Histograms

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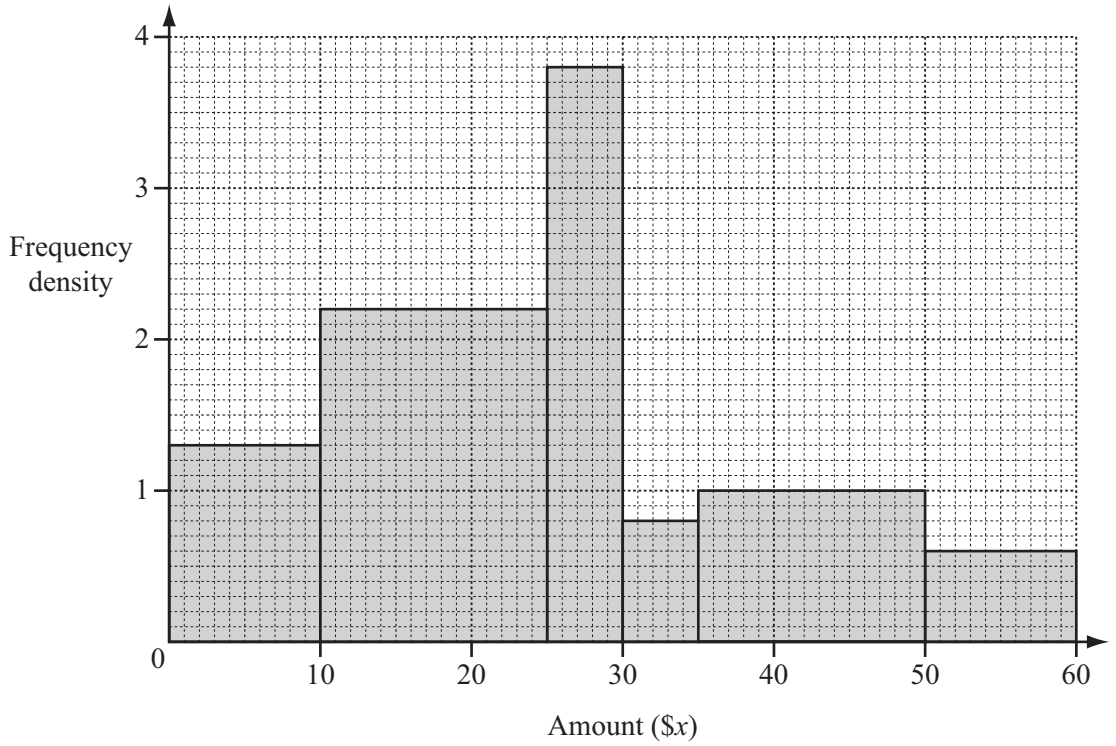
22 The table shows some information about the mass, m grams, of 200 bananas.

Mass (m grams)	$90 < m \leqslant 110$	$110 < m \leqslant 120$	$120 < m \leqslant 125$	$125 < m \leqslant 140$
Frequency	40	70	60	30
Height of column in histogram (cm)			6	

Complete the table.

[4]

2



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)	$0 < x \leqslant 10$					
Frequency				4		

[5]

