GCSE · Edexcel · Maths

3 hours 46 questions

Exam Questions

Histograms

Frequency Density / Drawing Histograms / Interpreting Histograms

Medium (12 questions)	/46
Hard (17 questions)	/71
Very Hard (17 questions)	/83
Total Marks	**/200**

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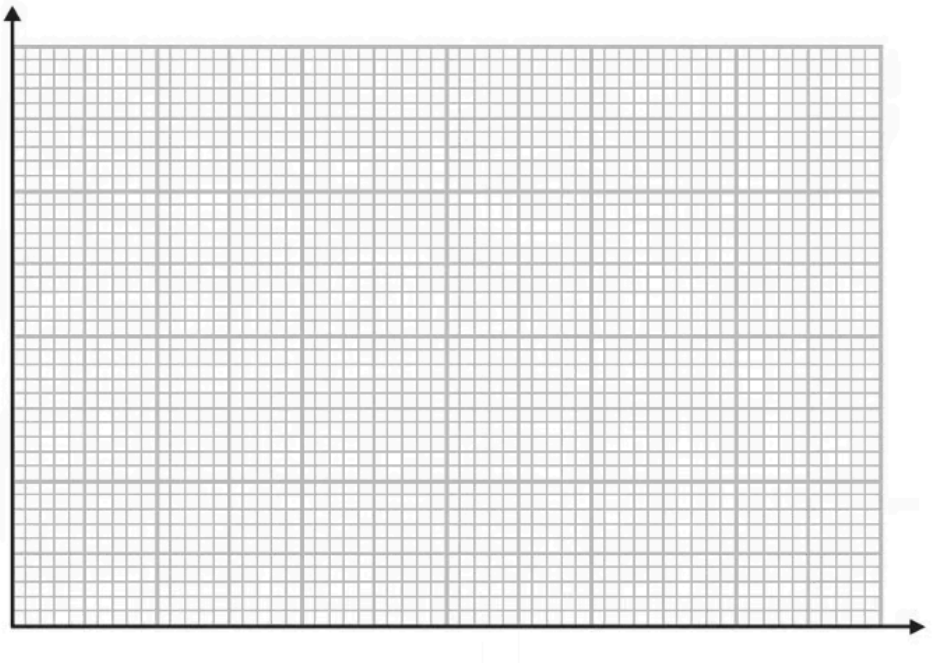
Medium Questions

1 The table gives information about the heights, h metres, of trees in a wood.

Height(h metres)	Frequency
$0 < h \leqslant 2$	7
$2 < h \leqslant 4$	14
$4 < h \leqslant 8$	18
$8 < h \leqslant 16$	24
$16 < h \leqslant 20$	10

Draw a histogram to show this information.



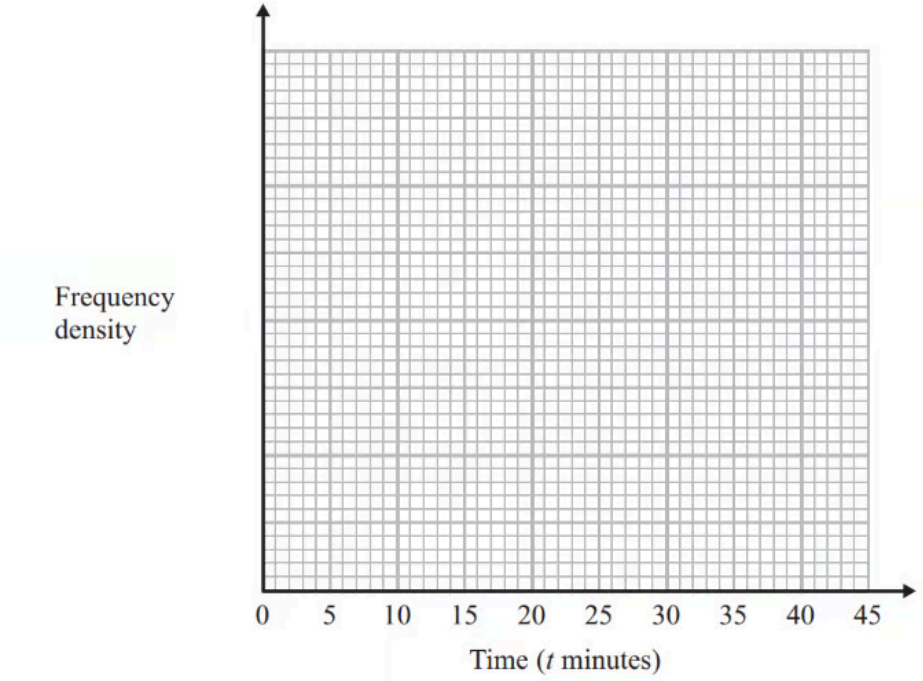
(3 marks)

2 Bill works for a computer service centre.

The table shows some information about the length of time, t minutes, of the phone calls Bill had.

