 10$	$10 < m \leq 40$	$40 < m \leq 60$	$60 < m \leq 90$	$90 < m \leq 100$	$100 < m \leq 120$
Frequency	3	39	43	55	11	9

(a) (i) Find the probability that one of these people, chosen at random, spends more than 100 minutes in the library.

..... [1]

(ii) Calculate an estimate of the mean time spent in the library.

..... min [4]

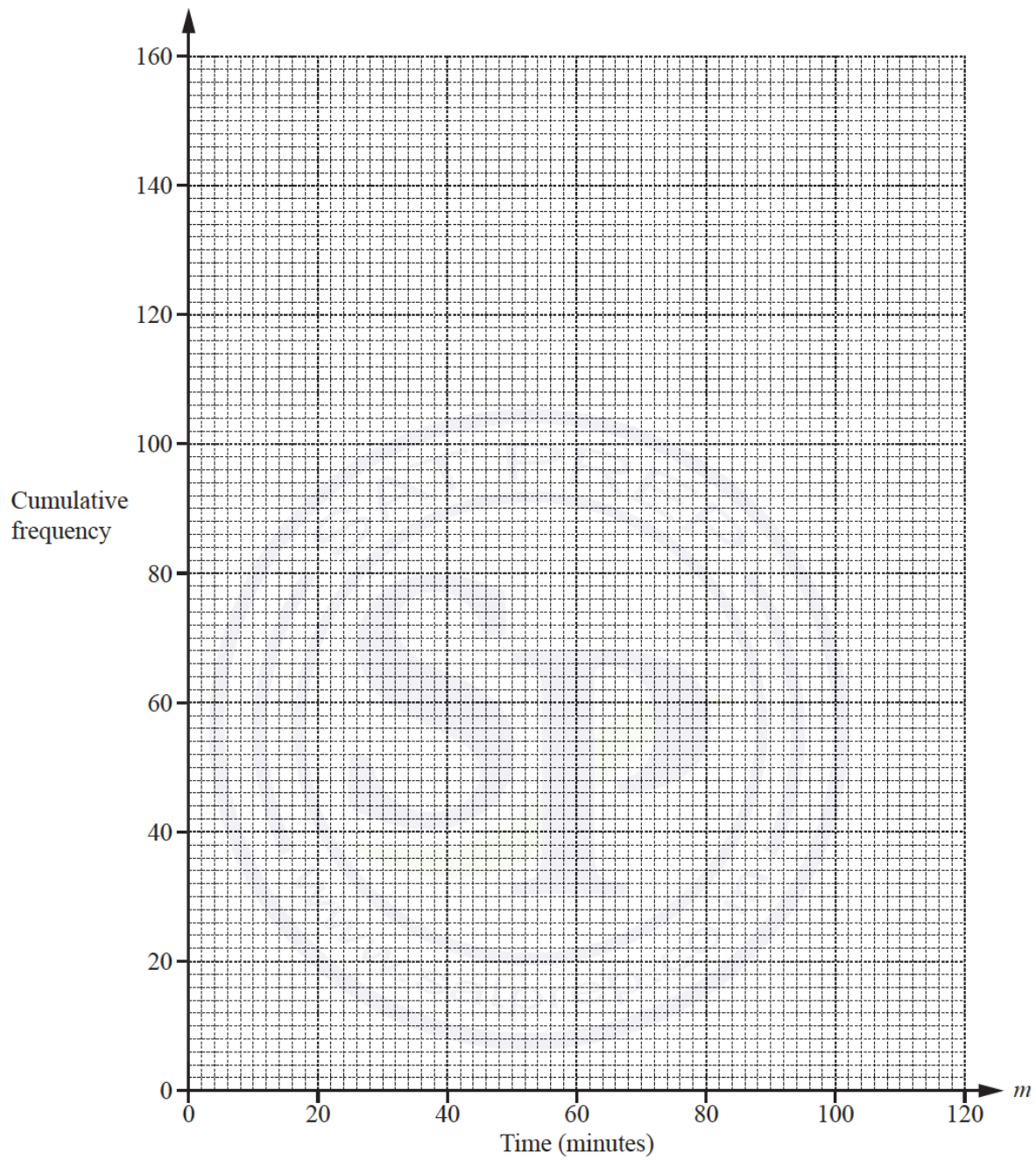
(b) Complete the cumulative frequency table below.

Time (m minutes)	$m \leq 10$	$m \leq 40$	$m \leq 60$	$m \leq 90$	$m \leq 100$	$m \leq 120$
Cumulative frequency	3	42				

[2]

(c) On the grid opposite, draw the cumulative frequency diagram.

Continue on the next page..



[3]

Continue on the next page..

(d) Use your cumulative frequency diagram to find

(i) the median, min [1]

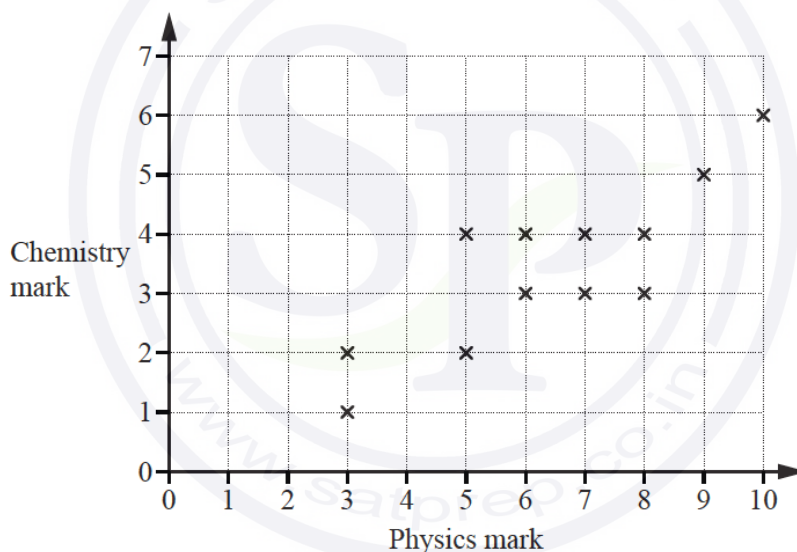
(ii) the interquartile range, min [2]

(iii) the 90th percentile, min [2]

(iv) the number of people who spend more than 30 minutes in the library. [2]

Question 32

(a) The scatter diagram shows the physics mark and the chemistry mark for each of 12 students.



(i) What type of correlation is shown in the scatter diagram? [1]

(ii) On the scatter diagram, draw a line of best fit. [1]

(iii) Find an estimate of the chemistry mark for another student who has a physics mark of 4. [1]

Continue on the next page..

- (b) A teacher records the number of days each of the 24 students in her class are absent. The frequency table shows the results.

Number of days	0	1	2	3	4	5
Frequency	10	8	3	2	0	1

Find the mode, the median and the mean.

Mode =

Median =

Mean = [5]

- (c) Three sizes of eggs are sold in a shop. The table shows the number of eggs of each size sold in one day.

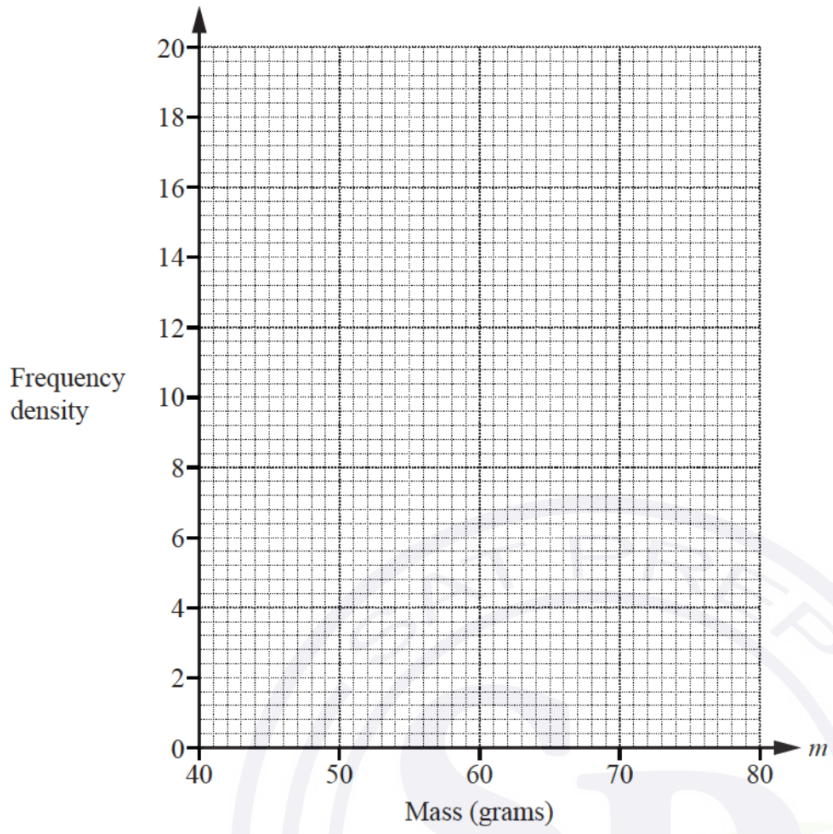
Size	Small	Medium	Large
Mass (m grams)	$46 < m \leq 52$	$52 < m \leq 62$	$62 < m \leq 80$
Number of eggs sold	78	180	162

- (i) Calculate an estimate of the mean mass.

..... g [4]

- (ii) On the grid, draw a histogram to show the information in the table.

Continue on the next page..



..... [4]

Question 33

The time taken for each of 120 students to complete a cooking challenge is shown in the table.

Time (t minutes)	$20 < t \leq 25$	$25 < t \leq 30$	$30 < t \leq 35$	$35 < t \leq 40$	$40 < t \leq 45$
Frequency	44	32	28	12	4

(a) (i) Write down the modal time interval.

..... $< t \leq$ [1]

(ii) Write down the interval containing the median time.

..... $< t \leq$ [1]

(iii) Calculate an estimate of the mean time.

..... min [4]

Continue on the next page..

(iv) A student is chosen at random.

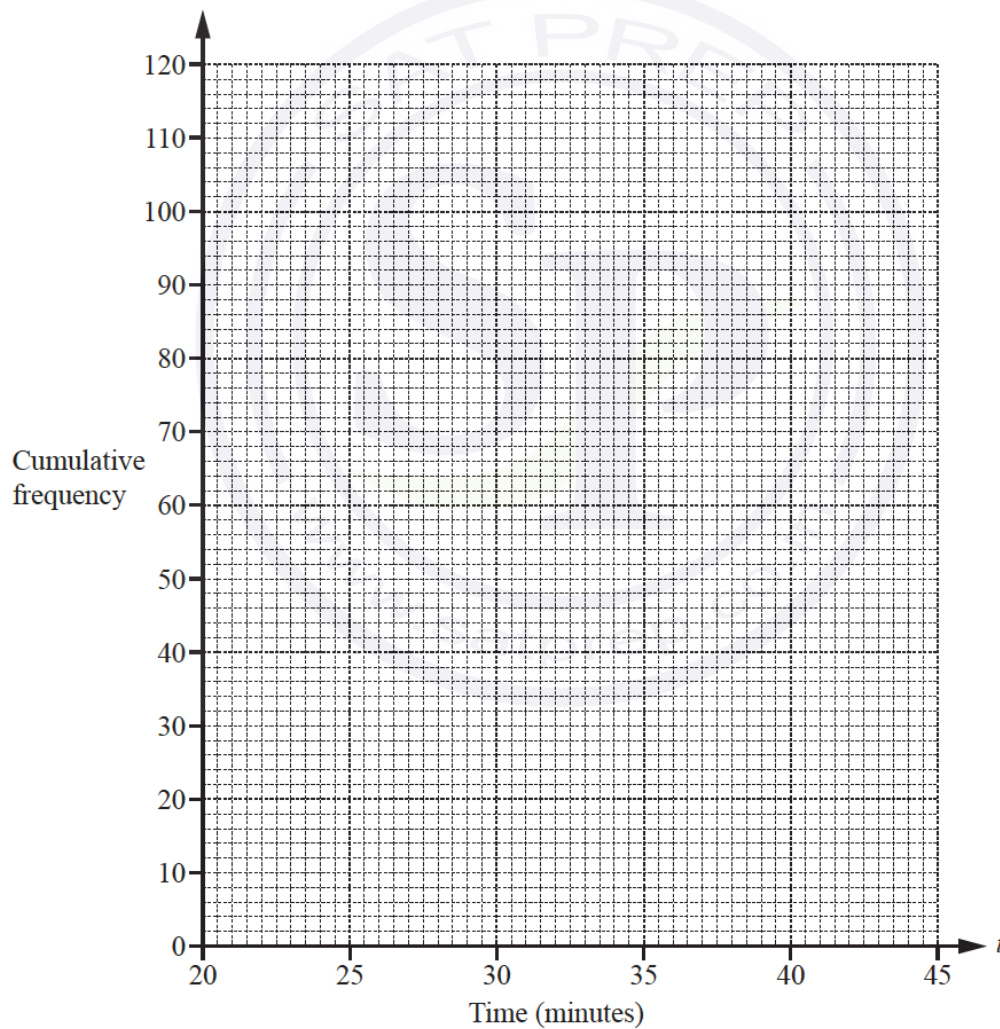
Find the probability that this student takes more than 40 minutes.

(b) (i) Complete the cumulative frequency table.

Time (t minutes)	$t \leq 20$	$t \leq 25$	$t \leq 30$	$t \leq 35$	$t \leq 40$	$t \leq 45$
Cumulative frequency	0	44				

[2]

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



[3]

Continue on the next page..

(iii) Find the median time.

..... min [1]

(iv) Find the interquartile range.

..... min [2]

(v) Find the number of students who took more than 37 minutes to complete the cooking challenge.

..... [2]

Question 34

(a) The table shows the amount of time, T minutes, 120 people each spend in a supermarket one Saturday.

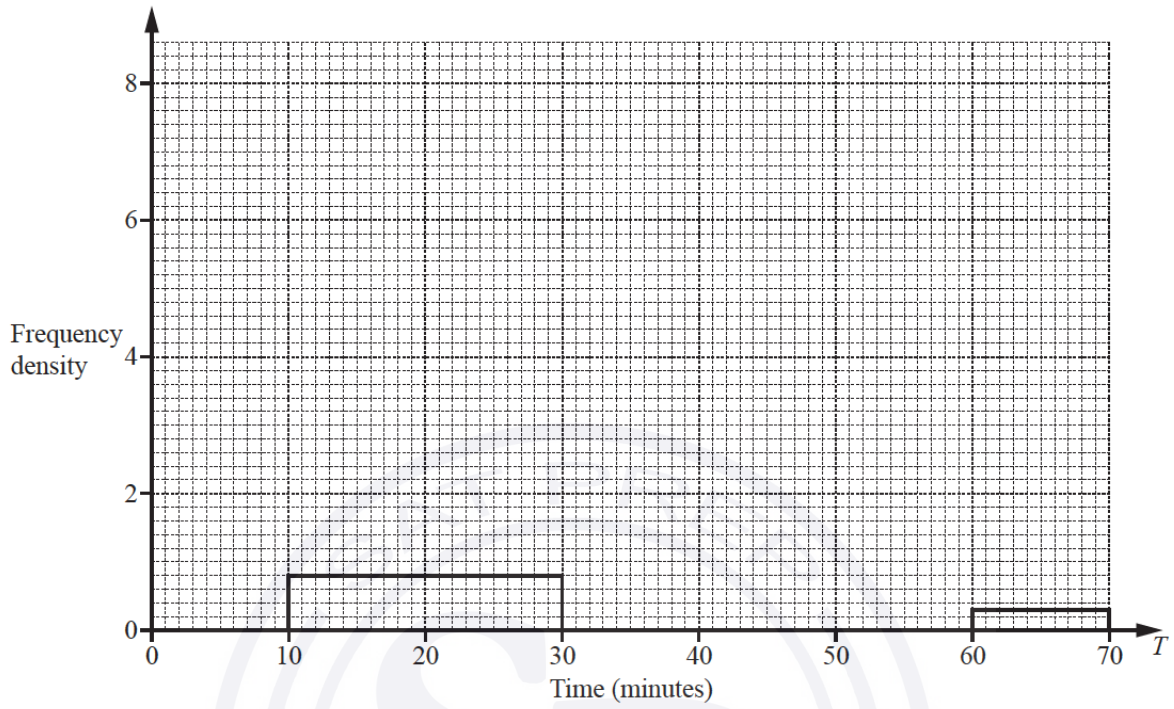
Time (T minutes)	Number of people
$10 < T \leq 30$	16
$30 < T \leq 40$	18
$40 < T \leq 45$	22
$45 < T \leq 50$	40
$50 < T \leq 60$	21
$60 < T \leq 70$	3

(i) Use the mid-points of the intervals to calculate an estimate of the mean.

..... min [4]

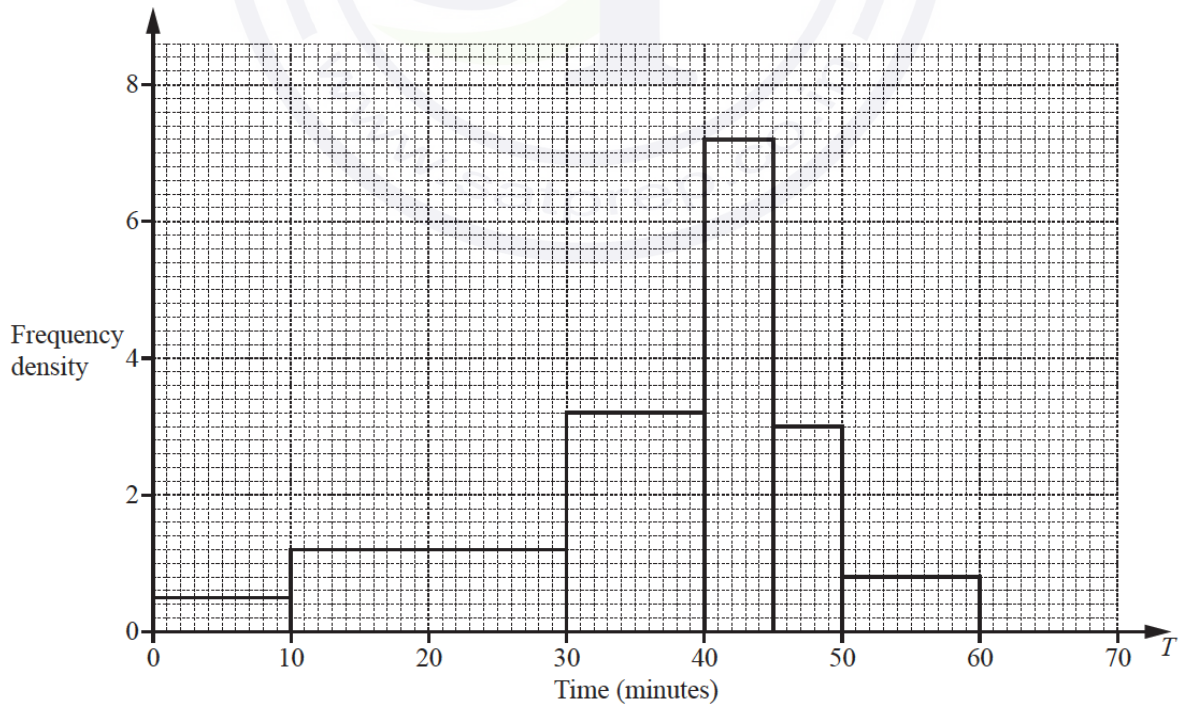
Continue on the next page..

(ii) Complete this histogram to show the information in the table.



[4]

(b) This histogram shows the amount of time, T minutes, 120 people each spend in the supermarket one Wednesday.



Make a comment comparing the distributions of the times for the two days.

.....
 [1]

Question 35

A school nurse records the height, h cm, of each of 180 children.
 The table shows the information.

Height (h cm)	$60 < h \leq 70$	$70 < h \leq 90$	$90 < h \leq 100$	$100 < h \leq 110$	$110 < h \leq 115$	$115 < h \leq 125$
Frequency	8	26	35	67	28	16

- (a) Calculate an estimate of the mean.
 Give your answer correct to 1 decimal place.

..... cm [4]

- (b) In a histogram showing the information, the height of the bar for the interval $60 < h \leq 70$ is 0.4 cm.

Calculate the height of the bar for each of the following intervals.