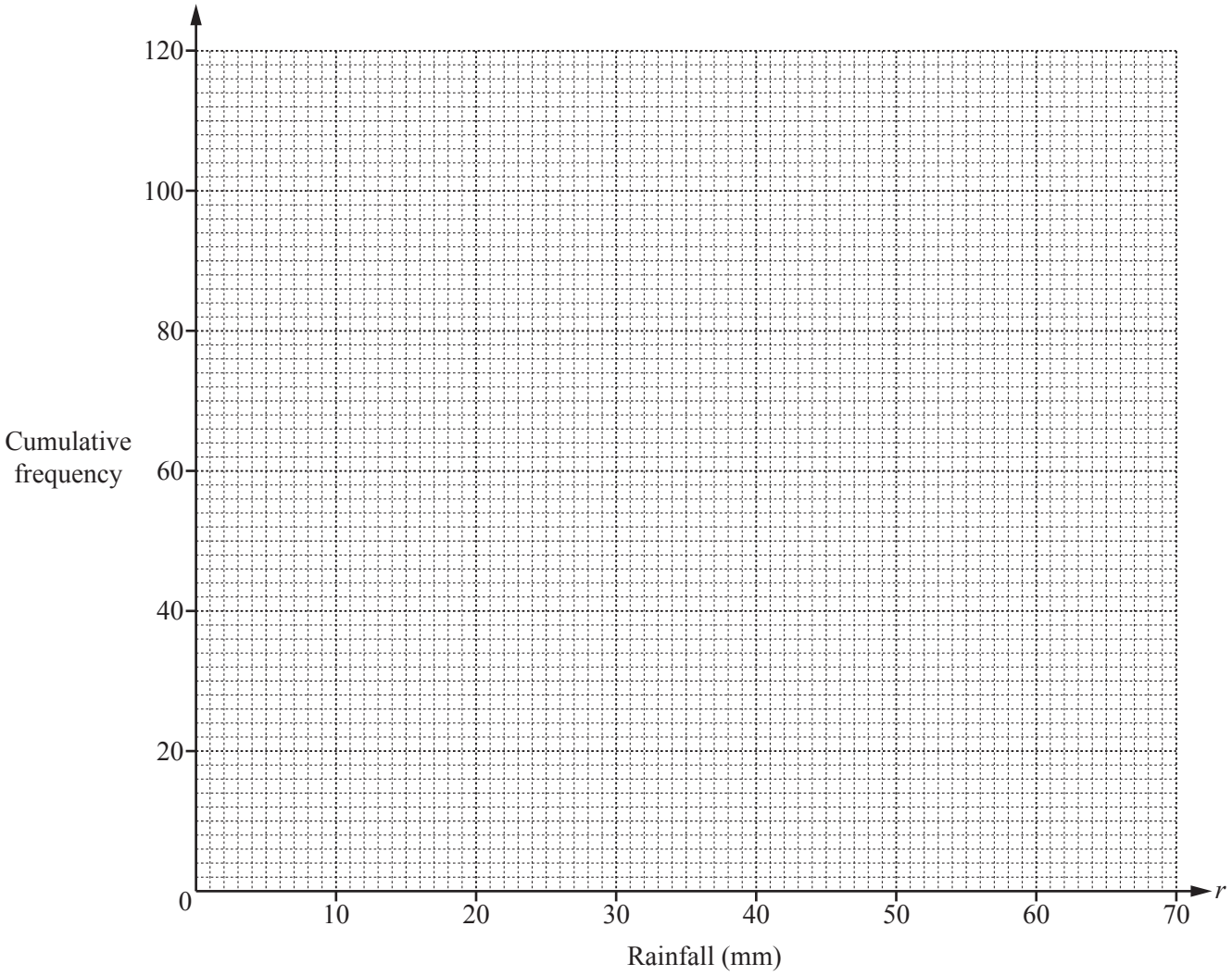
(b) Use your frequency table to calculate an estimate of the mean amount these 90 people gave to charity.

Answer(b) $ ..... [4]

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

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

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



[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)	$0 < r \leqslant 20$	$20 < r \leqslant 25$	$25 < r \leqslant 35$	$35 < r \leqslant 40$	$40 < r \leqslant 60$	$60 < r \leqslant 70$
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 $25 < r \leqslant 35$ is 5.9 .

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

Answer(e) $20 < r \leqslant 25$ .....

$40 < r \leqslant 60$ .....

$60 < r \leqslant 70$ ..... [4]

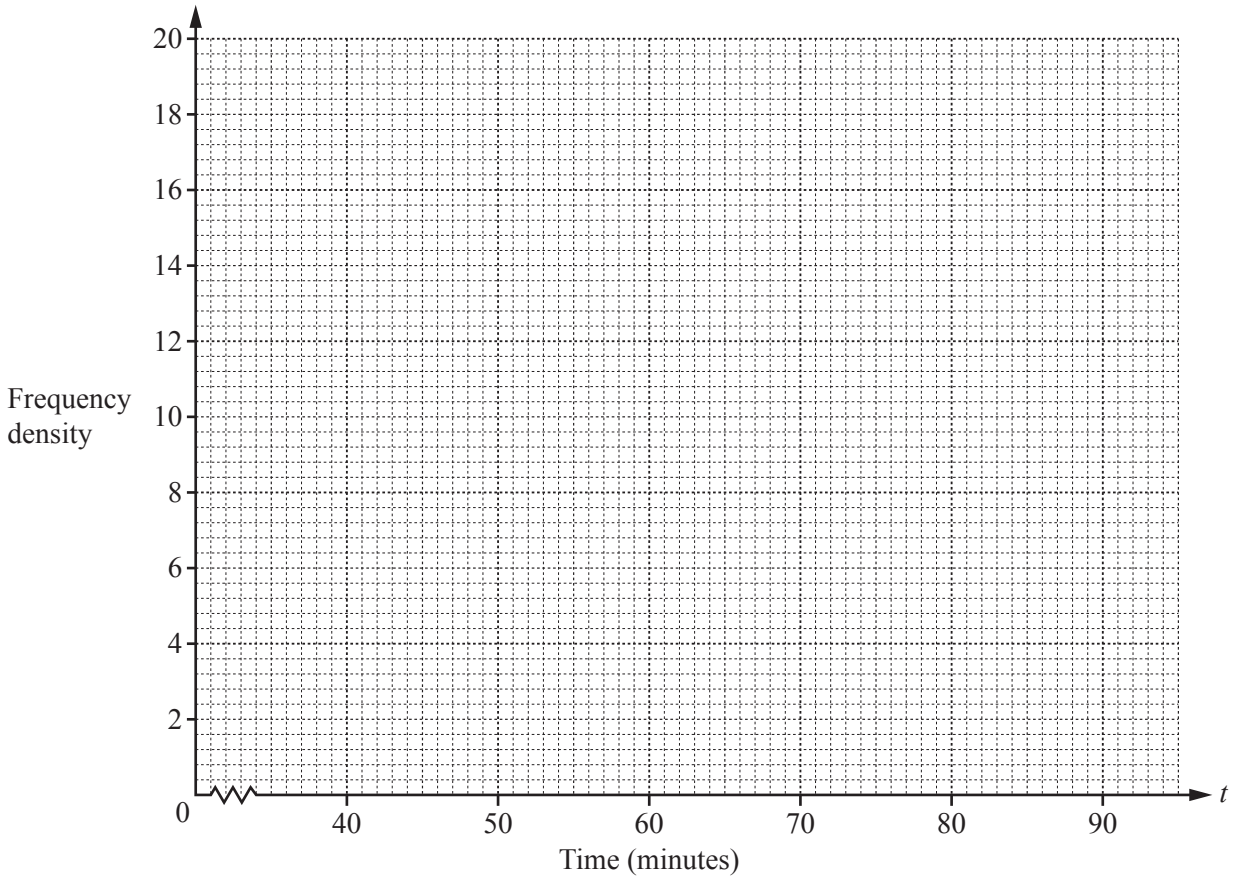
4 The table shows the times, t minutes, taken by 200 students to complete an IGCSE paper.