Time(t minutes)	$0 < t \leqslant 10$	$10 < t \leqslant 15$	$15 < t \leqslant 20$	$20 < t \leqslant 30$	$30 < t \leqslant 45$
Number of calls	12	15	13	18	3

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

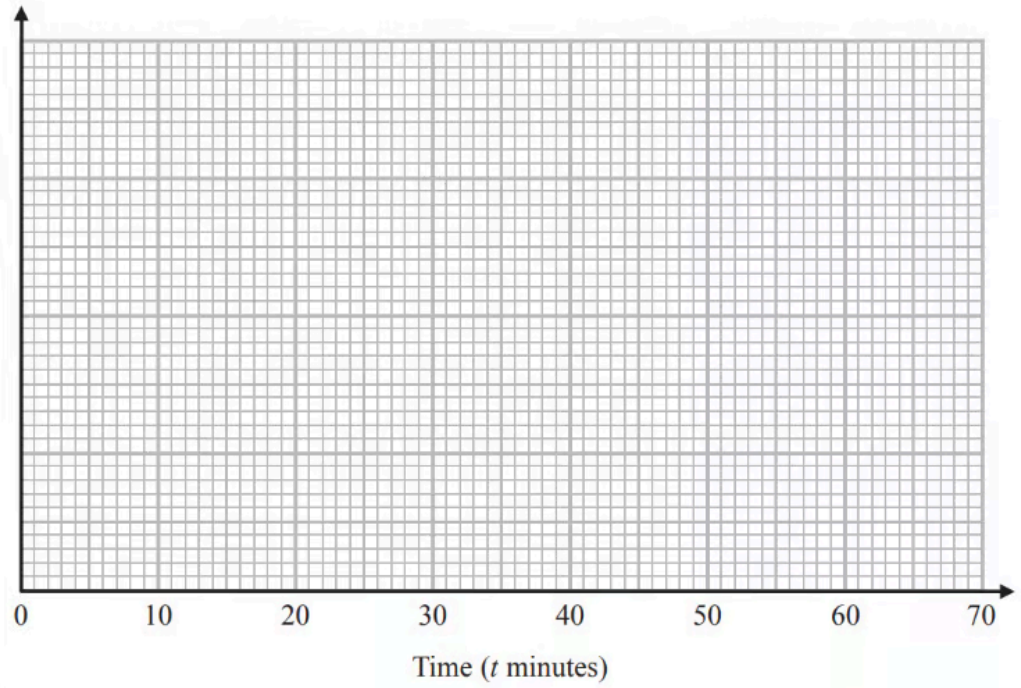


(3 marks)

3 The table gives information about the lengths of time some people were in a supermarket.

Time(t minutes)	**Frequency**
$0 < t \leqslant 5$	8
$5 < t \leqslant 15$	32
$15 < t \leqslant 30$	36
$30 < t \leqslant 40$	18
$40 < t \leqslant 60$	6

Draw a histogram for the information in the table.