$115 < h \leq 125$ cm

$110 < h \leq 115$ cm

$70 < h \leq 90$ cm [3]

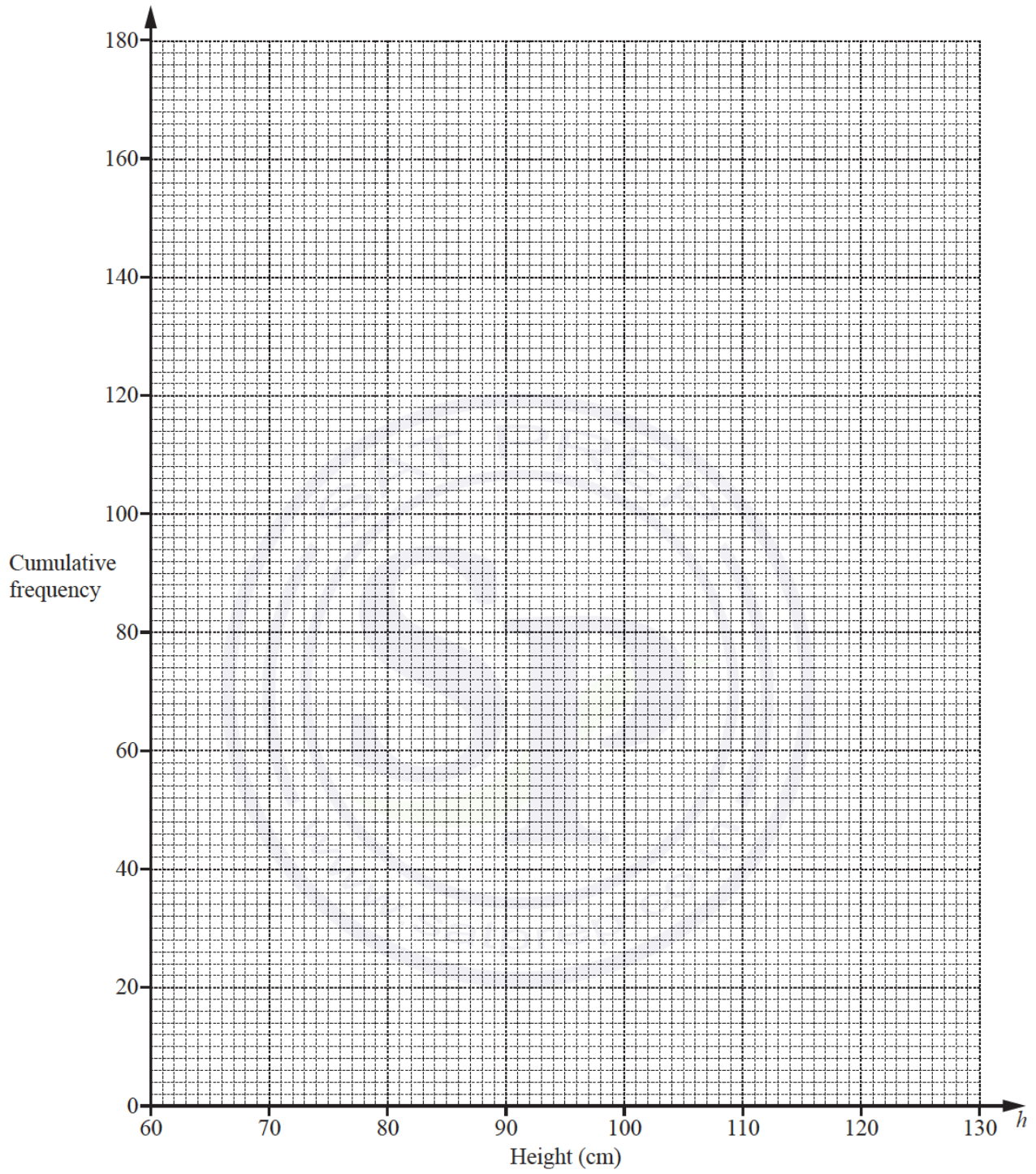
- (c) Complete the cumulative frequency table below.

Height (h cm)	$h \leq 70$	$h \leq 90$	$h \leq 100$	$h \leq 110$	$h \leq 115$	$h \leq 125$
Cumulative frequency						180

[2]

- (d) On the grid opposite, draw a cumulative frequency diagram.

Continue on the next page..



Continue on the next page..

[3]

(e) Use your cumulative frequency diagram to find an estimate of

(i) the interquartile range, cm [2]

(ii) the 70th percentile, cm [2]

(iii) the number of children with height greater than 106 cm. [2]

Question 36

(a) 20 students each record the mass, p grams, of their pencil case. The table below shows the results.

Mass (p grams)	$0 < p \leq 50$	$50 < p \leq 100$	$100 < p \leq 125$	$125 < p \leq 150$	$150 < p \leq 200$
Frequency	2	5	4	6	3

(i) Calculate an estimate of the mean mass. g [4]

(ii) Use the frequency table above to complete the cumulative frequency table.

Mass (p grams)	$p \leq 50$	$p \leq 100$	$p \leq 125$	$p \leq 150$	$p \leq 200$
Cumulative frequency					20

[2]

(iii) A student is chosen at random.

Find the probability that this student has a pencil case with a mass greater than 150 g.

.....[1]

Continue on the next page..

- (b) Some students each record the mass, m kg, of their school bag. Adil wants to draw a histogram to show this information.

Complete the table below.

Mass (m kg)	$0 < m \leq 4$	$4 < m \leq 6$	$6 < m \leq 7$	$7 < m \leq 10$
Frequency	32			42
Height of bar on histogram (cm)	1.6	2	1.2	2.8

[2]

- (c) The frequency table below shows information about the number of books read by some students in a reading marathon.

Number of books read	1	2	3	4	5	6	7	8
Frequency	2	2	16	10	9	4	x	2

- (i) The mean number of books read is 4.28 .

Find the value of x .

$x = \dots\dots\dots$ [3]

- (ii) Write down the mode.

$\dots\dots\dots$ [1]

- (iii) Write down the median.

$\dots\dots\dots$ [1]

Question 37

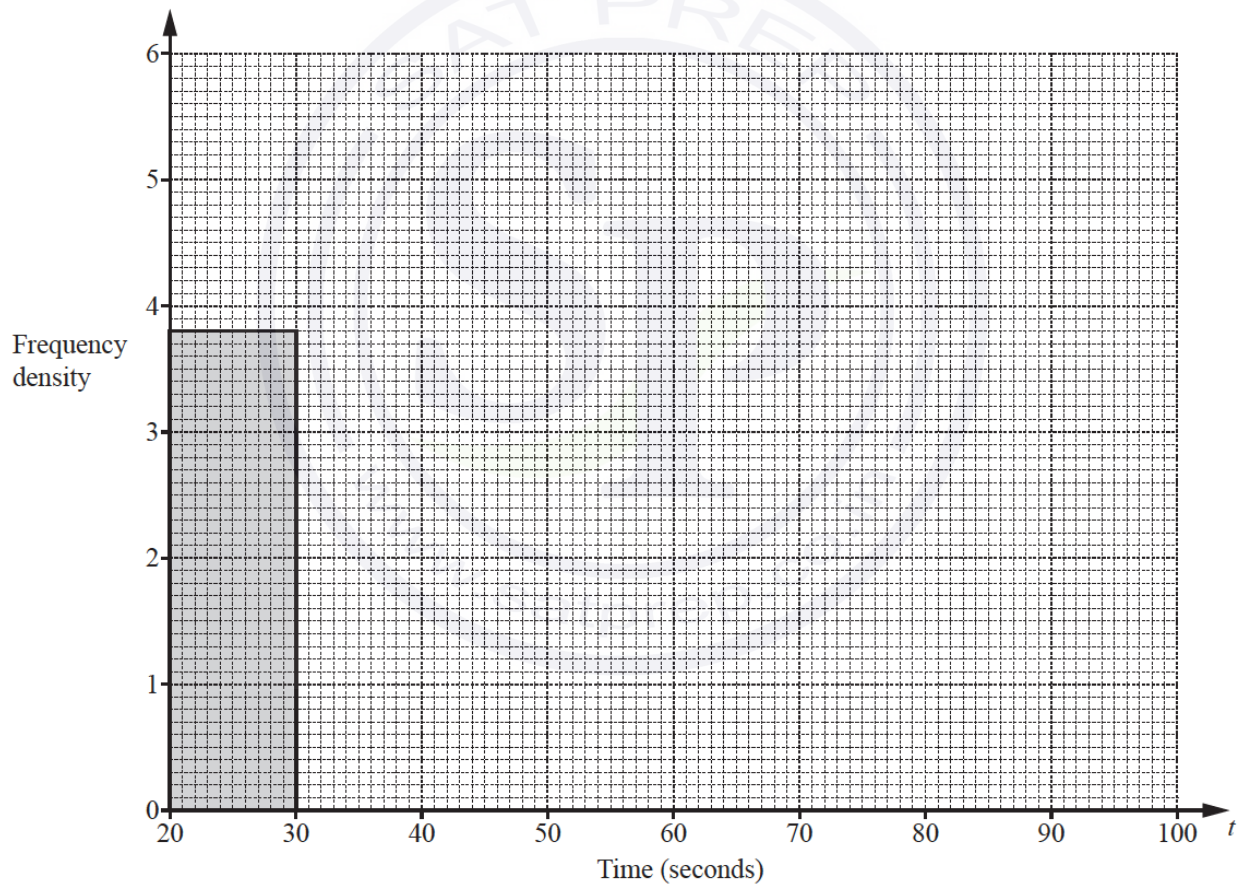
The table shows the time, t seconds, taken by each of 120 boys to solve a puzzle.

Time (t seconds)	$20 < t \leq 30$	$30 < t \leq 35$	$35 < t \leq 40$	$40 < t \leq 60$	$60 < t \leq 100$
Frequency	38	27	21	16	18

(a) Calculate an estimate of the mean time.

..... s [4]

(b) On the grid, complete the histogram to show the information in the frequency table.



[4]

Question 38

100 students were each asked how much money, $\$m$, they spent in one week.
The frequency table shows the results.

Amount ($\$m$)	$0 < m \leq 5$	$5 < m \leq 10$	$10 < m \leq 20$	$20 < m \leq 30$	$30 < m \leq 50$
Frequency	16	38	30	9	7

(a) Calculate an estimate of the mean.

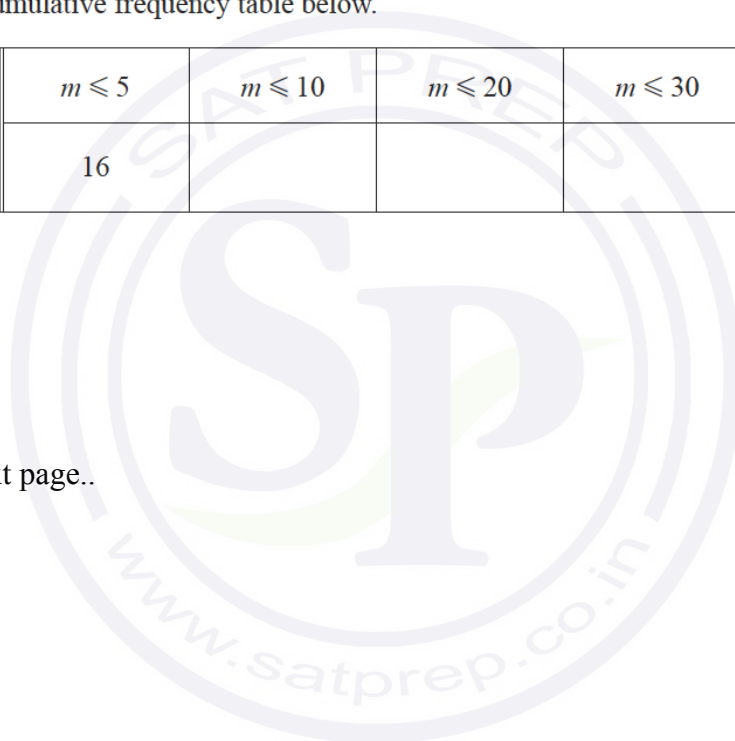
$\$$ [4]

(b) Complete the cumulative frequency table below.

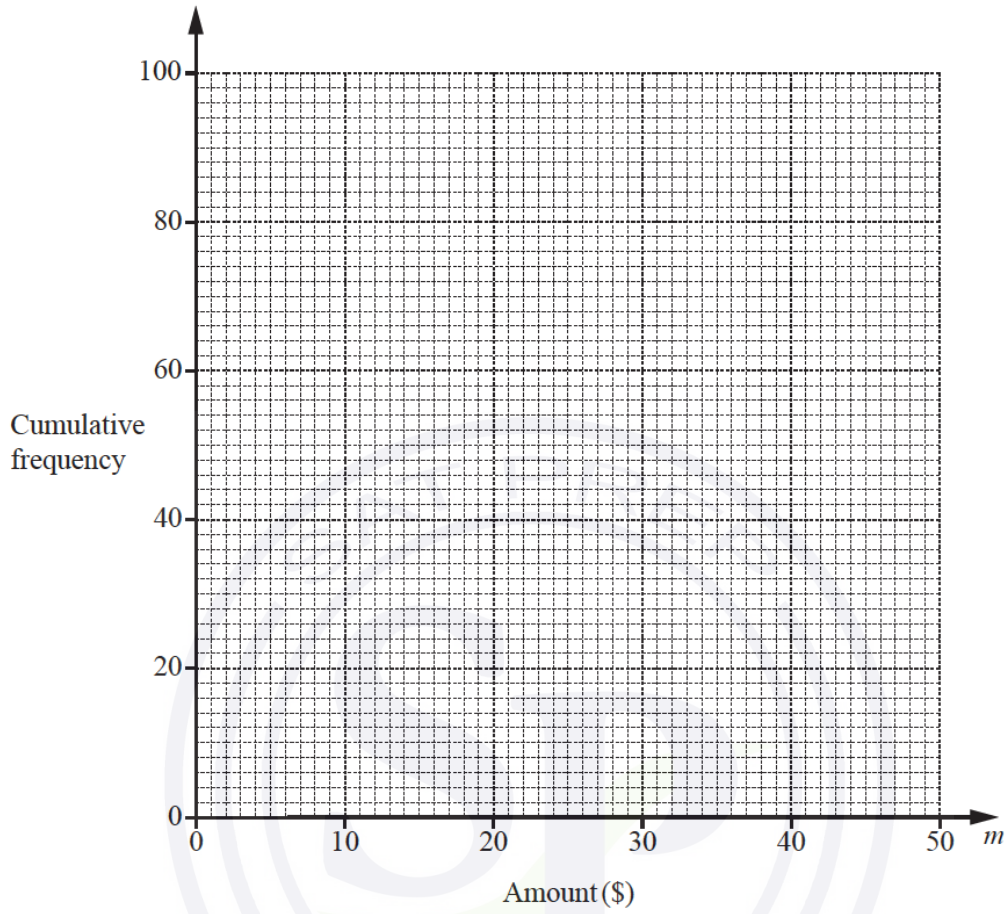
Amount ($\$m$)	$m \leq 5$	$m \leq 10$	$m \leq 20$	$m \leq 30$	$m \leq 50$
Cumulative frequency	16				100

[2]

Continue on the next page..



(c) On the grid, draw the cumulative frequency diagram.



[3]

(d) Use your cumulative frequency diagram to find an estimate for

(i) the median,

\$ [1]

(ii) the interquartile range,

\$ [2]

(iii) the number of students who spent more than \$25.

..... [2]

Question 39

(a) The test scores of 14 students are shown below.

21 21 23 26 25 21 22 20 21 23 23 27 24 21

(i) Find the range, mode, median and mean of the test scores.

Range =

Mode =

Median =

Mean = [6]

(ii) A student is chosen at random.

Find the probability that this student has a test score of more than 24.

.....[1]

(b) Petra records the score in each test she takes.

The mean of the first n scores is x .

The mean of the first $(n - 1)$ scores is $(x + 1)$.

Find the n th score in terms of n and x .

Give your answer in its simplest form.

.....[3]

(c) During one year the midday temperatures, $t^\circ\text{C}$, in Zedford were recorded.

The table shows the results.

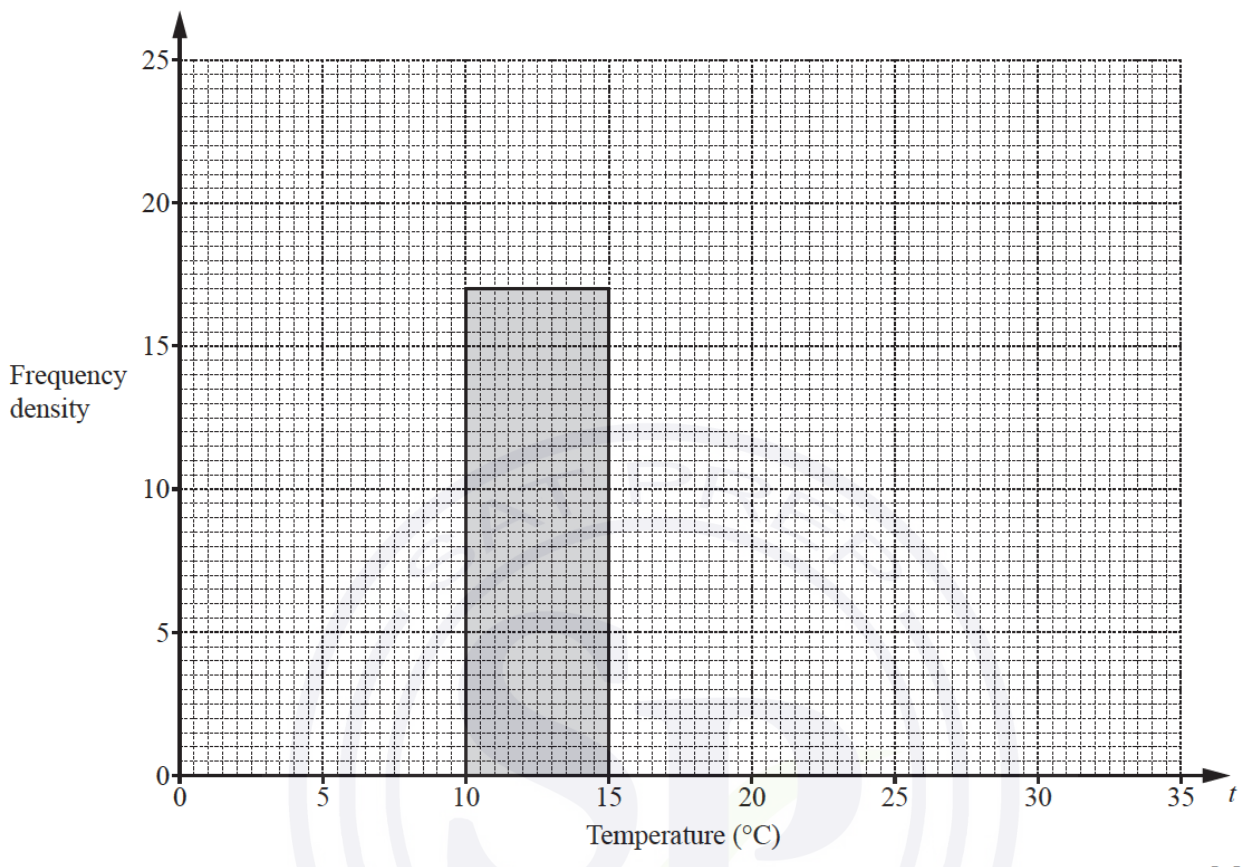
Temperature ($t^\circ\text{C}$)	$0 < t \leq 10$	$10 < t \leq 15$	$15 < t \leq 20$	$20 < t \leq 25$	$25 < t \leq 35$
Number of days	50	85	100	120	10

(i) Calculate an estimate of the mean.

..... $^\circ\text{C}$ [4]

Continue on the next page..