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

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

Answer(a) ..... min [3]

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



[4]

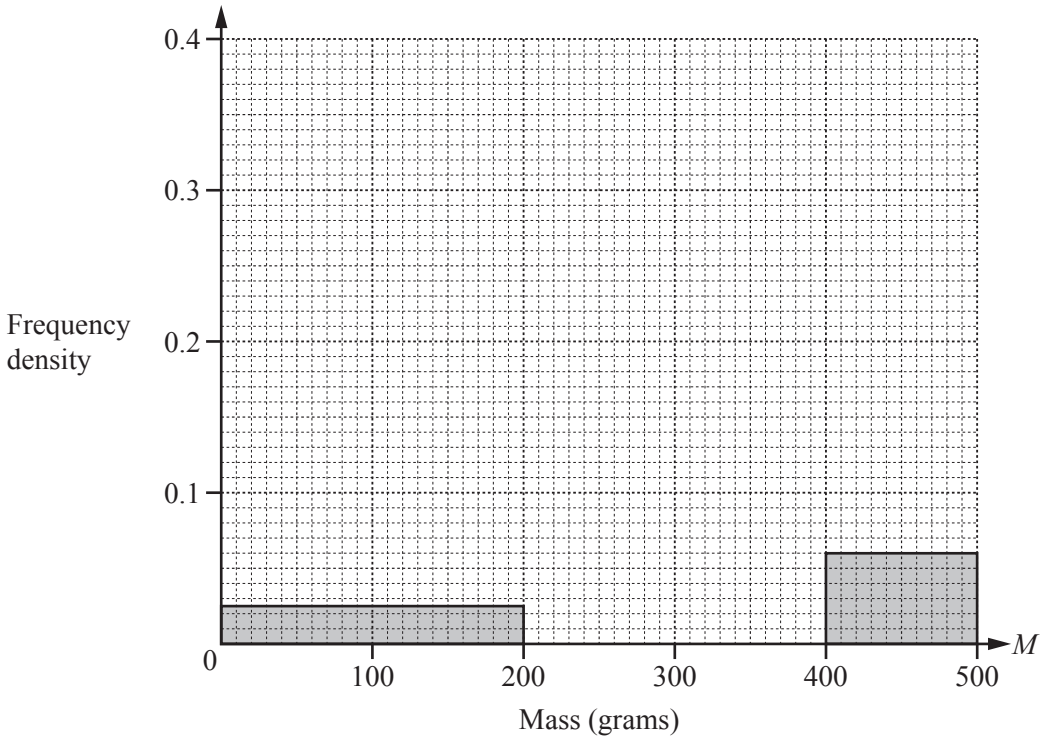
7 **(a)** A group of 50 students estimated the mass, M grams, of sweets in a jar.
The results are shown in the table.

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

(i) Calculate an estimate of the mean.