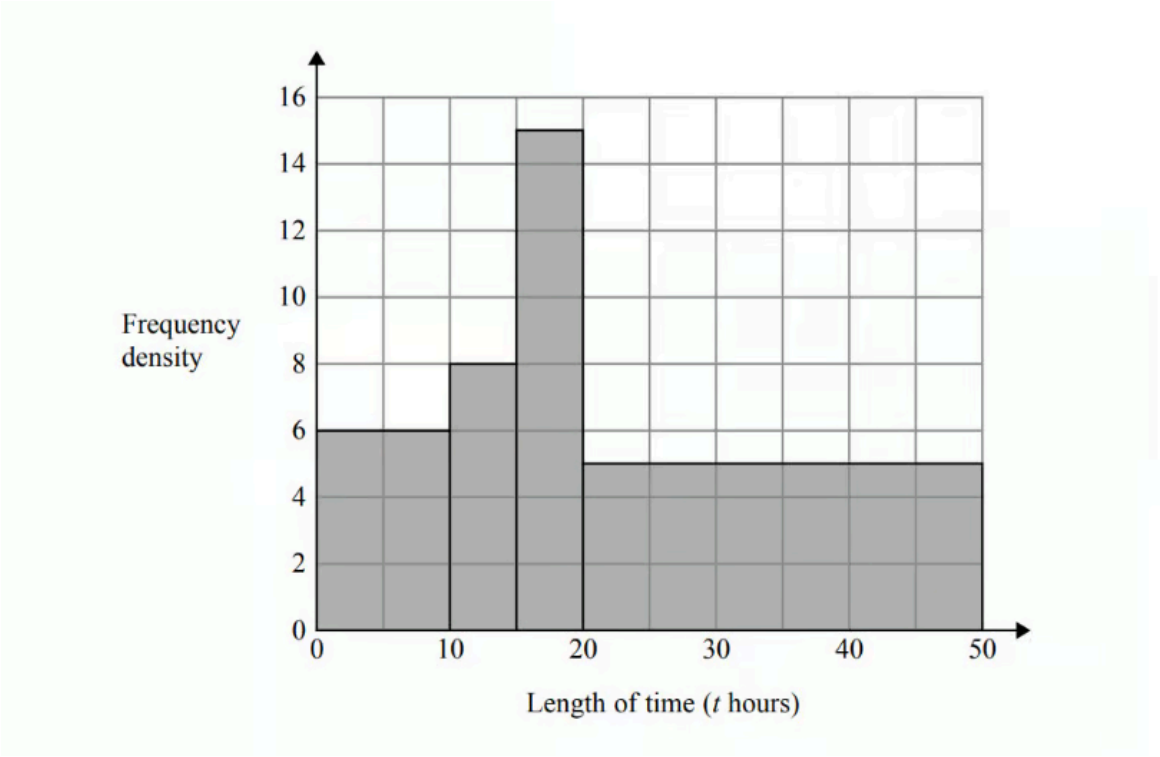


(3 marks)

4 Bhavna recorded the lengths of time, in hours, that some adults watched TV last week. The table shows information about her results.

Length of time(t hours)	**Frequency**
$0 \leqslant t < 10$	6
$10 \leqslant t < 15$	8
$15 \leqslant t < 20$	15
$20 \leqslant t < 40$	5

Bhavna made some mistakes when she drew a histogram for this information.



Write down **two** mistakes Bhavna made.

(2 marks)

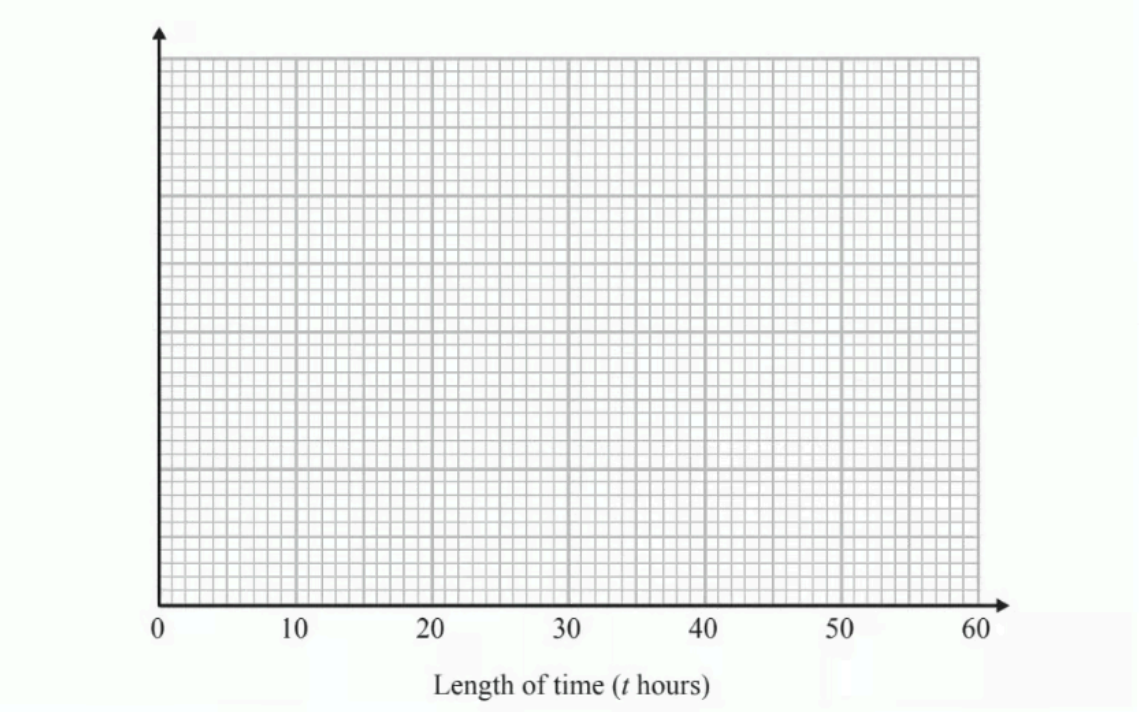
5 (a) The table gives some information about the lengths of time, in hours, that some adults watched TV last week.