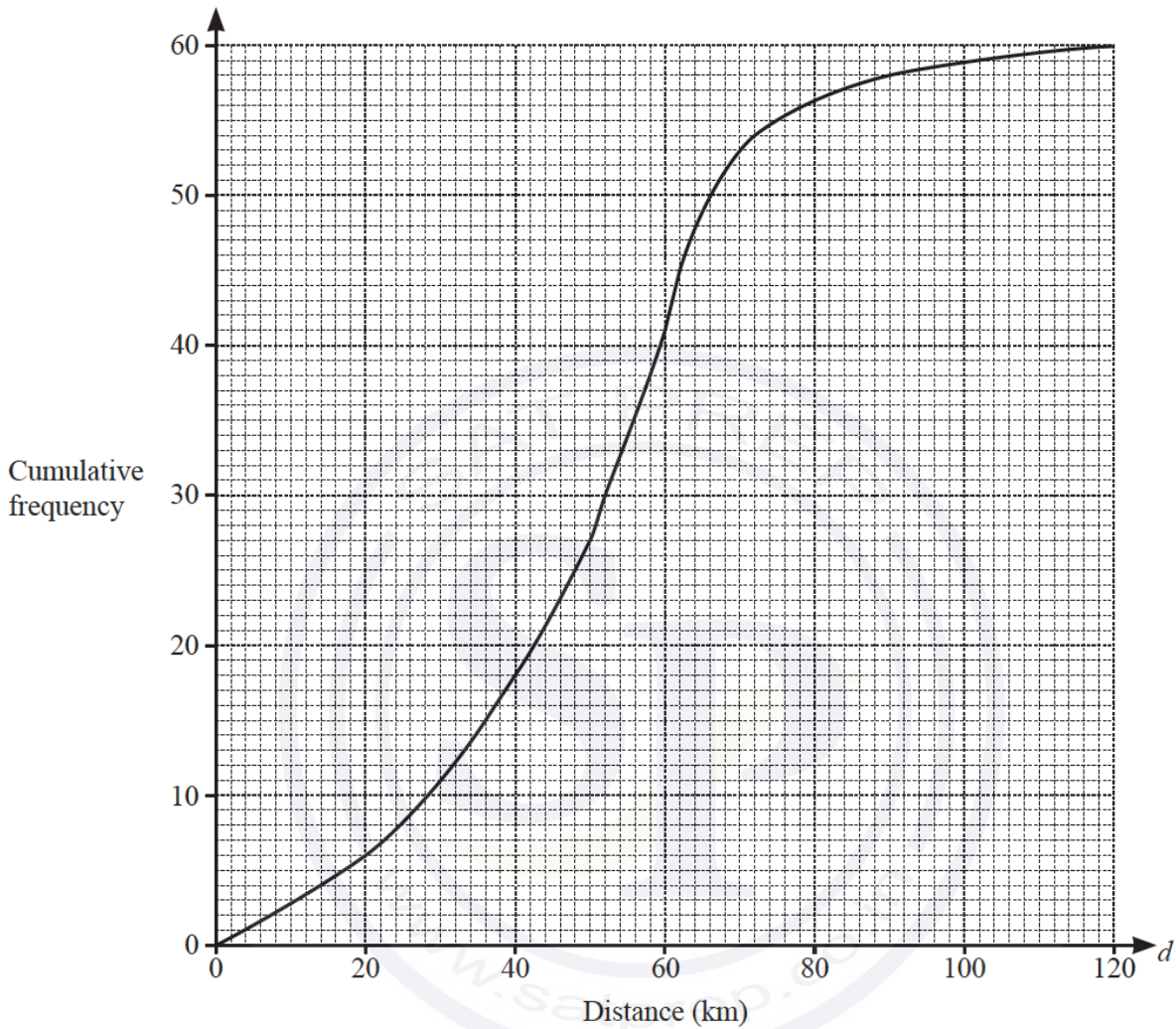
(ii) Complete the histogram to show the information in the table.



[4]

Question 40

The cumulative frequency diagram shows information about the distance, d km, travelled by each of 60 male cyclists in one weekend.



(a) Use the cumulative frequency diagram to find an estimate of

(i) the median,

..... km [1]

(ii) the lower quartile,

..... km [1]

(iii) the interquartile range.

..... km [1]

Continue on the next page..

- (b) For the same weekend, the interquartile range for the distances travelled by a group of female cyclists is 40 km.

Make one comment comparing the distribution of the distances travelled by the males with the distribution of the distances travelled by the females.

.....
 [1]

- (c) A male cyclist is chosen at random.

Find the probability that he travelled more than 50 km.

.....[2]

- (d) (i) Use the cumulative frequency diagram to complete this frequency table.

Distance (d km)	Number of male cyclists
$0 < d \leq 40$	18
$40 < d \leq 50$	9
$50 < d \leq 60$	
$60 < d \leq 70$	
$70 < d \leq 90$	
$90 < d \leq 120$	2

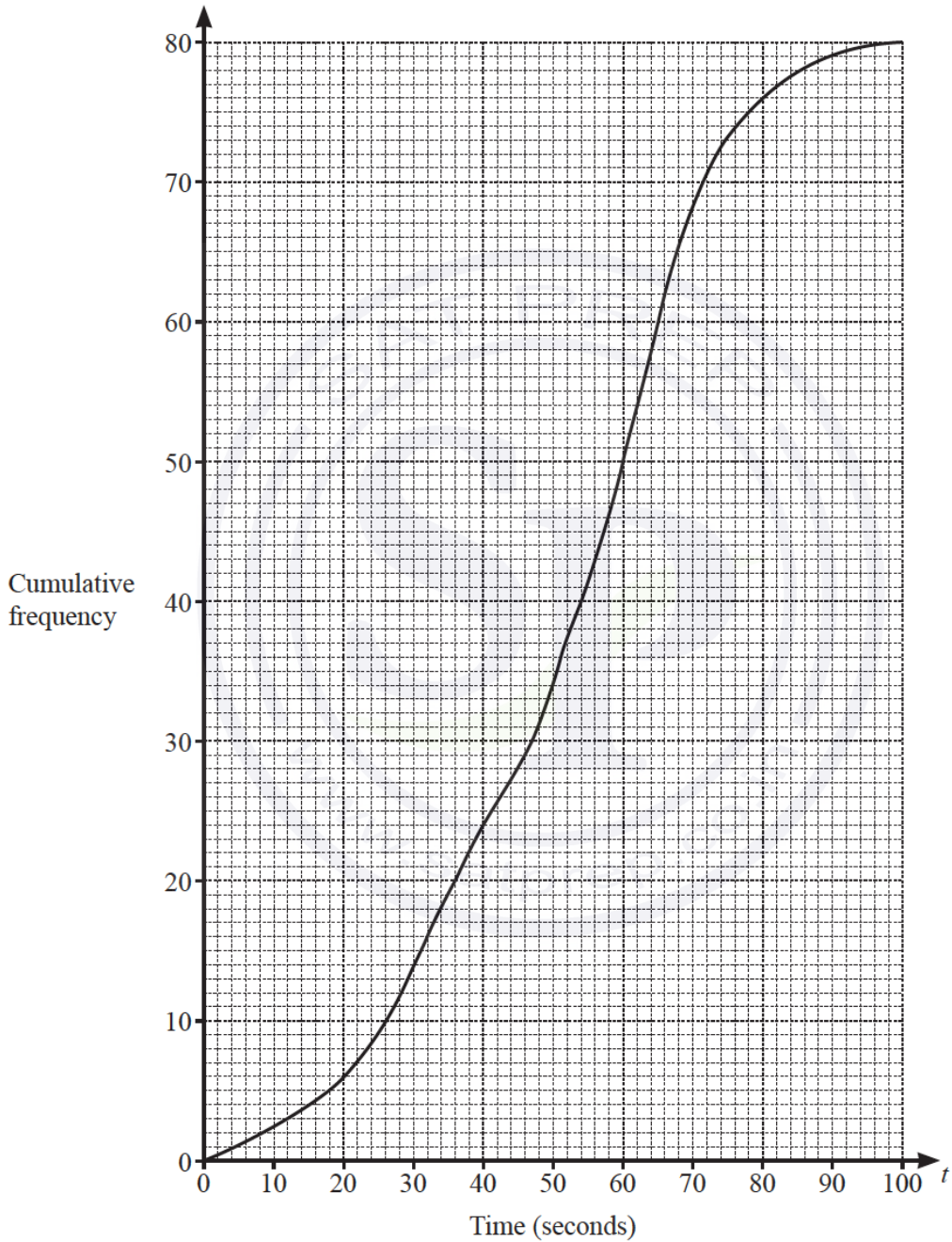
[2]

- (ii) Calculate an estimate of the mean distance travelled.

..... km [4]

Question 41

The cumulative frequency diagram shows information about the time taken, t seconds, for a group of girls to each solve a maths problem.



Continue on the next page..

(a) Use the cumulative frequency diagram to find an estimate for

(i) the median,

.....s [1]

(ii) the interquartile range

.....s [2]

(iii) the 20th percentile,

..... s [1]

(iv) the number of girls who took more than 66 seconds to solve the problem.

..... [2]

(b) (i) Use the cumulative frequency diagram to complete the frequency table.

Time (t seconds)	$0 < t \leq 20$	$20 < t \leq 40$	$40 < t \leq 60$	$60 < t \leq 80$	$80 < t \leq 100$
Frequency	6				4

[2]

(ii) Calculate an estimate of the mean time.

..... s [4]

(c) A group of boys solved the same problem.

The boys had a median time of 60 seconds, a lower quartile of 46 seconds and an upper quartile of 66 seconds.

(i) Write down the percentage of boys with a time of 66 seconds or less.

..... % [1]

(ii) Howard says

The boys' times vary more than the girls' times.

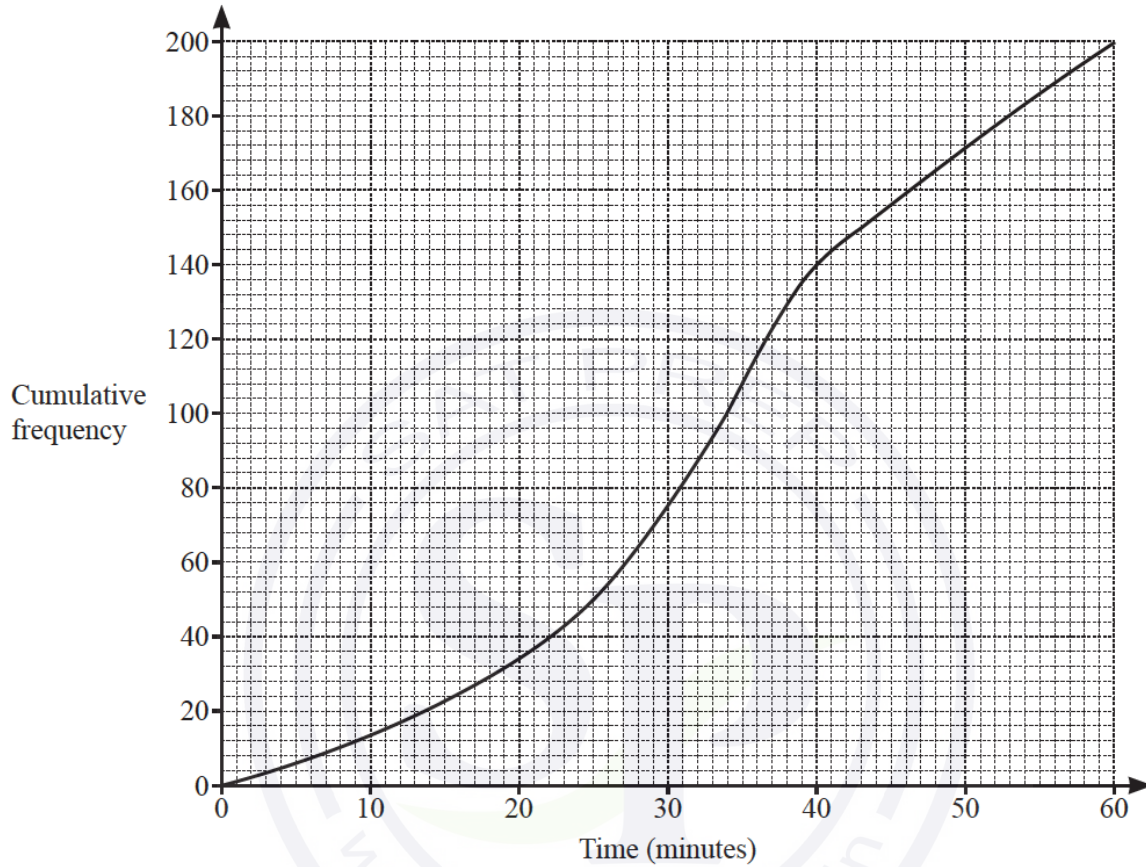
Explain why Howard is incorrect.

.....

..... [2]

Question 42

- (a) The cumulative frequency diagram shows information about the times taken by 200 students to solve a problem.



Use the cumulative frequency diagram to find an estimate for

- (i) the median, min [1]
- (ii) the interquartile range, min [2]
- (iii) the number of students who took more than 40 minutes.
..... [2]

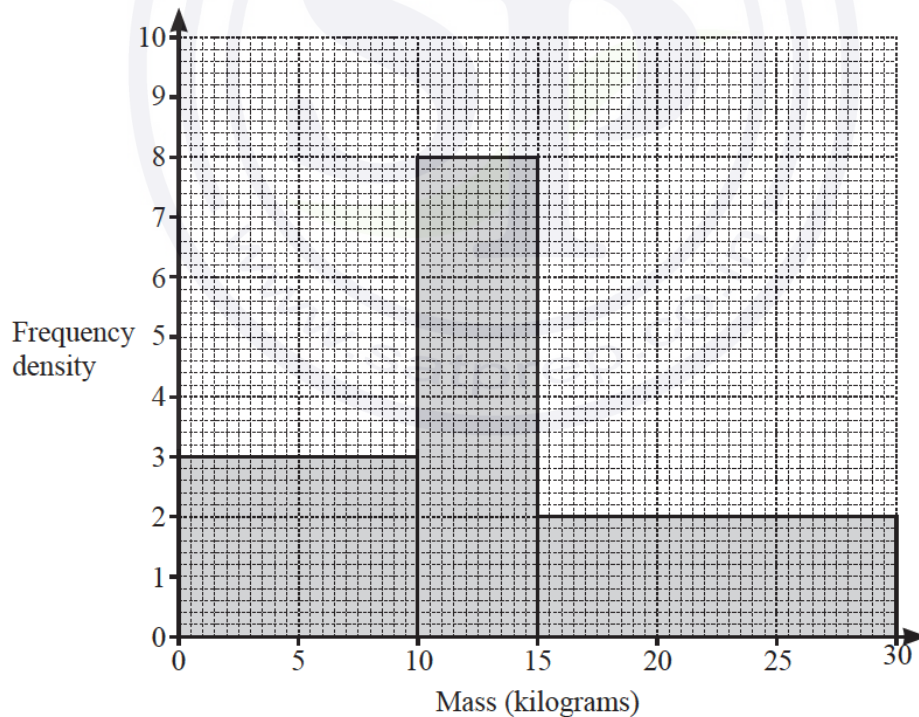
Continue on the next page..

- (b) Roberto records the value of each of the coins he has at home.
The table shows the results.

Value (cents)	1	2	5	10	20	50
Frequency	3	1	3	2	4	2

- (i) Find the range. cents [1]
- (ii) Find the mode. cents [1]
- (iii) Find the median. cents [1]
- (iv) Work out the total value of Roberto's coins. cents [2]
- (v) Work out the mean Cents [1]

- (c) The histogram shows information about the masses of 100 boxes.



Calculate an estimate of the mean.

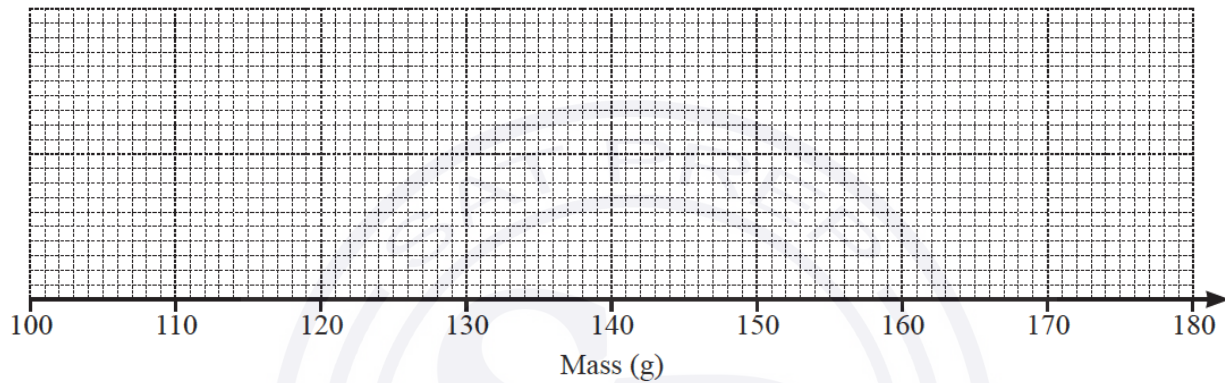
..... kg [6]

Question 42

(a) Here is some information about the masses of potatoes in a sack:

- The largest potato has a mass of 174 g.
- The range is 69 g.
- The median is 148 g.
- The lower quartile is 121 g.
- The interquartile range is 38 g.

On the grid below, draw a box-and-whisker plot to show this information.



[4]

(b) The table shows the marks scored by some students in a test.

Mark	5	6	7	8	9	10
Frequency	8	2	12	2	0	1

Calculate the mean mark.

.....[3]

Question 43

The speed, v km/h, of each of 200 cars passing a building is measured.
The table shows the results.

Speed (v km/h)	$0 < v \leq 20$	$20 < v \leq 40$	$40 < v \leq 45$	$45 < v \leq 50$	$50 < v \leq 60$	$60 < v \leq 80$
Frequency	16	34	62	58	26	4

(a) Calculate an estimate of the mean.

..... km/h [4]

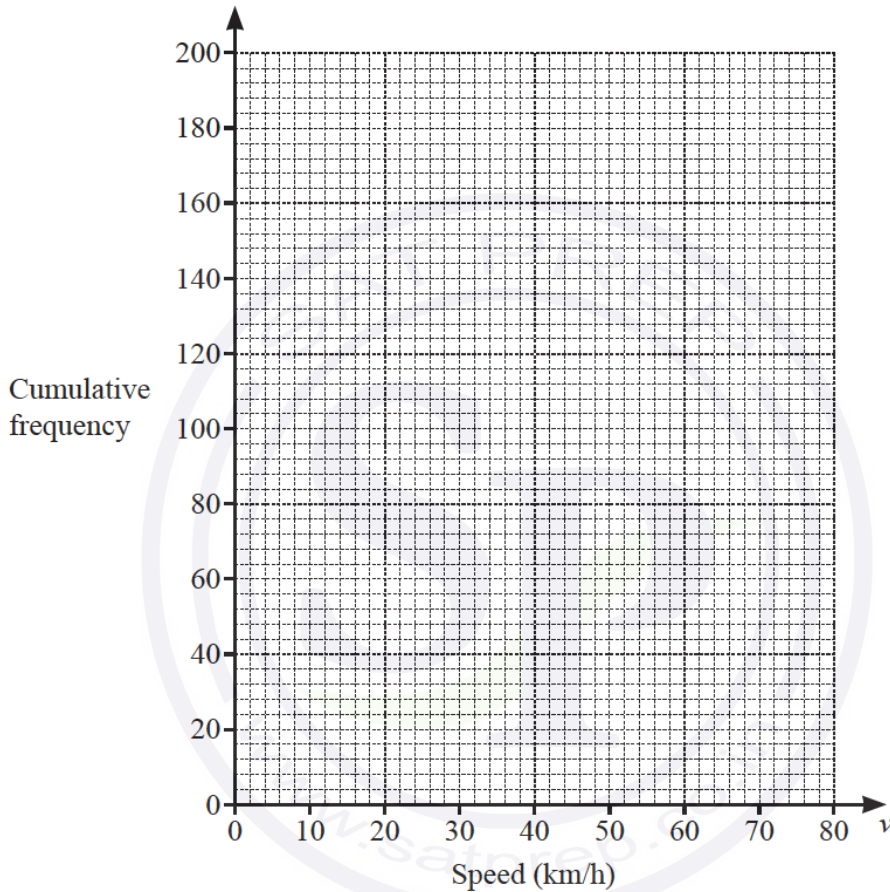
Continue on the next page..

(b) (i) Use the frequency table to complete the cumulative frequency table.

Speed (v km/h)	$v \leq 20$	$v \leq 40$	$v \leq 45$	$v \leq 50$	$v \leq 60$	$v \leq 80$
Cumulative frequency	16	50			196	200

[1]

(ii) On the grid, draw a cumulative frequency diagram.



[3]

(iii) Use your diagram to find an estimate of

(a) the upper quartile,

..... km/h [1]

(b) the number of cars with a speed greater than 35 km/h.

..... [2]

Continue on the next page..

(c) Two of the 200 cars are chosen at random.

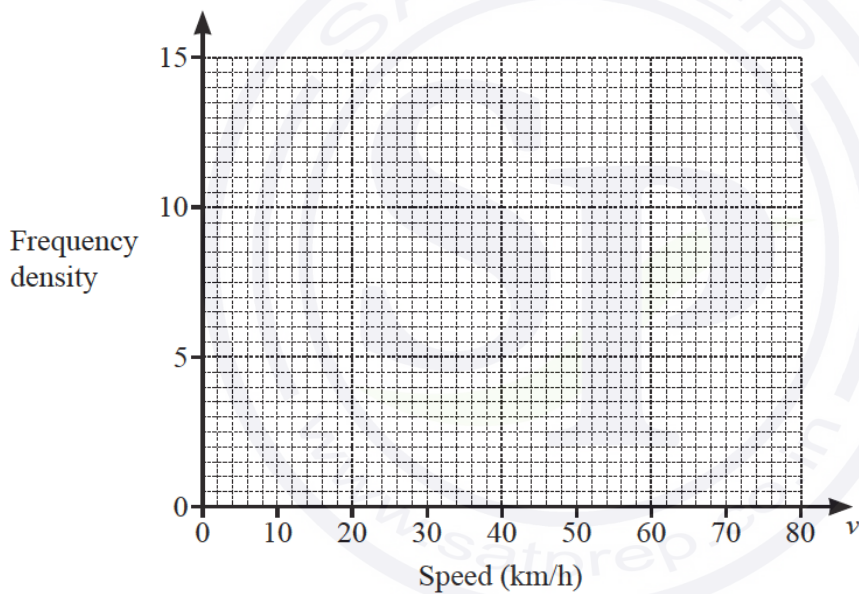
Find the probability that they both have a speed greater than 50 km/h.