Answer(a)(i) ..... grams [4]

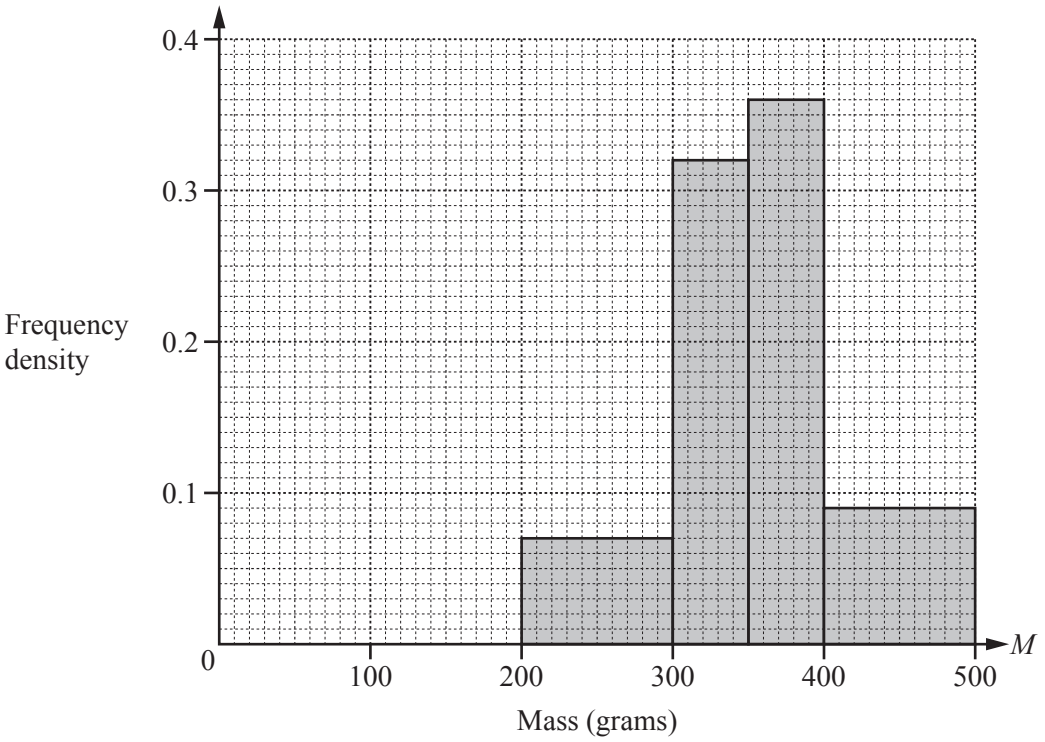
(ii) Complete this histogram to show the information in the table.



[3]

(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)

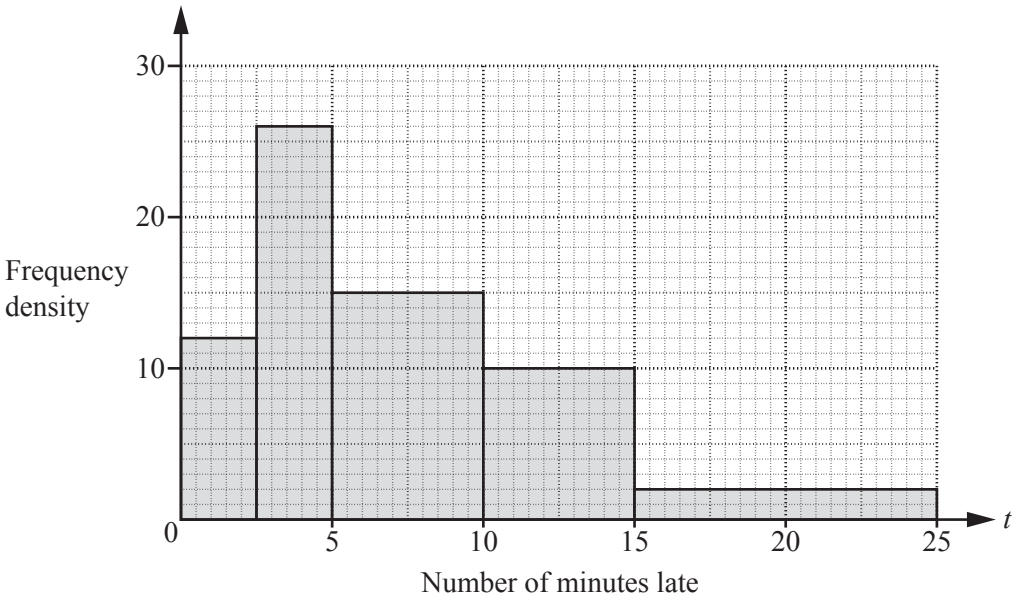
1 .....

.....

2 .....

..... [2]

20 Deborah records the number of minutes late, t, for trains arriving at a station.
The histogram shows this information.



(a) Find the number of trains that Deborah recorded.

..... [2]

(b) Calculate the percentage of the trains recorded that arrived more than 10 minutes late.

.....% [2]

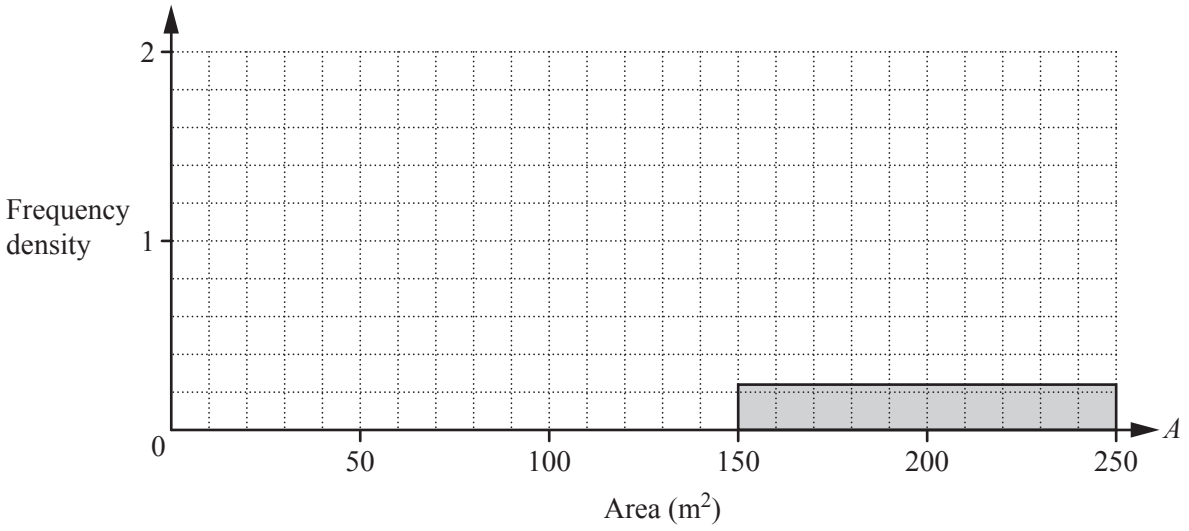
(b) The 200 students also estimate the total area, $A\,m^2$, of the windows in the classroom.
The results are shown in the table.

Area ($A\,m^2$)	$20 < A \leqslant 60$	$60 < A \leqslant 100$	$100 < A \leqslant 150$	$150 < A \leqslant 250$
Frequency	32	64	80	24

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

..... m^2 [4]

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



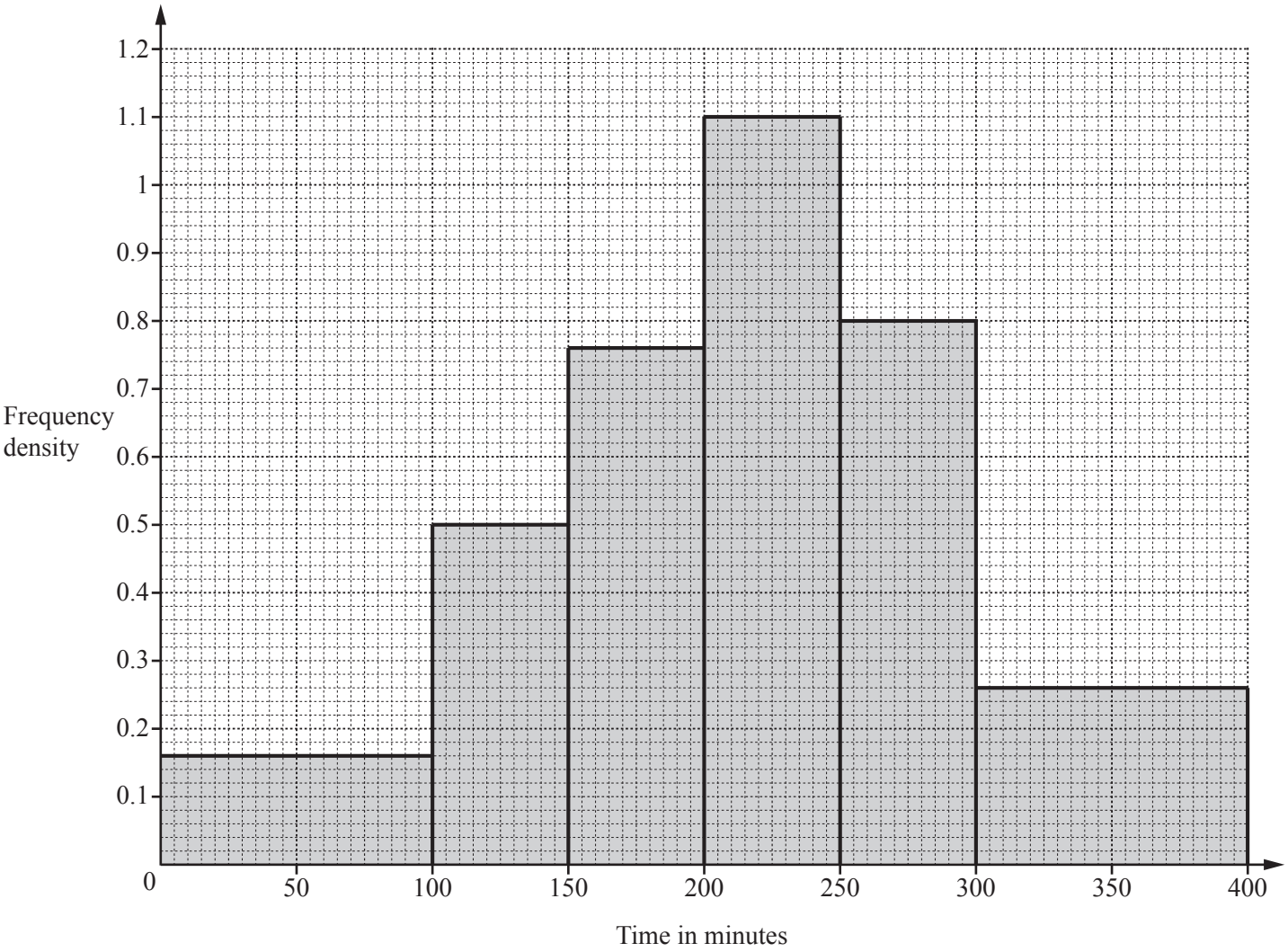
[4]