..... [2]

(d) A new frequency table is made by combining intervals.

Speed (v km/h)	$0 < v \leq 40$	$40 < v \leq 50$	$50 < v \leq 80$
Frequency	50	120	30

On the grid, draw a histogram to show the information in this table.



[3]

Question 44

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

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

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

..... $< h \leq$ [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 m and the other two boys each have a height of 1.4 m or less.

..... [4]

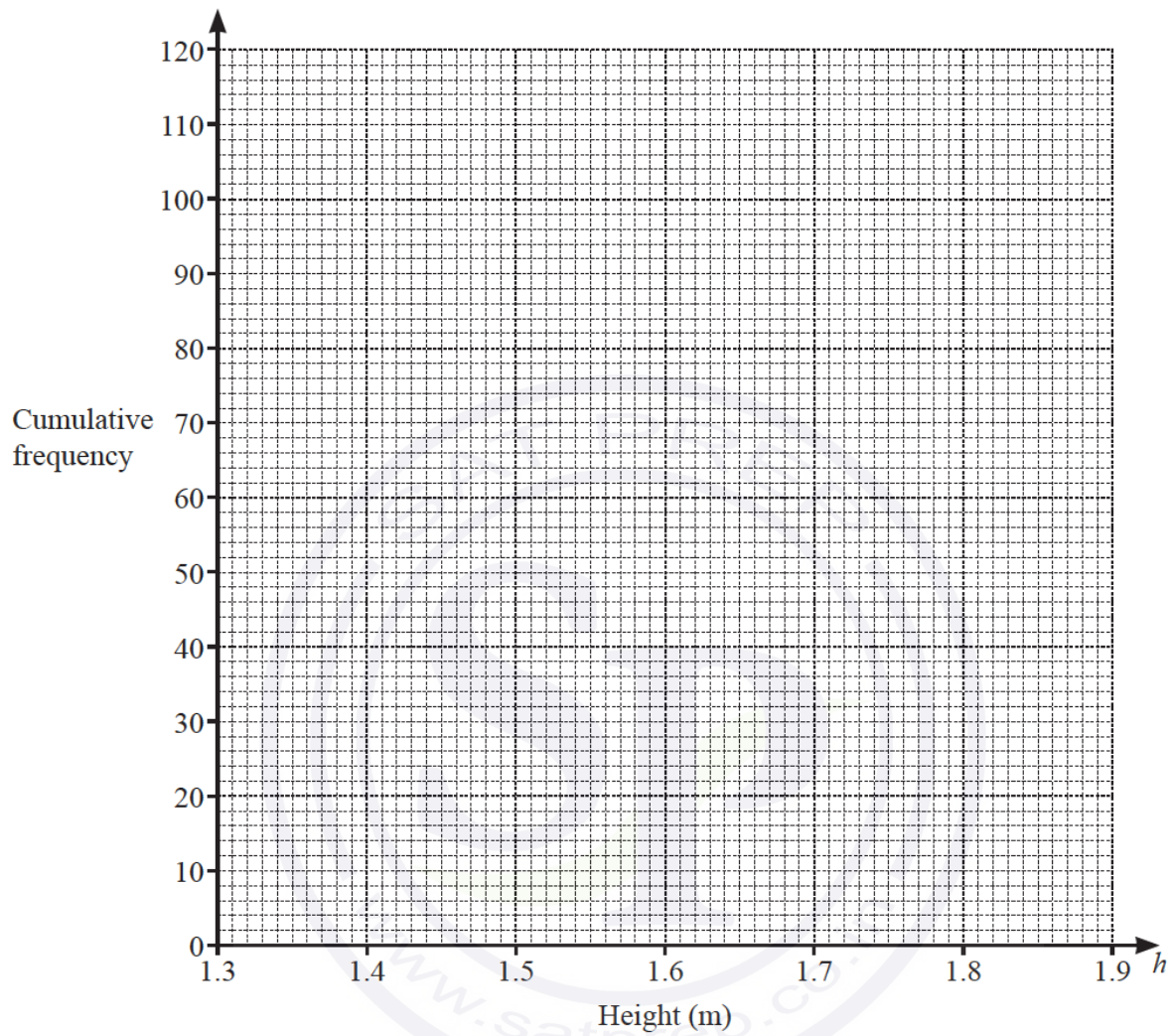
- (c) (i) Use the frequency table on page 4 to complete the cumulative frequency table.

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

[2]

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

Continue on the next page..



[3]

(d) Use your diagram to find an estimate for

(i) the median height,

..... m [1]

(ii) the 40th percentile.

..... m [2]

Question 45

The time, t minutes, taken by each of 80 people to travel to work is recorded.
The table shows information about these times.

Time (t minutes)	$0 < t \leq 5$	$5 < t \leq 10$	$10 < t \leq 20$	$20 < t \leq 35$	$35 < t \leq 60$
Frequency	3	7	18	28	24

(a) (i) Write down the class interval containing the median time.

..... $< t \leq$ [1]

(ii) Calculate an estimate of the mean time.

..... min [4]

(b) (i) One of these 80 people is chosen at random.

Find the probability that this person took longer than 10 minutes to travel to work.
Give your answer as a fraction in its simplest form.

..... [2]

(ii) Two people are chosen at random from those taking 20 minutes or less to travel to work.

Calculate the probability that one of these people took 5 minutes or less and the other took more than 5 minutes.

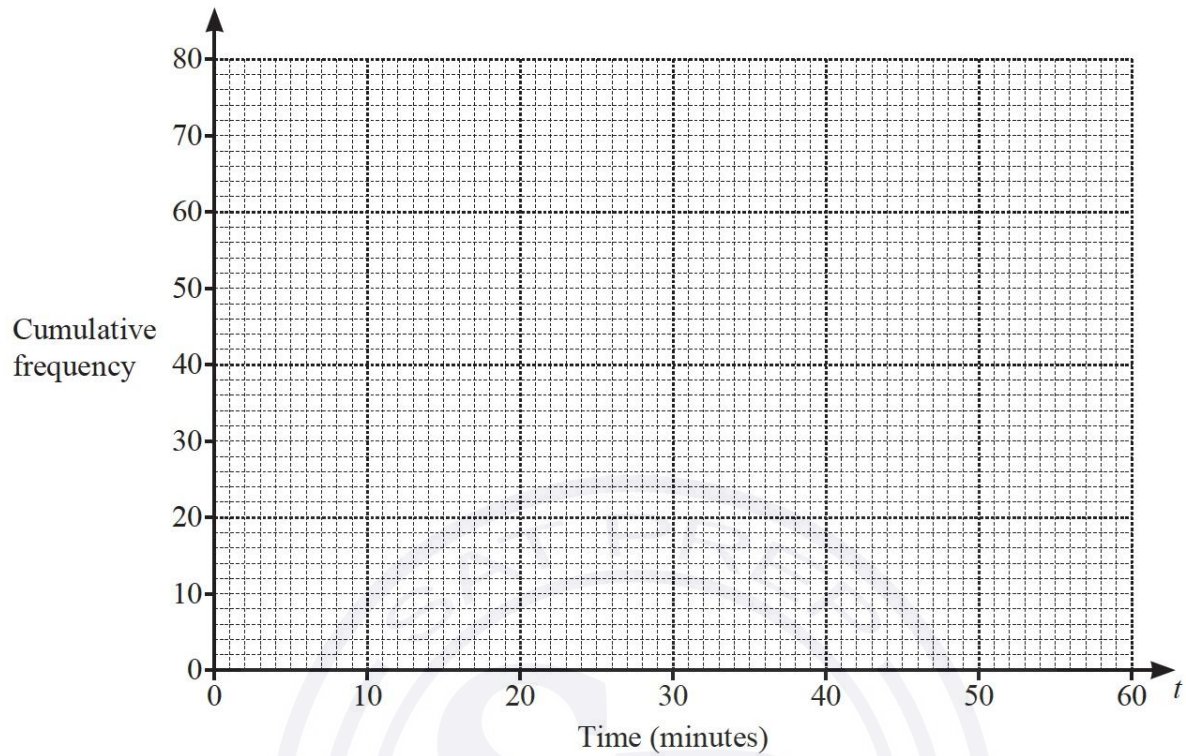
..... [3]

(c) (i) Use the frequency table on page 8 to complete the cumulative frequency table.

Time (t minutes)	$t \leq 5$	$t \leq 10$	$t \leq 20$	$t \leq 35$	$t \leq 60$
Cumulative frequency	3	10			80

[1]

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



[3]

(iii) Find an estimate for the 80th percentile.

..... min [2]

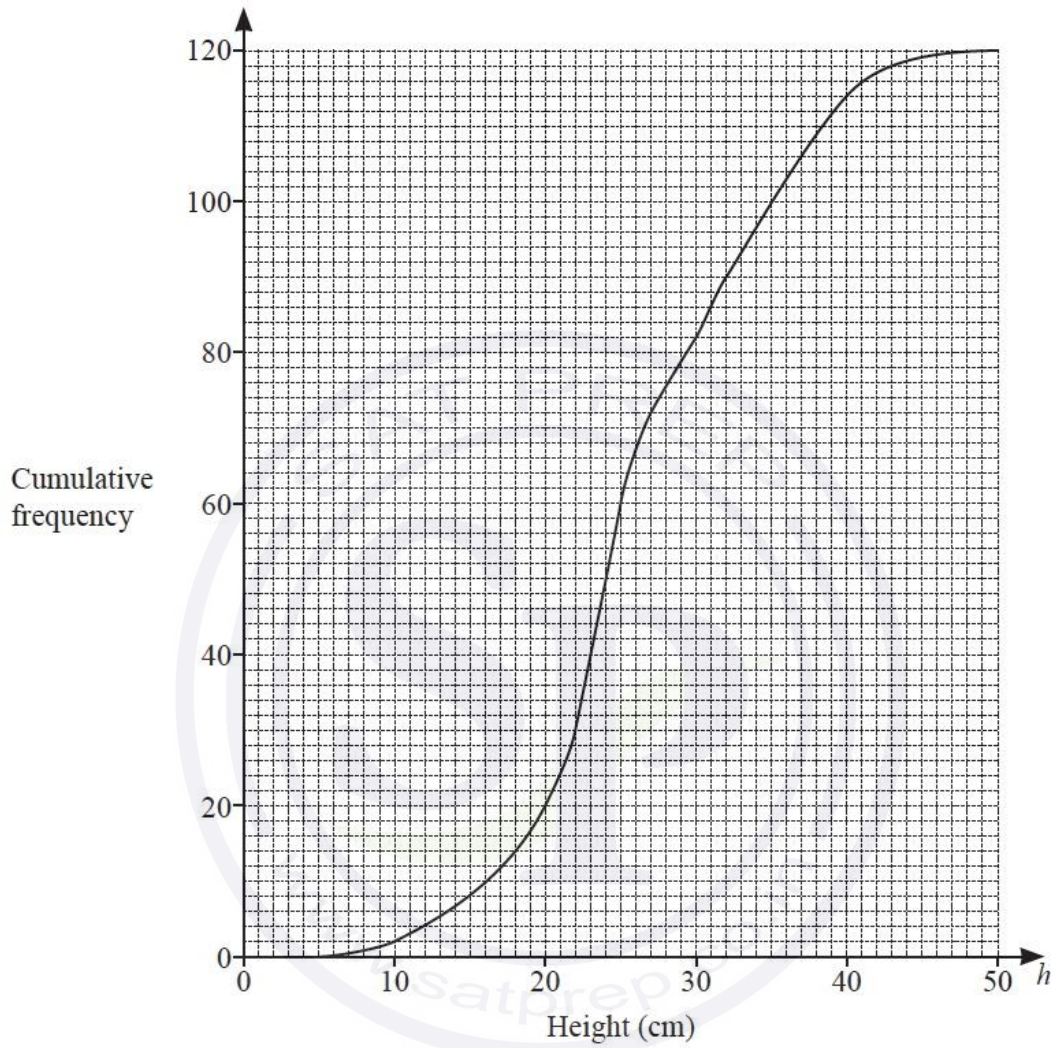
(iv) Find an estimate for the percentage of people who took longer than 45 minutes to travel to work.

Show all your working.

..... % [3]

Question 46

The height, h cm, of each of 120 plants is measured.
The cumulative frequency diagram shows this information.



Continue on the next page...

(a) Use the cumulative frequency diagram to find an estimate of

(i) the median,

..... cm [1]

(ii) the interquartile range,

..... cm [2]

(iii) the 60th percentile,

..... cm [1]

(iv) the number of plants with a height greater than 40 cm.

..... [2]

(b) The information in the cumulative frequency diagram is shown in this frequency table.

Height, h cm	$0 < h \leq 10$	$10 < h \leq 20$	$20 < h \leq 30$	$30 < h \leq 50$
Frequency	2	18	62	38

(i) Calculate an estimate of the mean height.

..... cm [4]

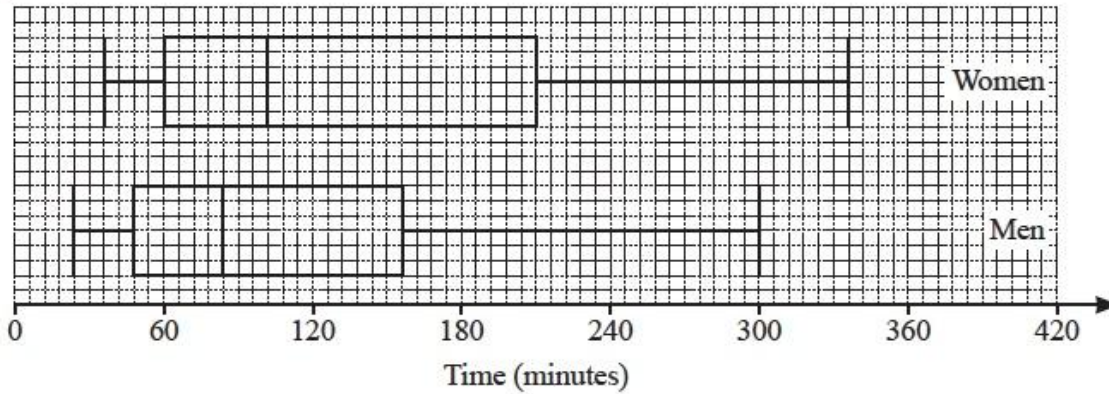
(ii) A histogram is drawn to show the information in the frequency table.
The height of the bar representing the interval $10 < h \leq 20$ is 7.2 cm.

Calculate the height of the bar representing the interval $30 < h \leq 50$.

..... cm [2]

Question 47

(a)



The box-and-whisker plots show the times spent exercising in one week by a group of women and a group of men.

Below are two statements comparing these times.

For each one, write down whether you agree or disagree, giving a reason for your answer.

Statement	Agree or disagree	Reason
On average, the women spent less time exercising than the men.		
The times for the women show less variation than the times for the men.		

[2]

(b) The frequency table shows the times, t minutes, each of 100 children spent exercising in one week.

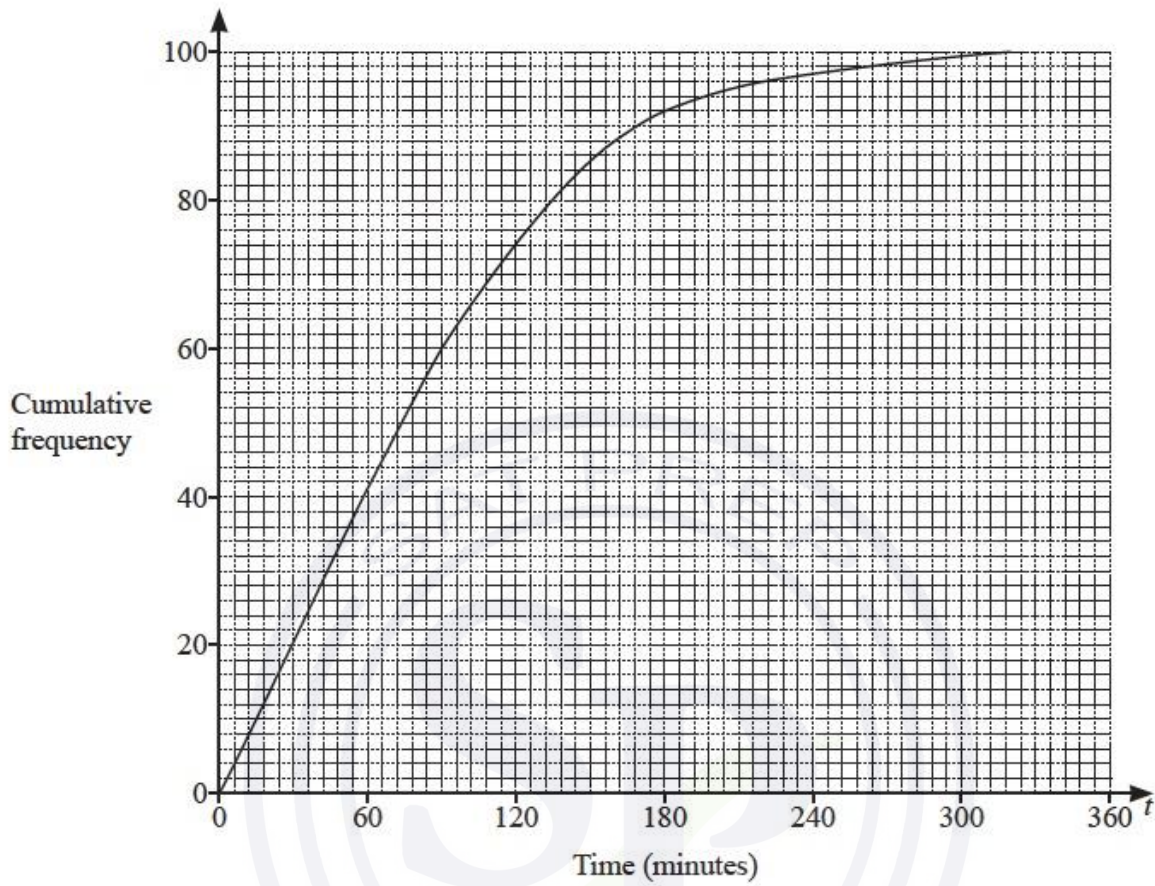
Time (t minutes)	$0 < t \leq 60$	$60 < t \leq 100$	$100 < t \leq 160$	$160 < t \leq 220$	$220 < t \leq 320$
Frequency	41	24	23	8	4

(i) Calculate an estimate of the mean time.

..... min [4]

Continue on the next page...

(ii) The information in the frequency table is shown in this cumulative frequency diagram.



Use the cumulative frequency diagram to find an estimate of

(a) the 60th percentile,

..... min [1]

(b) the number of children who spent more than 3 hours exercising.

..... [2]

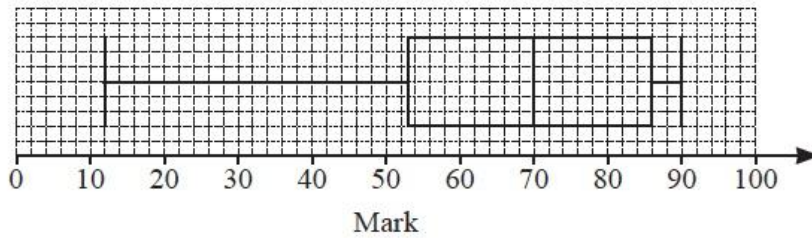
(iii) A histogram is drawn to show the information in the frequency table. The height of the bar for the interval $60 < t \leq 100$ is 10.8 cm.

Calculate the height of the bar for the interval $160 < t \leq 220$.

..... cm [2]

Question 48

(a) The box-and-whisker plot shows information about the marks scored by some students in a test.

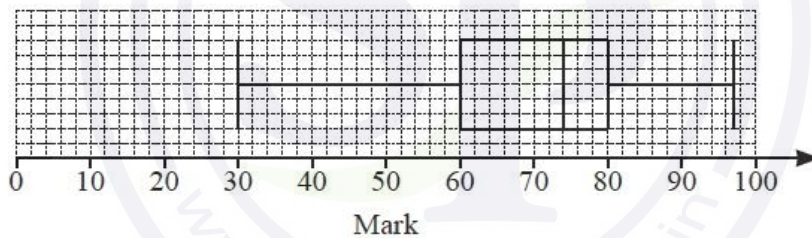


(i) Write down the median mark. [1]

(ii) Work out the range. [1]

(iii) Jais scored a mark in the test that was higher than the marks scored by 75% of the students.
Write down a possible mark for Jais. [1]

(iv) This box-and-whisker plot shows information about the marks scored by the same students in a second test.



Make one comparison between the distributions of marks in the two tests.

.....
..... [1]

(b) The table shows information about the height, h cm, of each of 50 plants.

Height (h cm)	$0 < h \leq 20$	$20 < h \leq 30$	$30 < h \leq 34$	$34 < h \leq 40$	$40 < h \leq 60$
Frequency	4	9	20	15	2

Calculate an estimate of the mean.

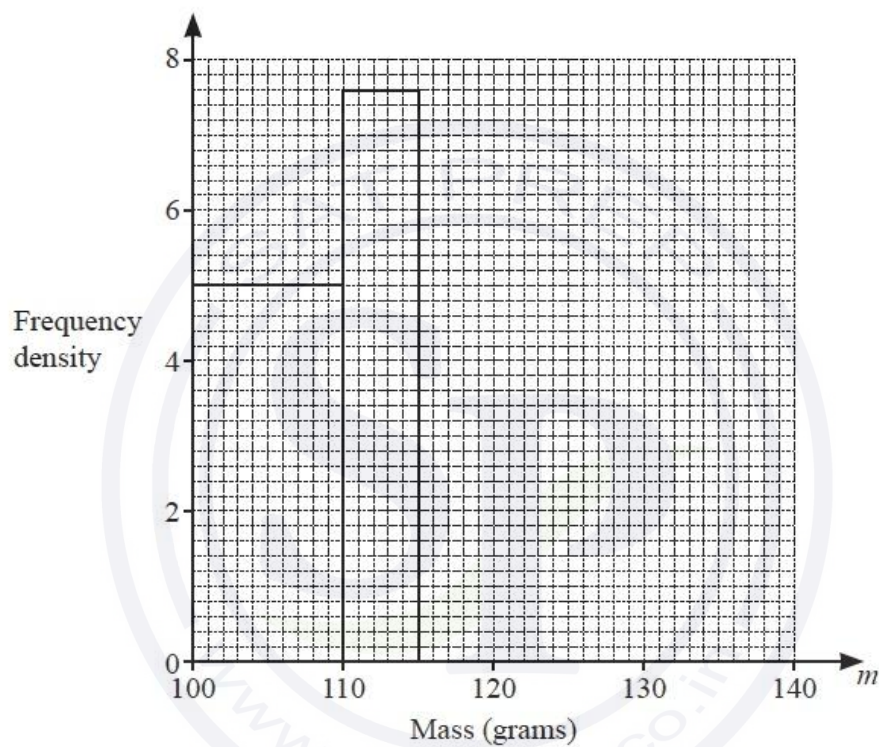
..... cm[4]

Continue on the next page...

- (c) Some apples are weighed and the mass, m grams, of each apple is recorded.
The table shows the results.

Mass (m grams)	$100 < m \leq 110$	$110 < m \leq 115$	$115 < m \leq 125$	$125 < m \leq 140$
Frequency	50	x	44	51

The histogram shows some of the information from the table.



- (i) Work out the value of x .

$$x = \dots\dots\dots [1]$$

- (ii) Complete the histogram.

[2]

Question 49

(a) Zoe's test scores last term were 6 7 7 7 8 9 9 10 10.

Find

(i) the range,

..... [1]

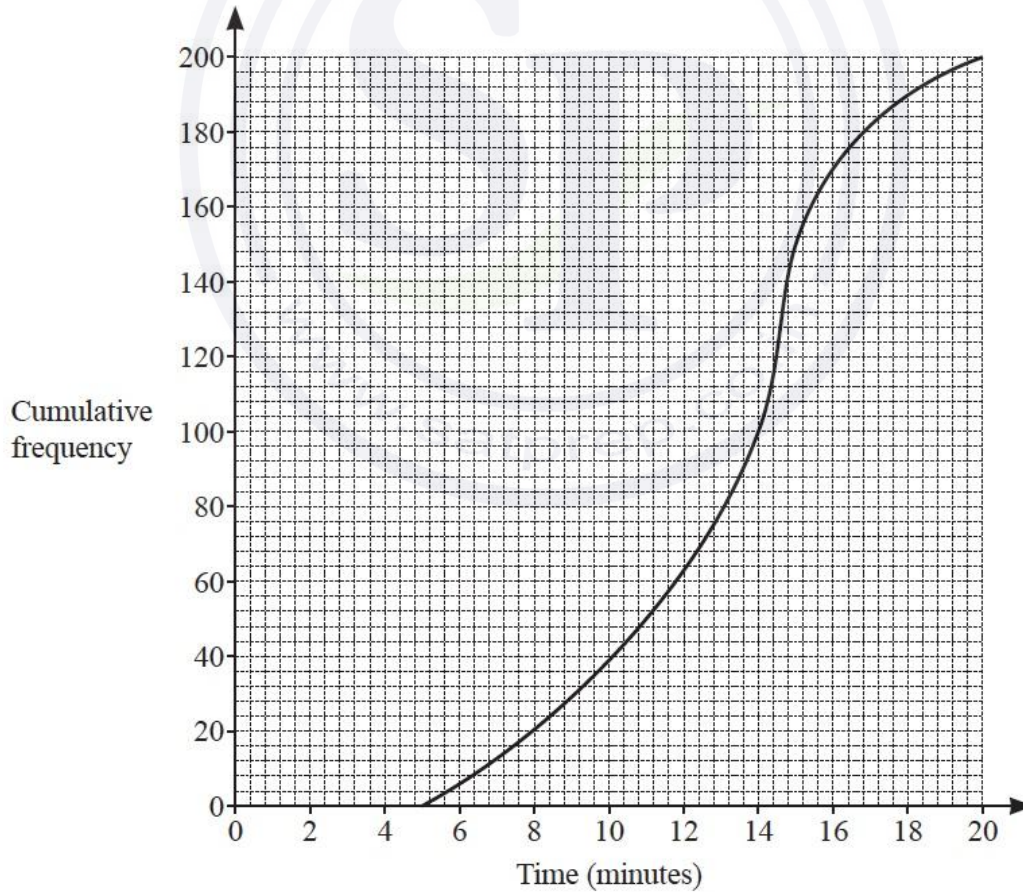
(ii) the mode,

..... [1]

(iii) the median.

..... [1]

(b) The cumulative frequency diagram shows information about the time taken by each of 200 students to solve a problem.



Continue on the next page...

Use the diagram to find an estimate of

(i) the median,

..... min [1]

(ii) the interquartile range.

..... min [2]

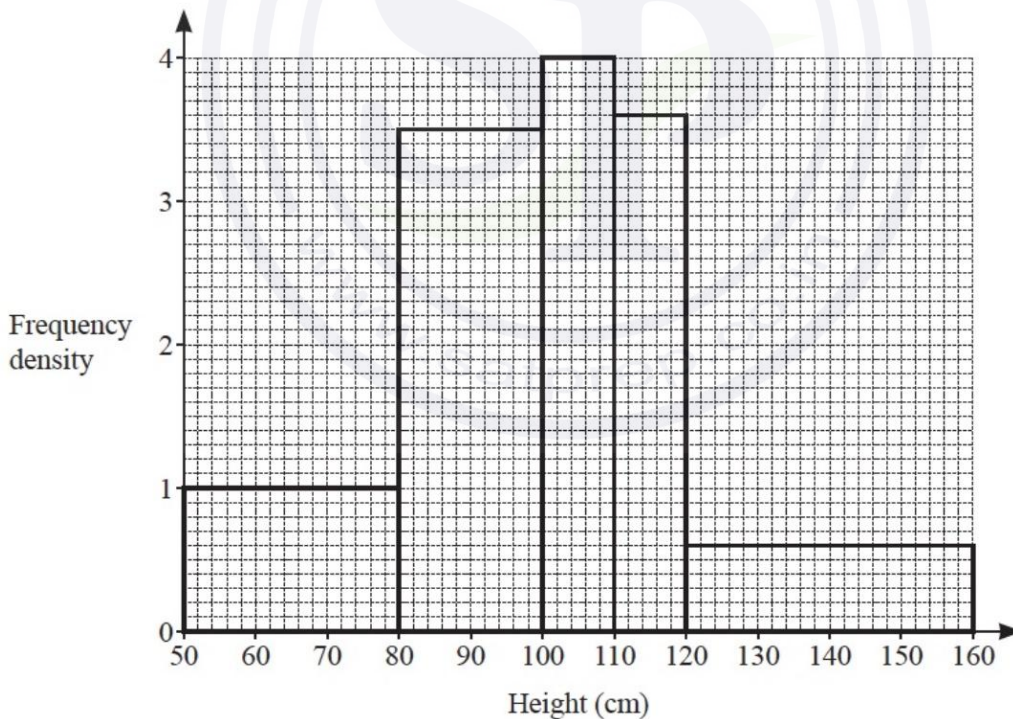
(c) The test scores of 200 students are shown in the table.

Score	5	6	7	8	9	10
Frequency	3	10	43	75	48	21

Calculate the mean.

..... [3]

(d) The height, in cm, of each of 200 plants is measured.
The histogram shows the results.



Calculate an estimate of the mean height.
You must show all your working.

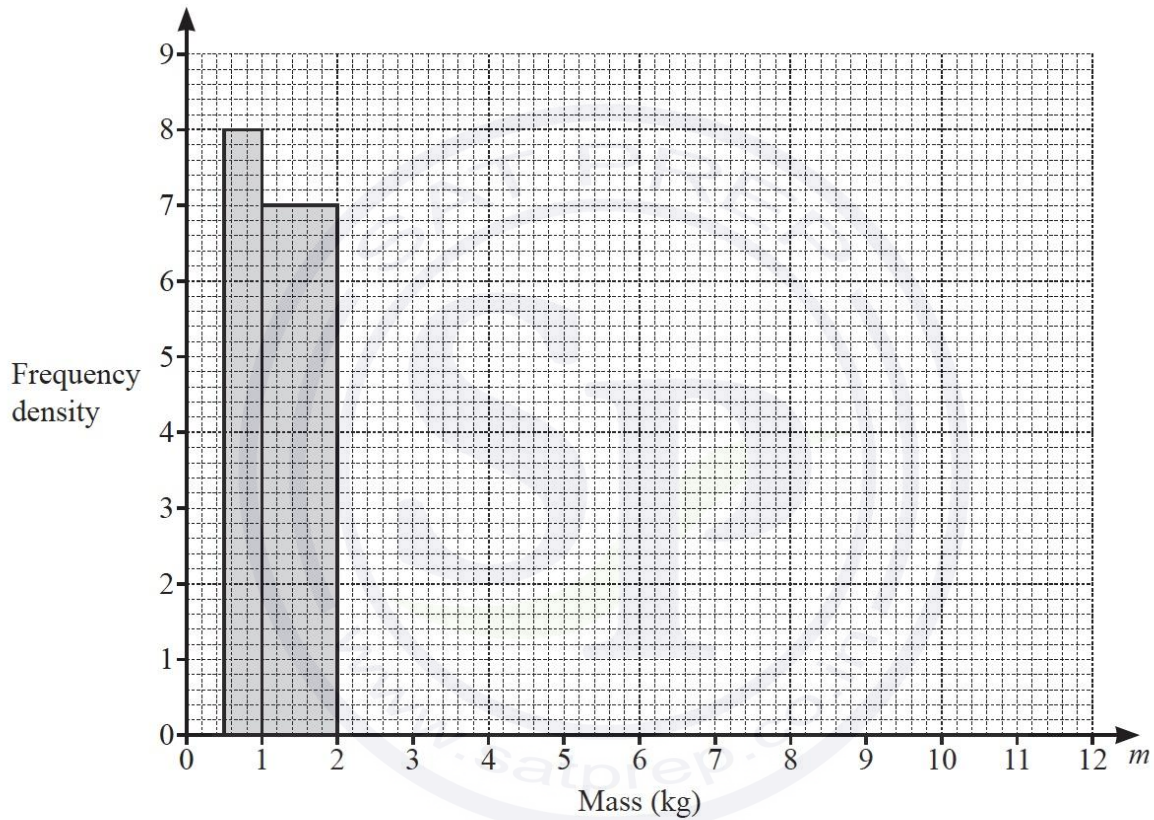
..... cm [6]

Question 50

- (a) The mass, m kg, of each of 40 parcels in a warehouse is recorded.
The table shows information about the masses of these parcels.

Mass (m kg)	$0.5 < m \leq 1$	$1 < m \leq 2$	$2 < m \leq 4$	$4 < m \leq 7$	$7 < m \leq 12$
Frequency	4	7	15	10	4

- (i) Complete the histogram to show this information.



[3]

- (ii) Calculate an estimate of the mean mass of the parcels.

..... kg [4]

- (iii) A parcel is picked at random from the 40 parcels.

Find the probability that this parcel has a mass of 2 kg or less.

..... [1]

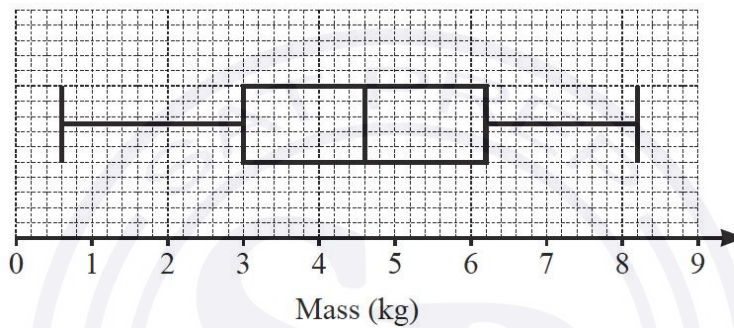
Continue on the next page...

- (iv) Two parcels are picked at random without replacement from those with a mass **greater than 2 kg**.

Work out the probability that one of them has a mass greater than 7kg and the other has a mass of 4 kg or less.

..... [3]

- (b) A van delivers parcels from a different warehouse.
The box-and-whisker plot shows information about the masses of the parcels in the van.



- (i) Find the median.

..... kg [1]

- (ii) Find the interquartile range.

..... kg [1]

- (iii) Two parcels are removed from the van at the first delivery.
The masses of these parcels are 2.4kg and 5.8 kg.

Describe the effect that removing these parcels has on the median mass of the remaining parcels.

Give a reason for your answer.

.....

..... [2]

Question 51

(a) The table shows information about the mass, in kilograms, of each of 50 children.

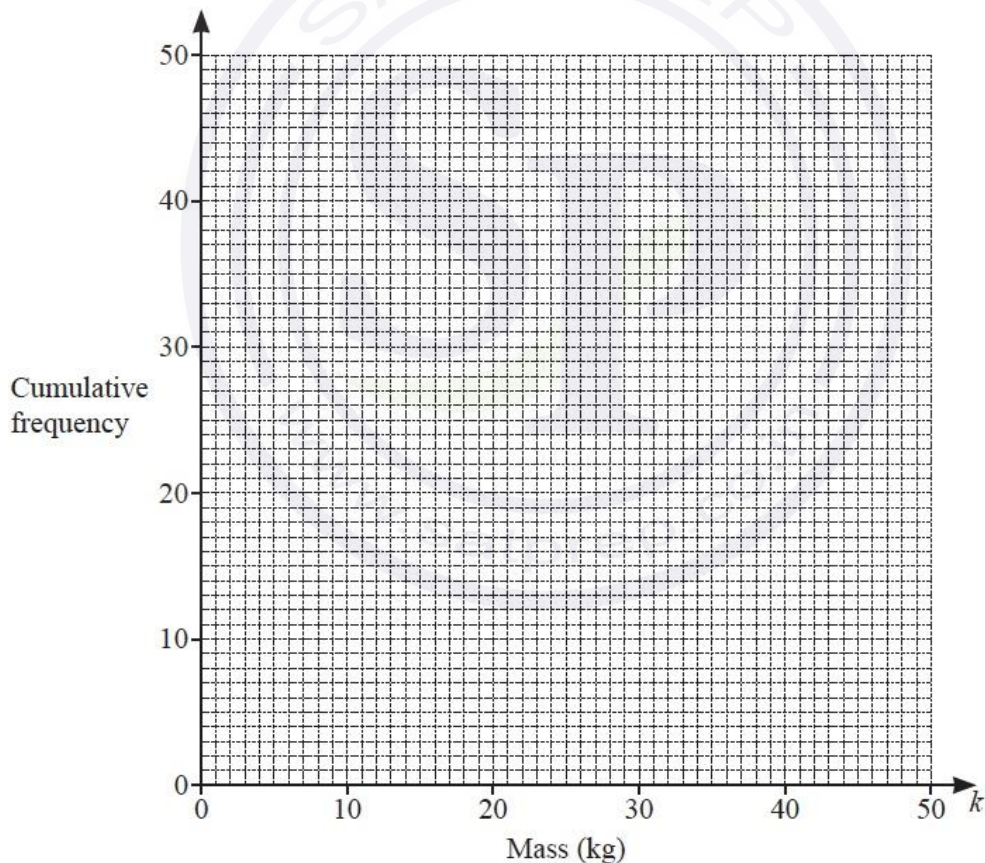
Mass (k kg)	$0 < k \leq 10$	$10 < k \leq 25$	$25 < k \leq 35$	$35 < k \leq 40$	$40 < k \leq 50$
Frequency	3	19	21	5	2

(i) Complete the cumulative frequency table.

Mass (k kg)	$k \leq 10$	$k \leq 25$	$k \leq 35$	$k \leq 40$	$k \leq 50$
Cumulative frequency					

[2]

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



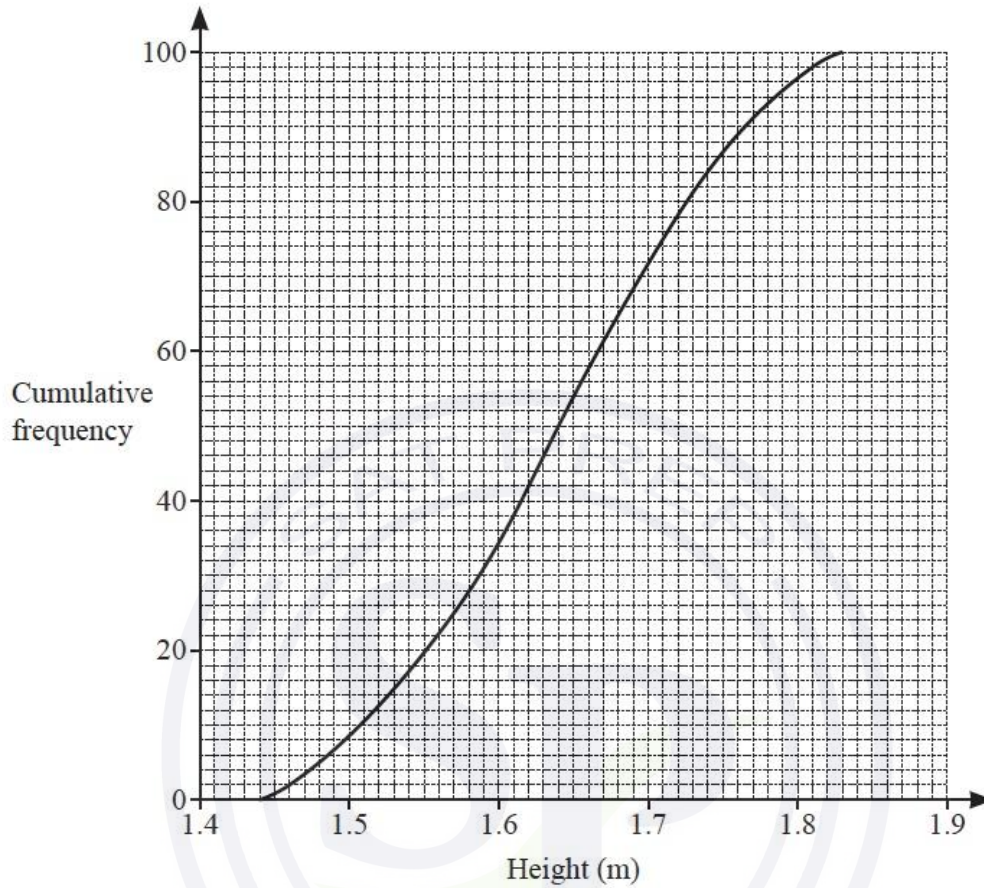
[3]

(iii) Use your diagram to find an estimate of the number of children with a mass of 32 kg or less.