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

Find the probability that they both estimate that the area is greater than $100\,m^2$.

..... [2]

(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]

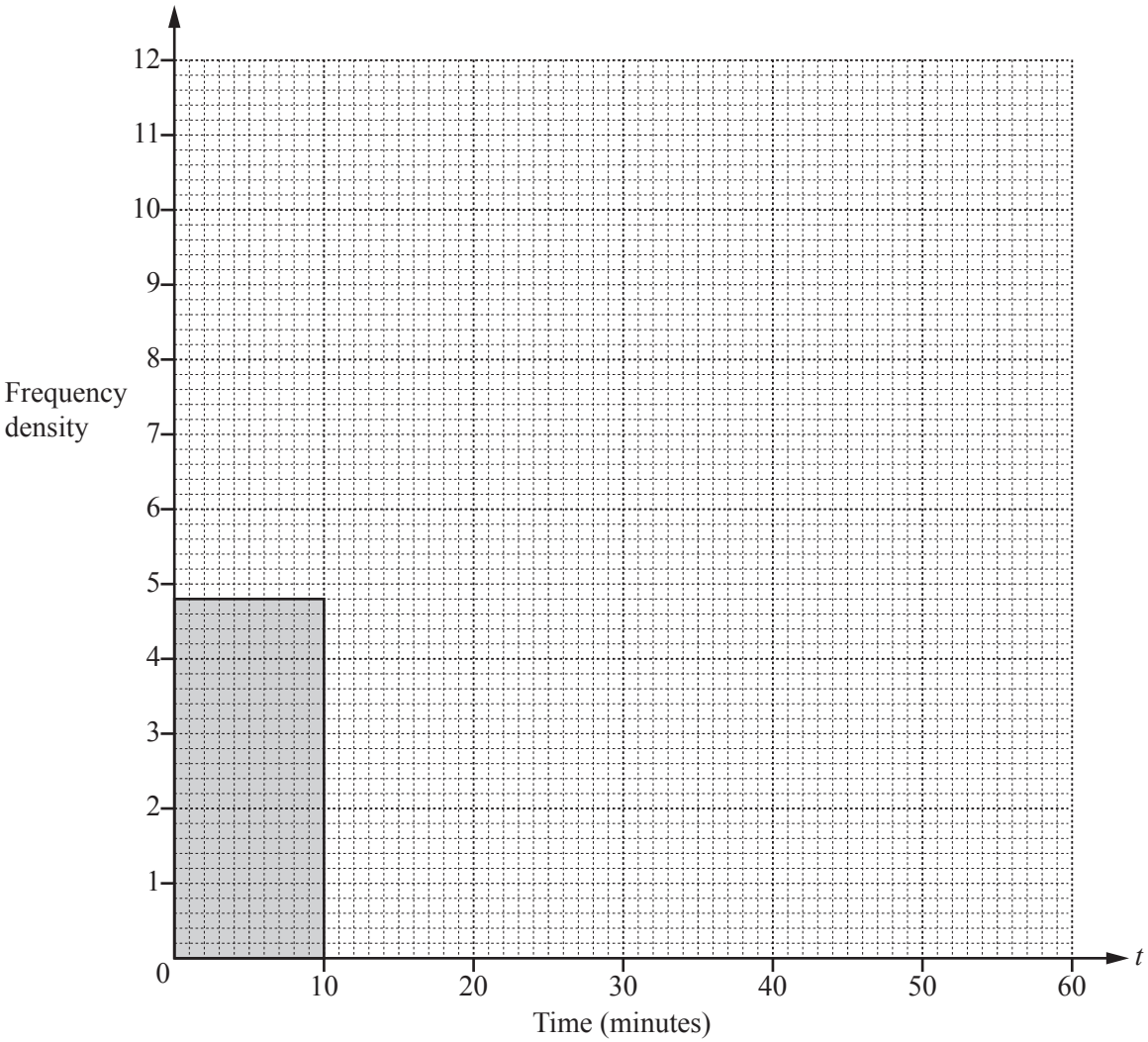
(b) The 200 students record the time, t minutes, for their journey from school to home. The frequency table shows the results.