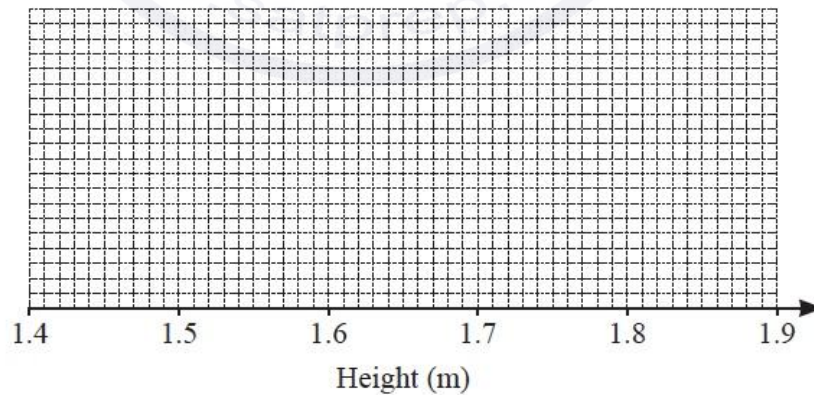
..... [1]

Continue on the next page...

- (b) This cumulative frequency diagram shows information about the height, in metres, of each of 100 students.



The height of the tallest student is 1.83 metres.
 The height of the shortest student is 1.45 metres.

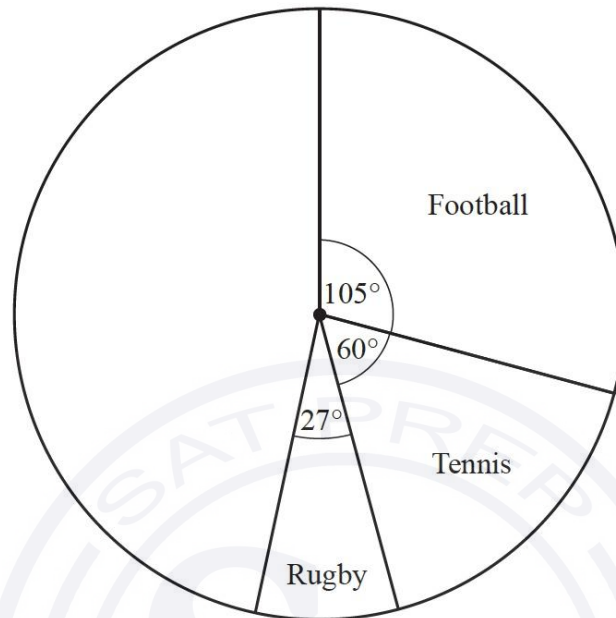


On this grid, draw a box-and-whisker plot for the heights of the 100 students.

[4]

Question 52

- (a) Jean asks 600 people to choose their favourite sport.
The pie chart shows some of this information.



- (i) Show that 100 people choose tennis.
- (ii) Work out how many people choose rugby.

[1]

Continue on the next page...

- (c) A dice is rolled 100 times.
The frequency table shows the results.

Score	1	2	3	4	5	6
Frequency	16	25	17	19	8	15

Find

- (i) the range,

..... [1]

- (ii) the mode,

..... [1]

- (iii) the median.

..... [1]

- (d) 50 students answer a mathematics question.
The table shows the time, t seconds, taken by each student to answer the question.

Time (t seconds)	$10 < t \leq 20$	$20 < t \leq 25$	$25 < t \leq 30$	$30 < t \leq 50$	$50 < t \leq 80$
Frequency	2	8	12	16	12

Calculate an estimate of the mean.

..... s [4]

Continue on the next page...

..... [2]

(iii) 125 people choose cricket and the rest choose swimming.

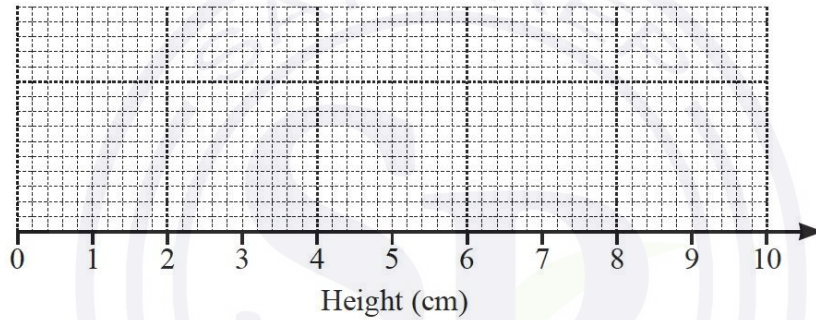
Complete the pie chart to show this information.

[2]

(b) The heights of some plants are measured:

- smallest height = 0.6 cm
- range = 8.1 cm
- median = 5.2 cm
- lower quartile = 3.4 cm
- interquartile range = 4.1 cm.

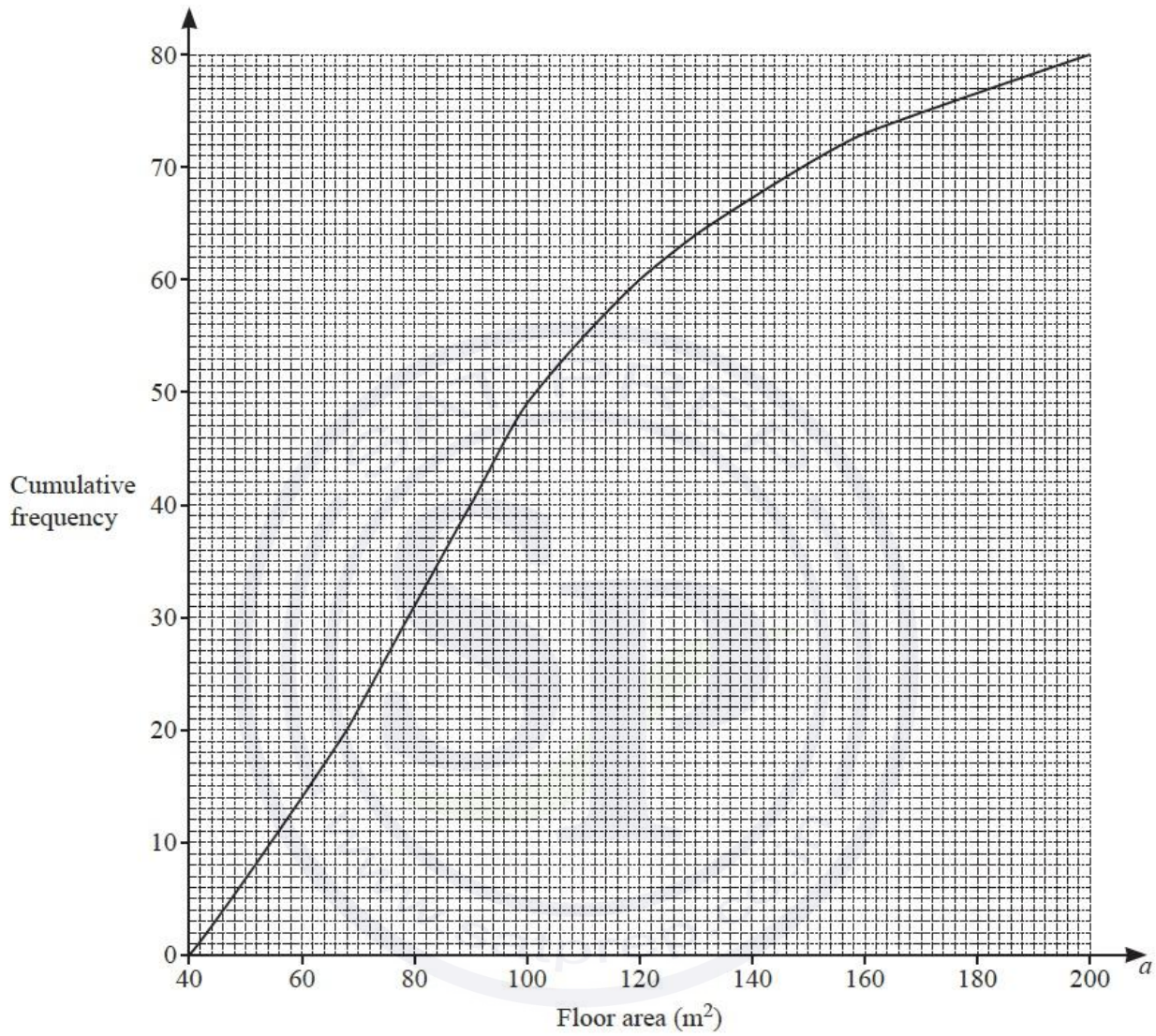
On the grid, draw a box-and-whisker plot to show this information.



[3]

Question 53

- 2 (a) The cumulative frequency diagram shows information about the floor area, $a \text{ m}^2$, of each of 80 houses.



Use the diagram to find an estimate of

- (i) the median, m^2 [1]
- (ii) the lower quartile, m^2 [1]
- (iii) the interquartile range,

Continue on the next page...

..... m^2 [1]

(iv) the number of houses with a floor area greater than $120m^2$.

..... [2]

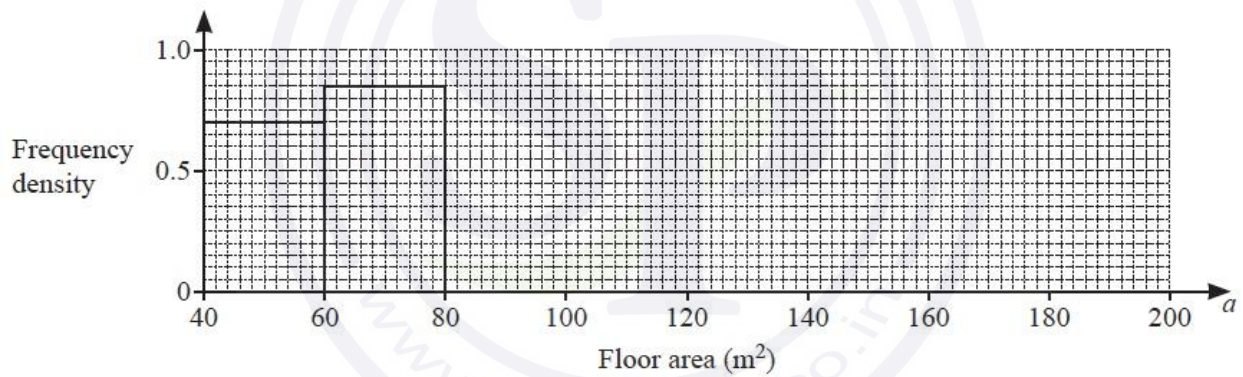
(b) The information about the 80 floor areas is shown in this frequency table.

Floor area ($a m^2$)	$40 < a \leq 60$	$60 < a \leq 80$	$80 < a \leq 100$	$100 < a \leq 130$	$130 < a \leq 160$	$160 < a \leq 200$
Frequency	14	17	18	15	9	7

(i) Calculate an estimate of the mean floor area.

..... m^2 [4]

(ii) Complete the histogram to show the information in the frequency table.



[4]

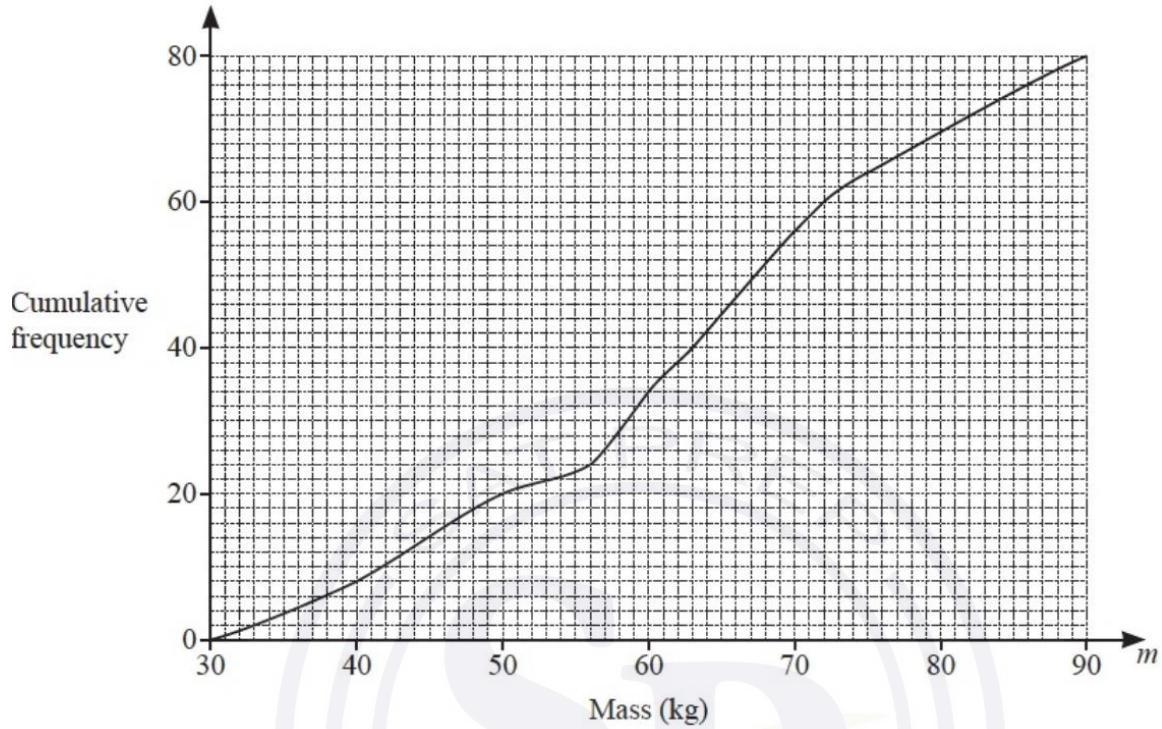
(iii) Two of the houses are picked at random.

Find the probability that one of the houses has a floor area greater than $130m^2$ and the other has a floor area $60m^2$ or less.

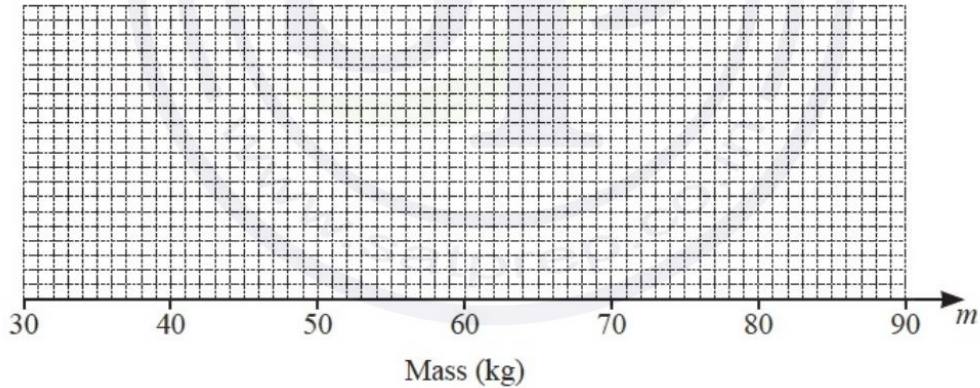
..... [3]

Question 54

3 The cumulative frequency diagram shows information about the mass, m kg, of each of 80 boys.



(a)



On the grid, draw a box-and-whisker plot to show the information in the cumulative frequency diagram. [4]

(b) Use the cumulative frequency diagram to find an estimate of

- (i) the 30th percentile,
- (ii) the number of boys with a mass greater than 75 kg.

.....[2]

Continue on the next page...

(c) (i) Use the cumulative frequency diagram to complete this frequency table.

Mass (m kg)	$30 < m \leq 40$	$40 < m \leq 50$	$50 < m \leq 60$	$60 < m \leq 70$	$70 < m \leq 80$	$80 < m \leq 90$
Frequency	8	12			14	10

[1]

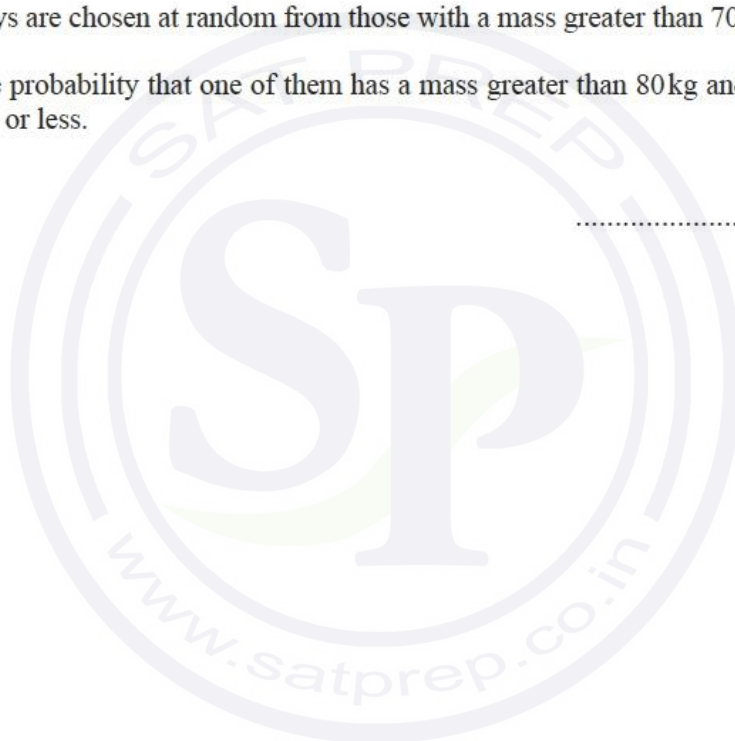
(ii) Calculate an estimate of the mean mass of the boys.

..... kg [4]

(iii) Two boys are chosen at random from those with a mass greater than 70 kg.

Find the probability that one of them has a mass greater than 80 kg and the other has a mass of 80 kg or less.

..... [3]



Question 55

The table shows information about the mass, m grams, of each of 120 letters.

Mass (m grams)	$0 < m \leq 50$	$50 < m \leq 100$	$100 < m \leq 200$	$200 < m \leq 500$
Frequency	43	31	25	21

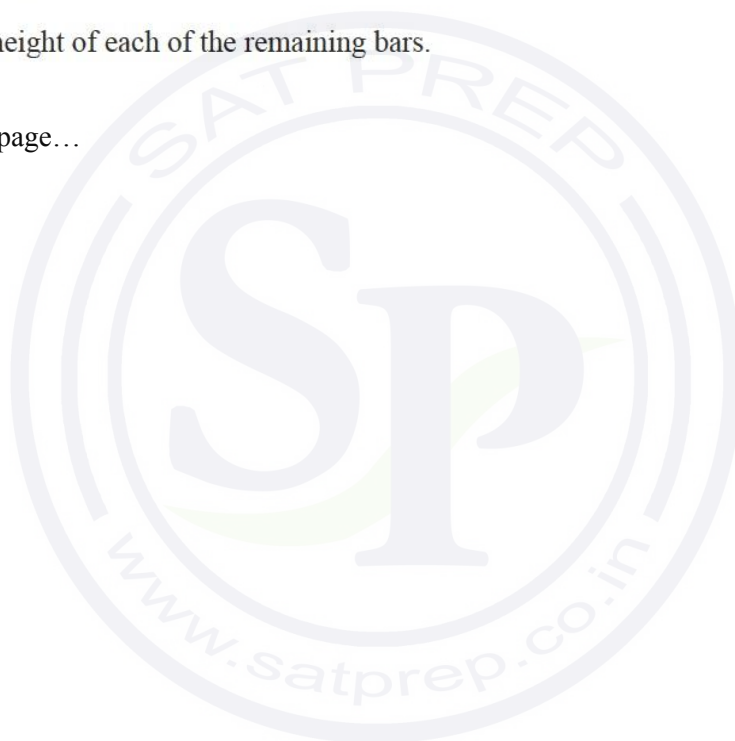
(a) Calculate an estimate of the mean mass.

..... g [4]

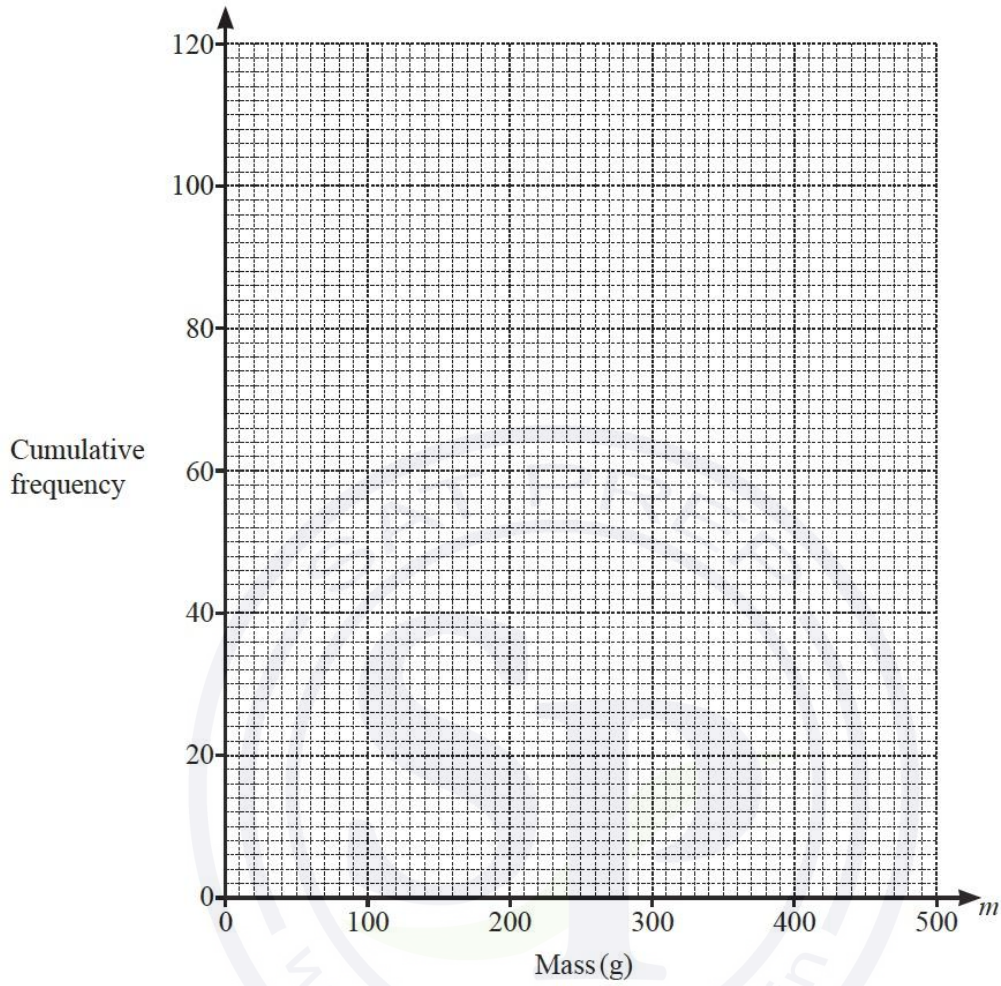
(b) Iraj draws a histogram to show this information.
He makes the height of the first bar 17.2 cm.

Calculate the height of each of the remaining bars.

Continue on the next page...



(d) Draw a cumulative frequency diagram.



[3]

(e) Use the cumulative frequency diagram to find an estimate for

(i) the median,

..... g [1]

(ii) the upper quartile,

..... g [1]

(iii) the 40th percentile,

..... g [2]

(iv) the number of letters with a mass m where $250 < m \leq 400$.

..... [2]

Question 56

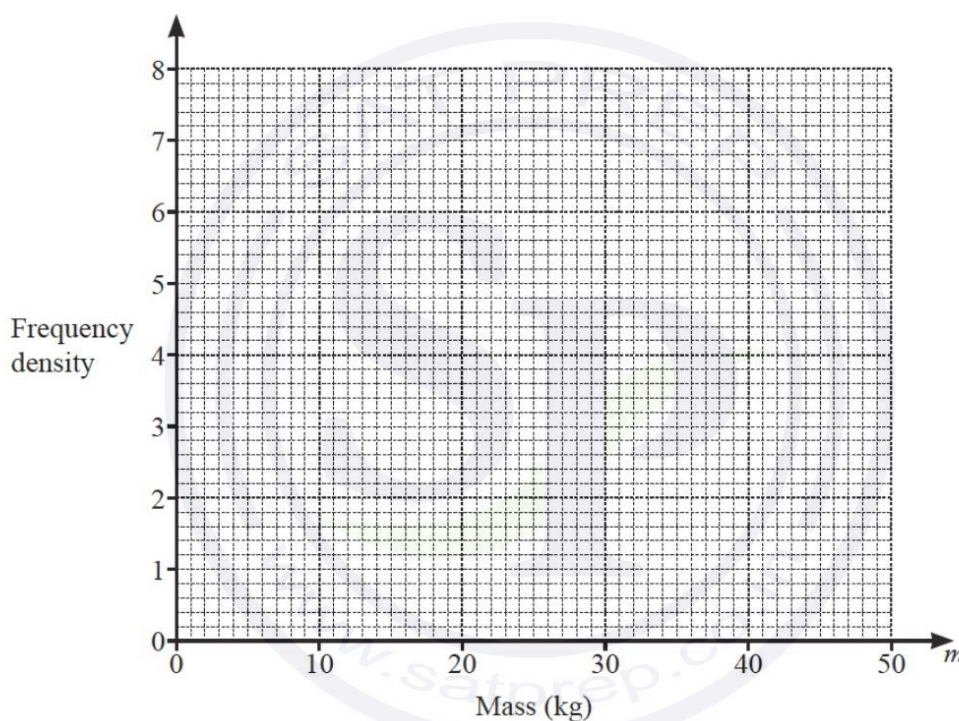
Information about the mass, m kg, of each of 150 children is recorded in the frequency table.

Mass (m kg)	$0 < m \leq 10$	$10 < m \leq 20$	$20 < m \leq 25$	$25 < m \leq 40$	$40 < m \leq 50$
Frequency	12	38	32	50	18

(a) Calculate an estimate of the mean mass.

..... kg [4]

(b) Draw a histogram to show the information in the table.



[4]

(c) (i) Use the frequency table to complete this cumulative frequency table.

Mass (m kg)	$m \leq 10$	$m \leq 20$	$m \leq 25$	$m \leq 40$	$m \leq 50$
Cumulative frequency					

[2]

(ii) Calculate the percentage of children with a mass greater than 10 kg.

..... % [2]

Question 57

(a) The list shows 15 midday temperatures, in degrees Celsius, in Suntown.

17 21 21 18 23 22 25 19

21 17 19 18 21 24 23

(i) Complete the stem-and-leaf diagram to show this information.

1	7
2	

Key: 1|7 represents 17°C

[2]

(ii) Find the median.

.....°C [1]

(iii) Find the upper quartile.

.....°C [1]

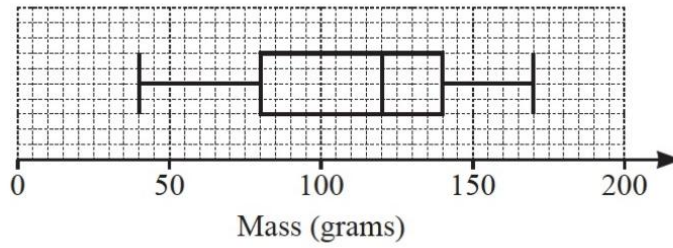
(iv) Rahul draws a pie chart to show this information.

Calculate the sector angle for the number of days the temperature is 18°C.

..... [2]

Continue on the next page.....

(b)



The box-and-whisker plot shows information about the masses, in grams, of some apples.

(i) Find the median.

..... g [1]

(ii) Find the range.

..... g [1]

(iii) Find the interquartile range.

..... g [1]

(c) (i) The time, t minutes, spent on homework in one week by each of 200 students is recorded. The table shows the results.

Time (t minutes)	$40 < t \leq 60$	$60 < t \leq 80$	$80 < t \leq 90$	$90 < t \leq 100$	$100 < t \leq 150$
Frequency	6	10	70	84	30

Calculate an estimate of the mean.

..... min [4]

(ii) A new table with different class intervals is completed.

Time (t minutes)	$40 < t \leq 90$	$90 < t \leq 150$
Frequency	86	114

On a histogram the height of the bar for the $40 < t \leq 90$ interval is 17.2 cm.

Calculate the height of the bar for the $90 < t \leq 150$ interval.

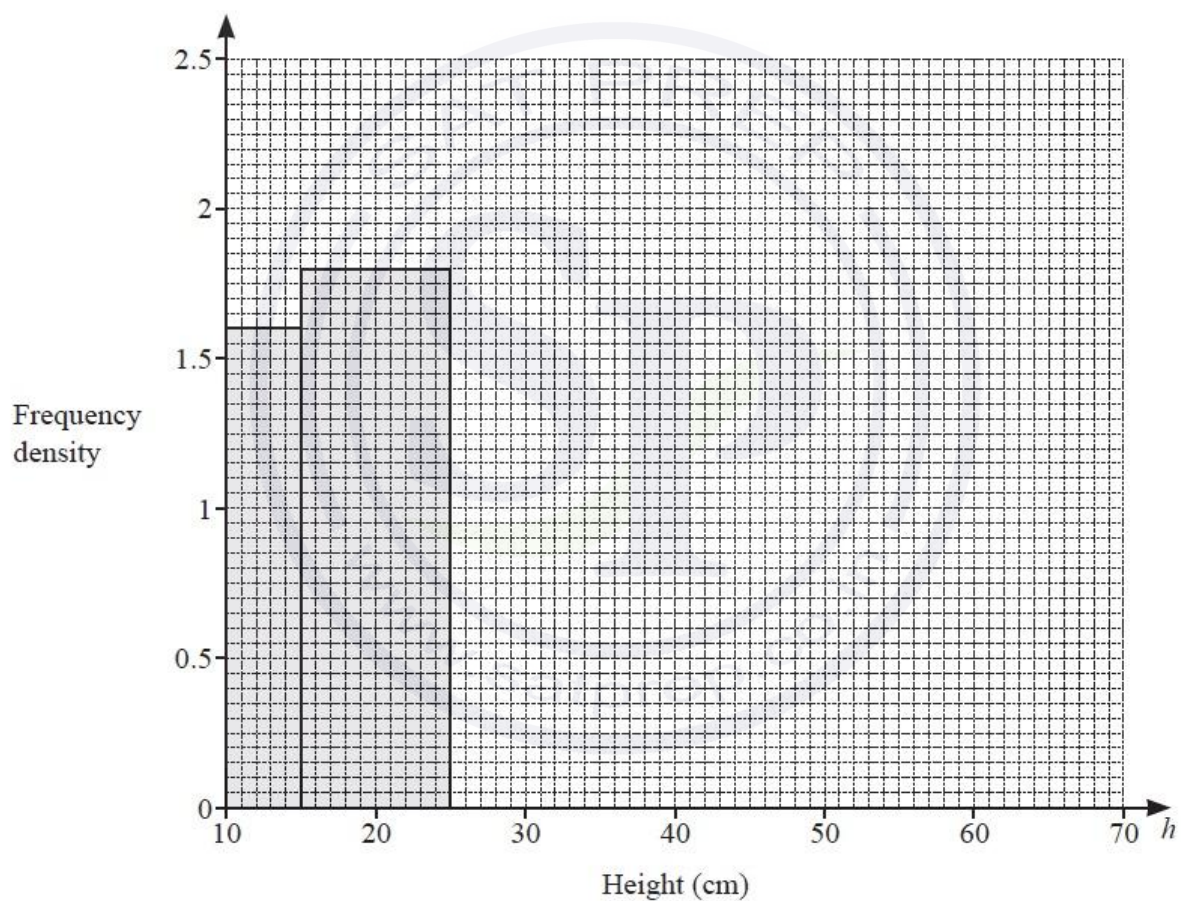
..... cm [2]

Question 58

The height, h cm, of each of 100 plants is recorded.
 The table shows information about the heights of these plants.

Height (h cm)	$10 < h \leq 15$	$15 < h \leq 25$	$25 < h \leq 40$	$40 < h \leq 60$	$60 < h \leq 70$
Frequency	8	18	28	33	13

- (a) Complete the histogram to show this information.
 The first two blocks have been drawn for you.



[3]

- (b) Calculate an estimate of the mean height.

..... cm [4]

Question 59

3 Kai and Ann carry out a survey on the distances travelled, in kilometres, by 200 cars.

Kai completes this frequency table for the data collected.

Distance (d km)	$80 < d \leq 100$	$100 < d \leq 150$	$150 < d \leq 200$	$200 < d \leq 300$	$300 < d \leq 400$
Frequency	7	33	76	52	32

(a) (i) Calculate an estimate of the mean.

..... km [4]

(ii) Ann uses this frequency table for the same data.
There is a different interval for the final group.

Distance (d km)	$80 < d \leq 100$	$100 < d \leq 150$	$150 < d \leq 200$	$200 < d \leq 300$	$300 < d \leq 360$
Frequency	7	33	76	52	32

Without calculating an estimate of the mean for this data, find the difference between Ann's and Kai's estimate of the mean.
You must show all your working.

..... km [2]

(iii) A histogram is drawn showing the information in Kai's frequency table.
The height of the block for the interval $200 < d \leq 300$ is 2.6 cm.

Calculate the height of the block for each of the following intervals.

$80 < d \leq 100$ cm

$150 < d \leq 200$ cm

$300 < d \leq 400$ cm [3]

Continue on the next page...

(b) One car is picked at random.

Find the probability that the car has travelled more than 300 km.

..... [1]

(c) Two of the 200 cars are picked at random.

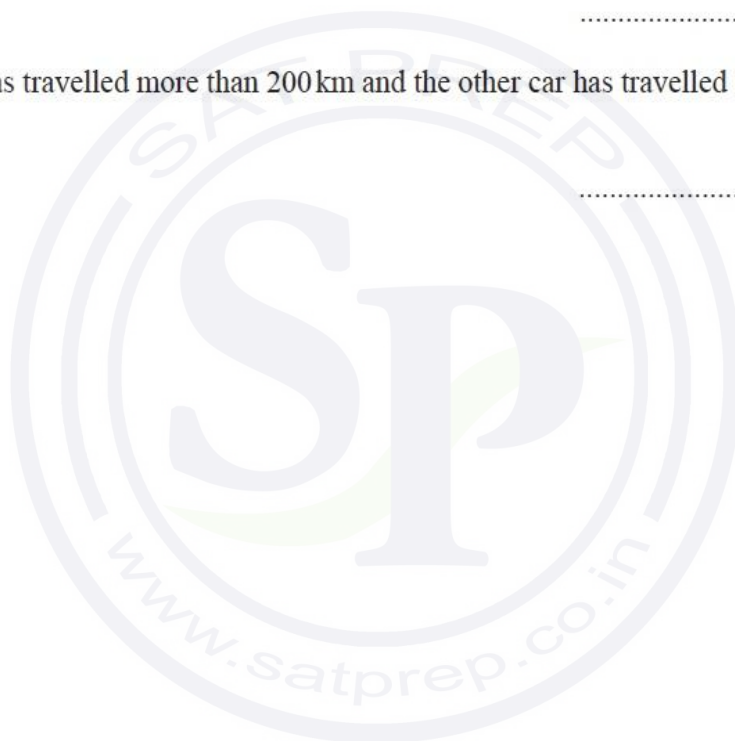
Find the probability that

(i) both cars have travelled 150 km or less,

..... [2]

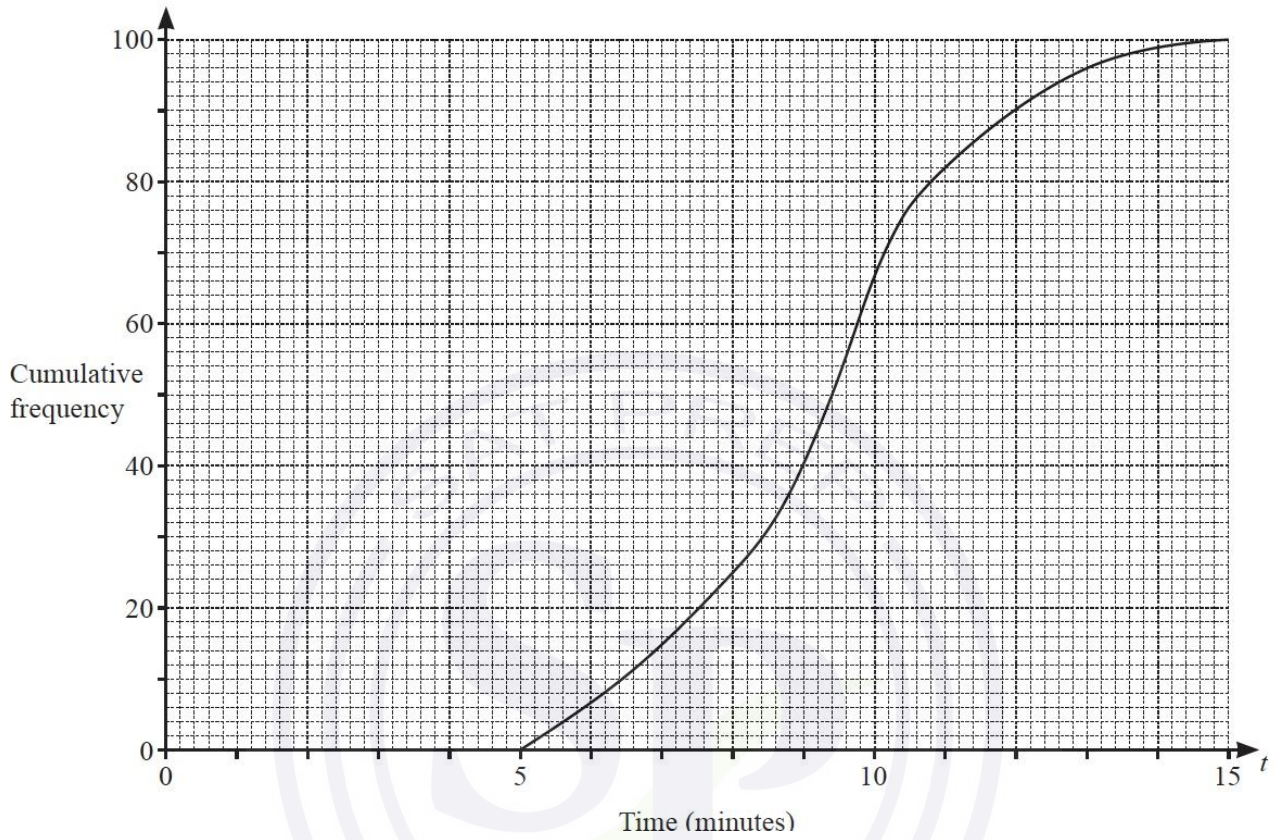
(ii) one car has travelled more than 200 km and the other car has travelled 100 km or less.

..... [3]



Question 60

- 5 (a) 100 students each record the time, t minutes, taken to eat a pizza.
The cumulative frequency diagram shows the results.



Find an estimate of

- (i) the median,

..... min [1]

- (ii) the interquartile range,

..... min [2]

- (iii) the number of students taking more than 11 minutes to eat a pizza.

..... [2]

Continue on the next page...

- (b) 150 students each record how far they can throw a tennis ball.
The table shows the results.

Distance (d metres)	$0 < d \leq 20$	$20 < d \leq 30$	$30 < d \leq 35$	$35 < d \leq 45$	$45 < d \leq 60$
Frequency	4	38	40	53	15

- (i) Calculate an estimate of the mean.

..... m [4]

- (ii) A histogram is drawn to show this information.
The height of the bar representing $30 < d \leq 35$ is 12 cm.

Calculate the height of each of the other bars.

Distance (d metres)	Frequency	Height of bar (cm)
$0 < d \leq 20$	4	
$20 < d \leq 30$	38	
$30 < d \leq 35$	40	12
$35 < d \leq 45$	53	
$45 < d \leq 60$	15	

[3]

- (iii) Two students are chosen at random.

Find the probability that they both threw the ball more than 45 m.

..... [2]

Question 61

- (a) 100 students take part in a reaction test.
The table shows the results.

Reaction time (seconds)	6	7	8	9	10	11
Number of students	3	32	19	29	11	6

- (i) Write down the mode.

..... s [1]

- (ii) Find the median.

..... s [1]

- (iii) Calculate the mean.

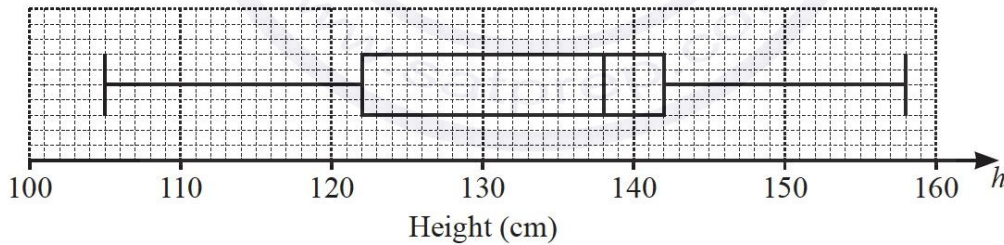
..... s [3]

- (iv) Two students are chosen at random.

Find the probability that both their reaction times are greater than or equal to 9 seconds.

..... [2]

- (b) The box-and-whisker plot shows the heights, h cm, of some students.



- (i) Find the range.

..... cm [1]

- (ii) Find the interquartile range.