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

(i) Calculate an estimate of the mean.

..... min [4]

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



[4]

4 200 people run 10 km.
The table shows some information about the times, t minutes, taken to run the 10 km.

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

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

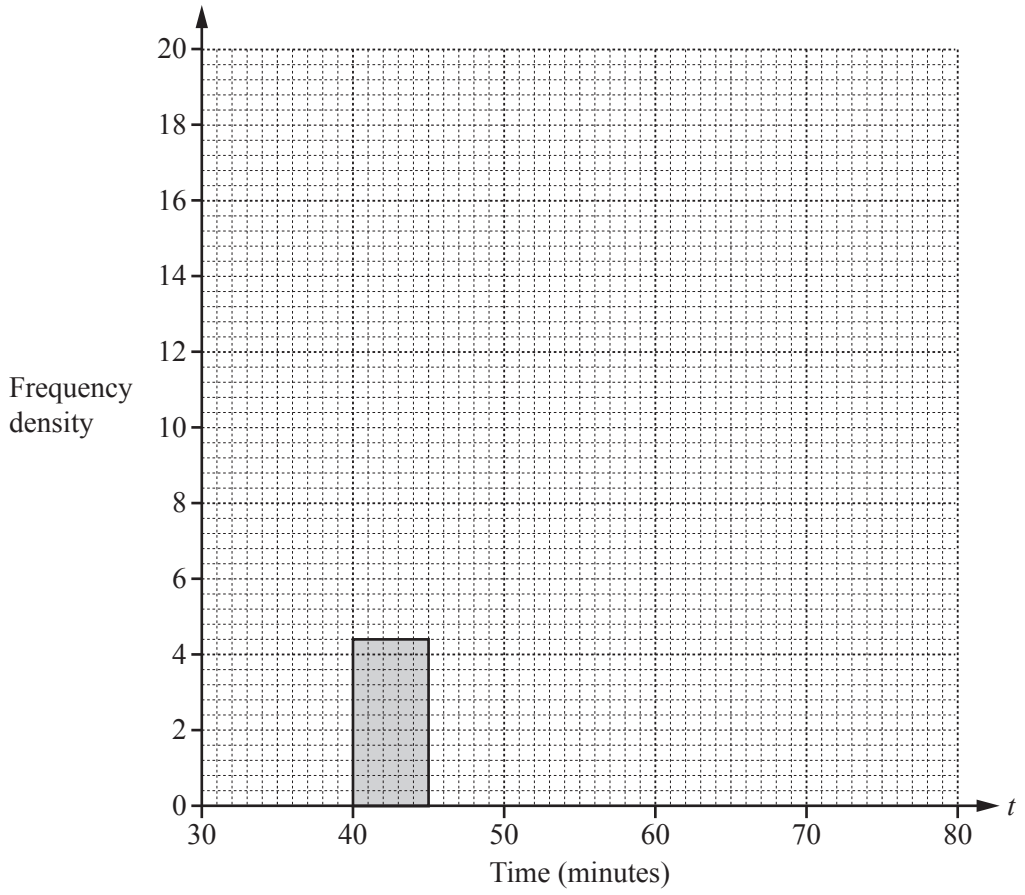
Calculate his average speed in kilometres per hour.

..... km/h [2]

(b) Calculate an estimate of the mean time.