..... cm [1]

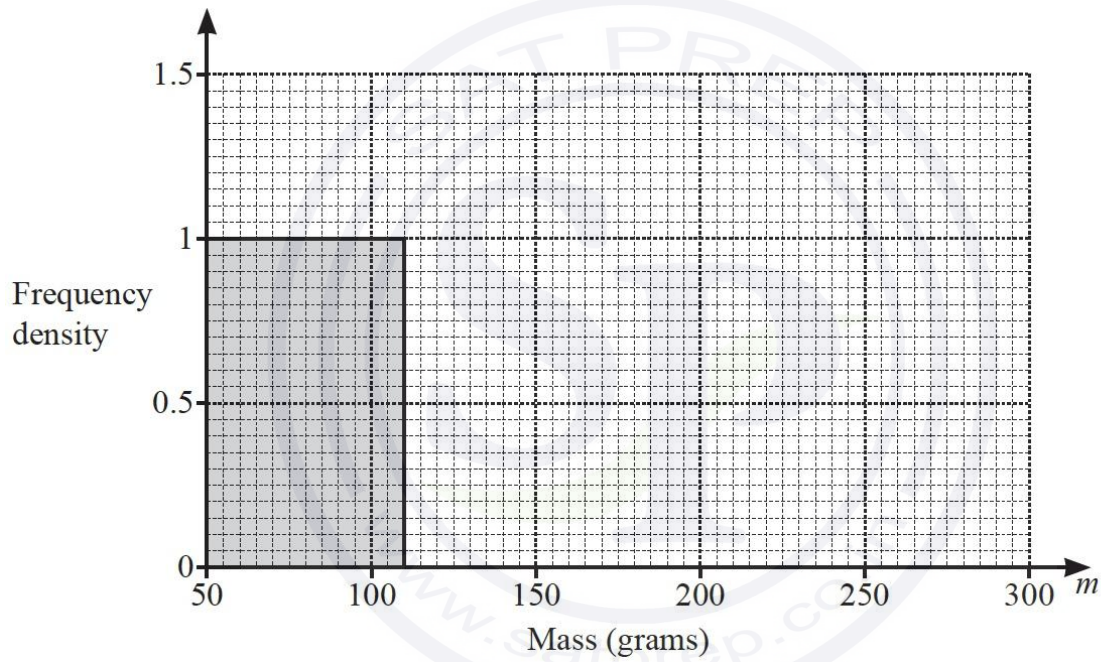
(c) The mass of each of 200 potatoes is measured.
The table shows the results.

Mass (m grams)	$50 < m \leq 110$	$110 < m \leq 200$	$200 < m \leq 300$
Frequency	60	99	41

(i) Calculate an estimate of the mean

..... g [4]

(ii) Complete the histogram to show the information in the table.



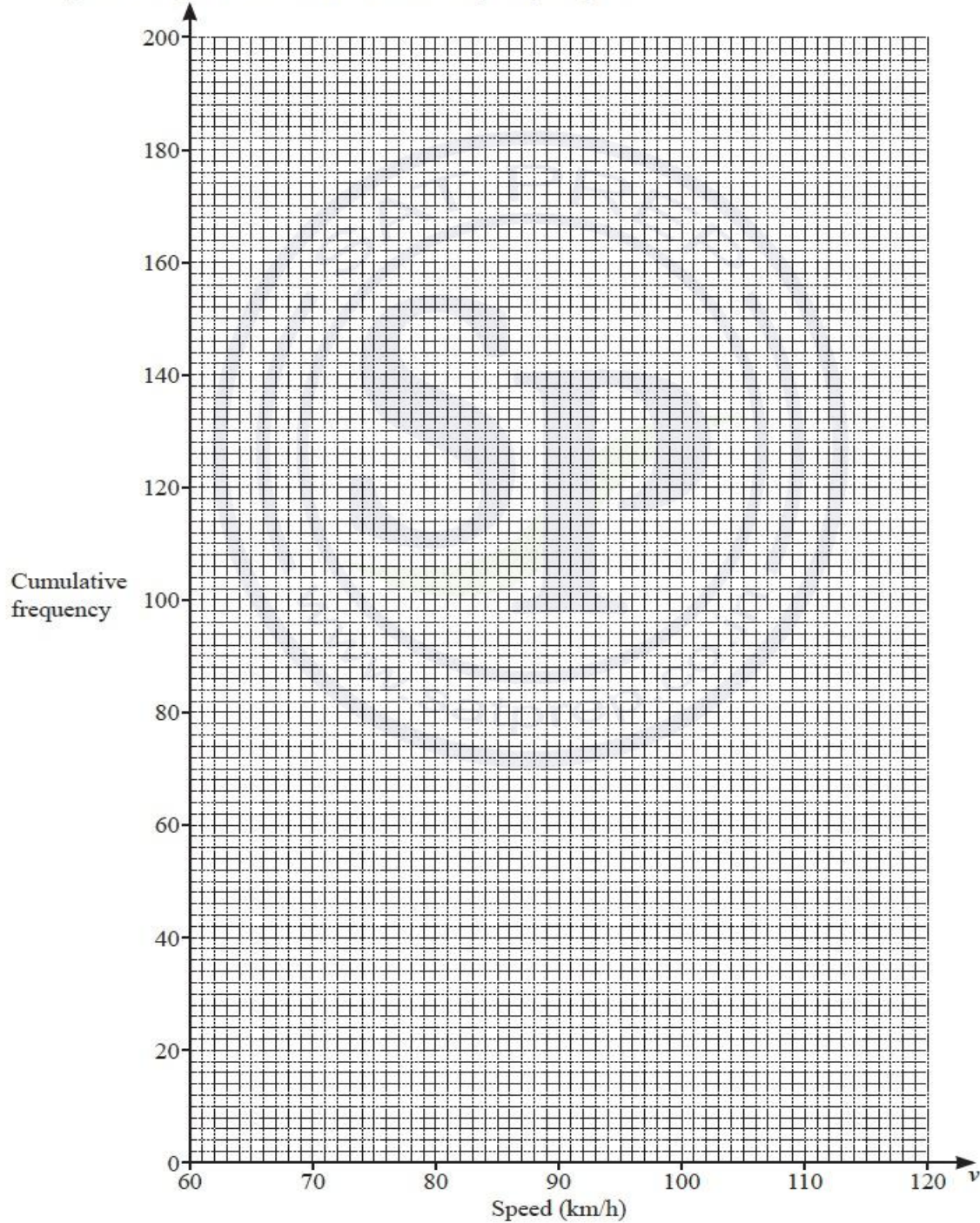
[2]

Question 62

- (a) The cumulative frequency table shows information about the speed of each of 200 cars as they pass a speed camera.

Speed (v km/h)	$v \leq 70$	$v \leq 80$	$v \leq 90$	$v \leq 95$	$v \leq 100$	$v \leq 120$
Cumulative frequency	12	46	115	155	177	200

- (i) On the grid, draw the cumulative frequency diagram.



[3]

(ii) Use your cumulative frequency diagram to find an estimate of

(a) the median

..... km/h [1]

(b) the interquartile range

..... km/h [2]

(c) the number of cars with a speed greater than 110 km/h.

..... [2]

(b) The frequency table shows information about the mass of each of 50 trucks.

Mass (m kg)	$2000 < m \leq 2600$	$2600 < m \leq 3500$	$3500 < m \leq 5000$	$5000 < m \leq 5700$
Frequency	12	15	16	7

(i) Calculate an estimate for the mean mass of the trucks.

..... kg [4]

(ii) In a histogram showing this information, the height of the first block is 6 cm.

Calculate the heights of the remaining three blocks.

Height of block for $2600 < m \leq 3500$ cm

Height of block for $3500 < m \leq 5000$ cm

Height of block for $5000 < m \leq 5700$ cm [3]

Question 63

(a) Anna records the number of text messages she receives for 14 days.

17 15 31 38 31 22 13
 18 21 27 28 21 31 29

(i) Complete the stem-and-leaf diagram.

1	
2	
3	

Key:

[3]

(ii) Find the median.

(iii) Find the mode.

..... [1]

(iv) Find the range.

..... [1]

..... [1]

(b) In a shop, there are 4 red and 8 grey phones.
 Anna and Pete each pick one of these phones at random.

Work out the probability that they both pick a grey phone.

[2]

Question 64

The table shows information about the heights of 80 children.

Height (h metres)	$1.2 < h \leq 1.4$	$1.4 < h \leq 1.5$	$1.5 < h \leq 1.65$	$1.65 < h \leq 1.8$	$1.8 < h \leq 1.9$
Frequency	2	13	24	32	9

(a) (i) Write down the interval containing the median.

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

(ii) Calculate an estimate of the mean height.

..... m [4]

(b) (i) One of these children is chosen at random.
Calculate the probability that they have a height of 1.4 m or less.

..... [1]

(ii) Two of these children are chosen at random.
Calculate the probability that both children are taller than 1.5 m but only one of them is taller than 1.8 m.

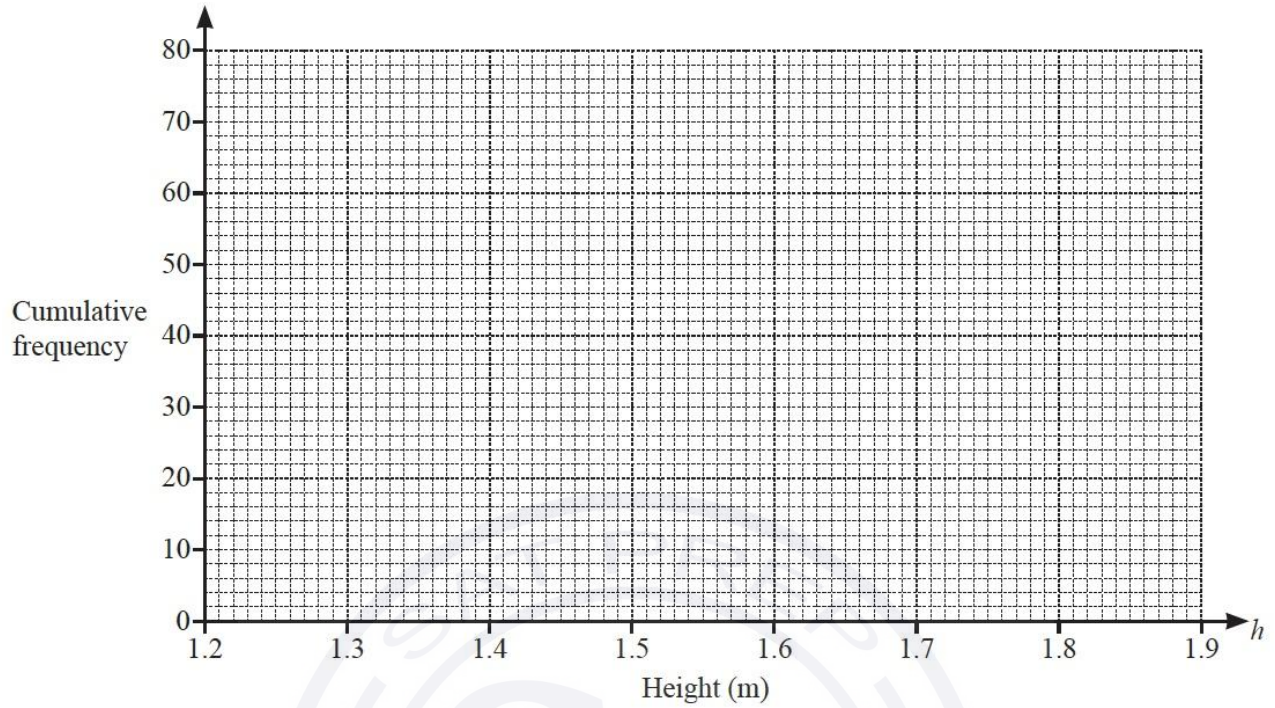
..... [3]

(c) (i) Complete the cumulative frequency table for the heights.

Height (h metres)	$h \leq 1.4$	$h \leq 1.5$	$h \leq 1.65$	$h \leq 1.8$	$h \leq 1.9$
Cumulative frequency	2				

[2]

(ii) On the grid, draw the cumulative frequency diagram.



[3]

(d) Use your diagram to find an estimate of

(i) the interquartile range

.....m [2]

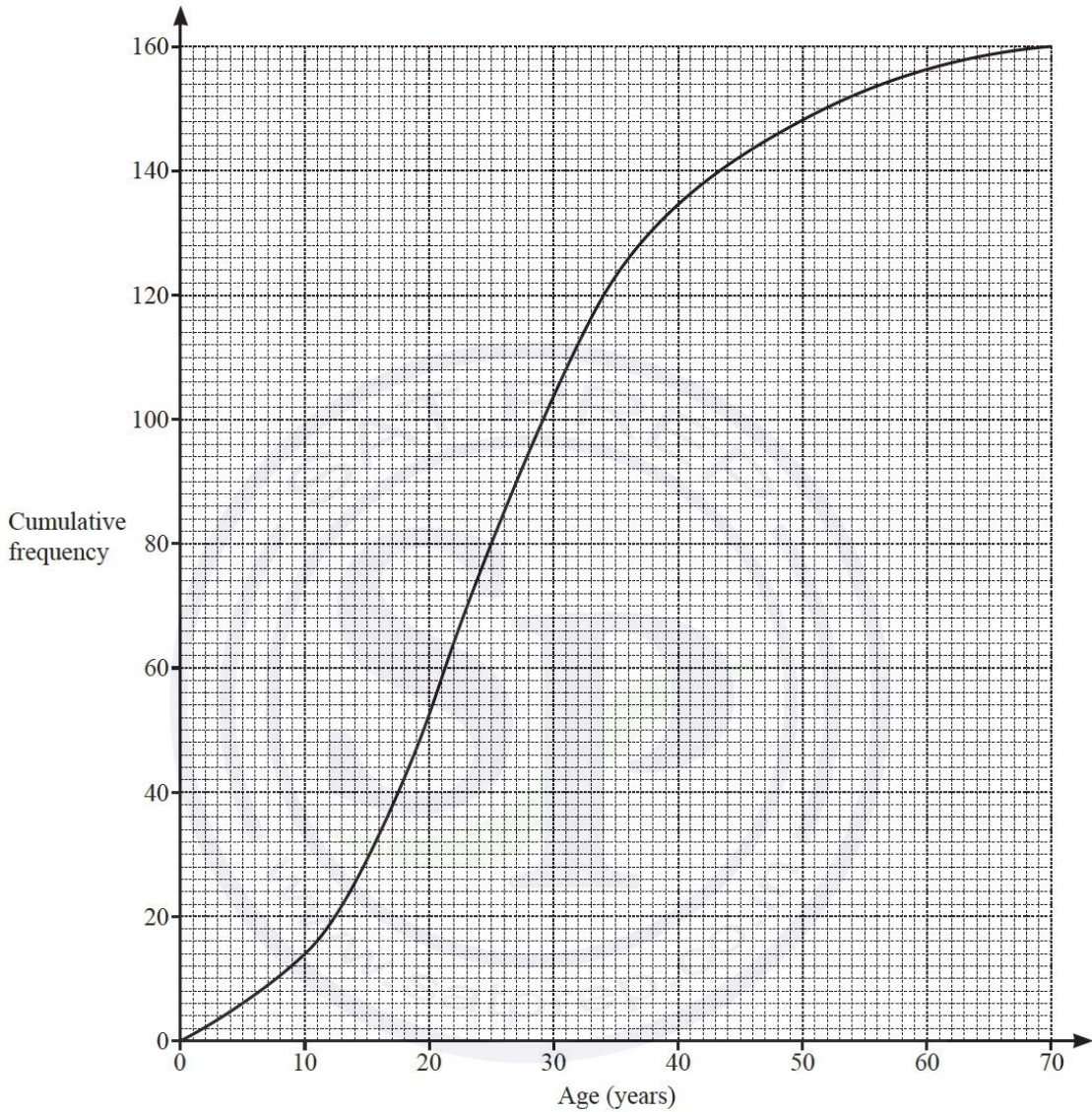
(ii) the 60th percentile.

.....m [2]

Question 65

(a) There are 160 people in a village.

The cumulative frequency diagram shows information about their ages.



(i) Find an estimate for

(a) the median age

..... [1]

(b) the lower quartile

..... [1]

(c) the number of people who are 50 or more years of age

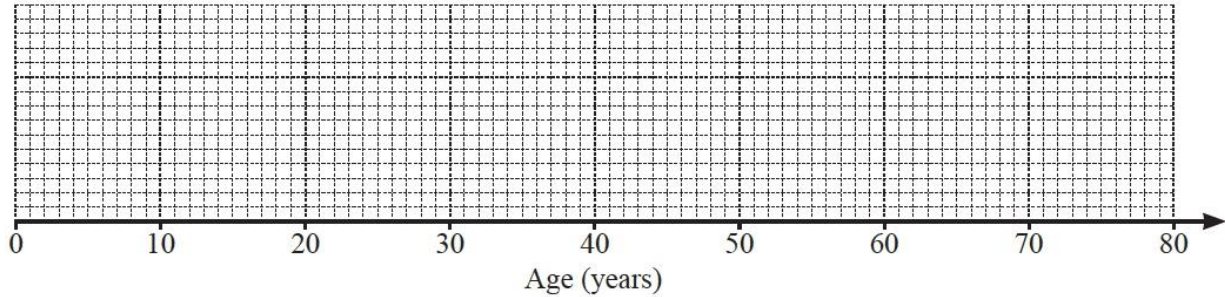
..... [2]

(d) the 65th percentile.

..... [2]

(ii) The youngest person in the village is 1 year old and the oldest is 70 years old.

(a) Draw a box-and-whisker plot to show the distribution of ages in the village.



[3]

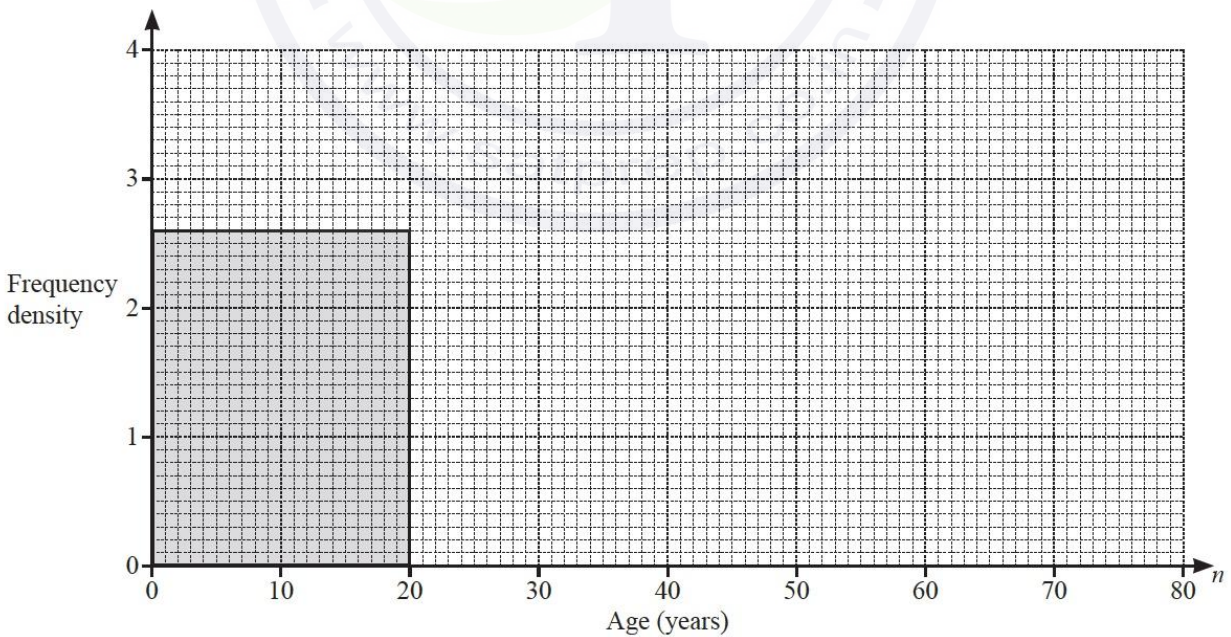
(b) Write down an estimate of the percentage of people in the village that are younger than the median age.

..... % [1]

(b) The frequency table shows information about the age of each person in another village.

Age (n years)	$0 < n \leq 20$	$20 < n \leq 30$	$30 < n \leq 50$	$50 < n \leq 80$
Frequency	52	37	24	60

On the grid, complete the histogram to show this information.
The first block has been drawn for you.



[3]

Question 66

(a) The table shows information about the mass of each of 1000 eggs.

Mass (m grams)	$40 < m \leq 50$	$50 < m \leq 56$	$56 < m \leq 64$	$64 < m \leq 70$
Frequency	126	520	154	200

(i) Calculate an estimate of the mean.

..... g [4]

(ii) An egg is picked at random from the 1000 eggs.

Find the probability that this egg has a mass greater than 56 g.
Give your answer as a fraction in its simplest form.

..... [2]