..... min [4]

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



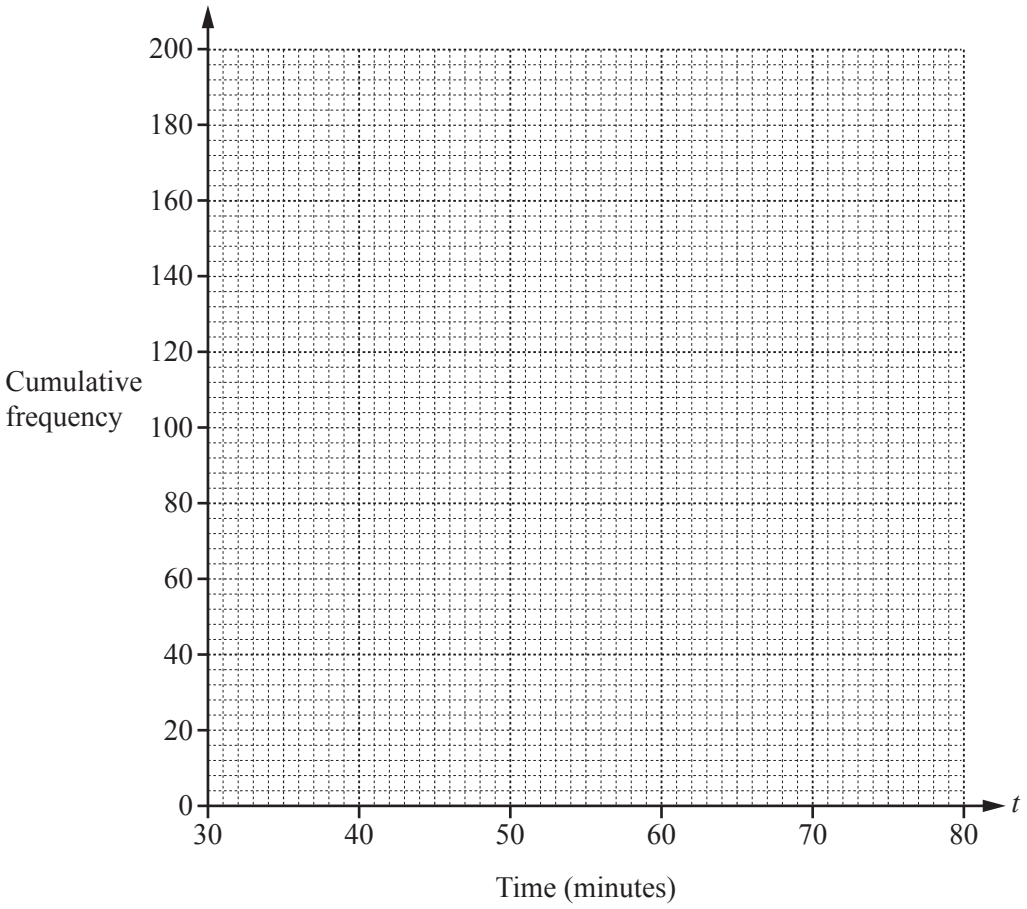
[4]

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

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

[1]

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



[3]

(iii) Use your diagram to find

(a) the median,

.....min [1]

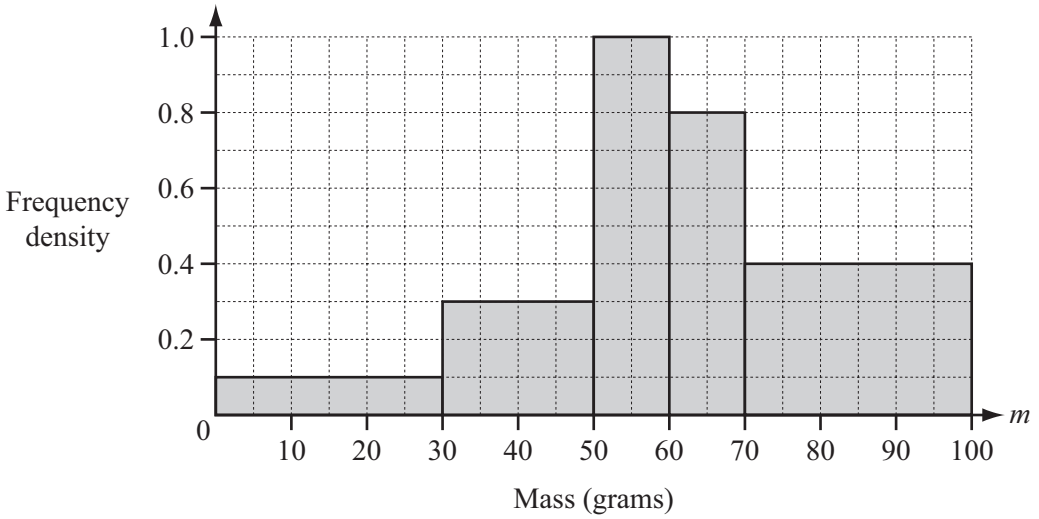
(b) the 90th percentile,

.....min [1]

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

..... [2]

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 $70 < m \leqslant 100$.

Answer(a)(i)

[1]

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

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]