Length of time(t hours)	Frequency
$0 \leqslant t < 10$	8
$10 \leqslant t < 15$	15
$15 \leqslant t < 20$	11
$20 \leqslant t < 30$	10
$30 \leqslant t < 50$	6

Work out an estimate for the mean length of time.

(4 marks)

(b) Draw a histogram for the information in the table.



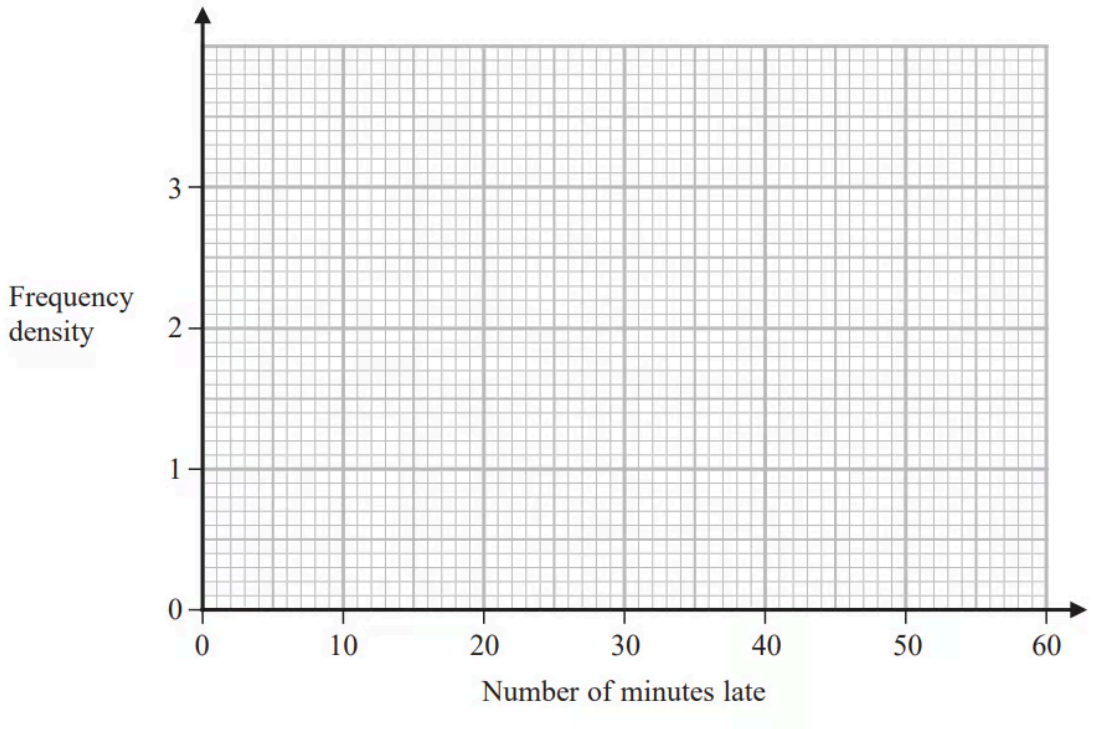
(3 marks)

6 (a) Manuel collected information about the flights that arrived late at an airport last month.

The table gives information about the number of minutes that these flights were late.

Minutes late (L minutes)	Frequency
$0 < L \leqslant 10$	8
$10 < L \leqslant 15$	13
$15 < L \leqslant 25$	19
$25 < L \leqslant 40$	24
$40 < L \leqslant 60$	6

On the grid, draw a histogram for this information.



(3 marks)

(b) Manuel selected at random a flight that was late by 25 minutes or less from his results.

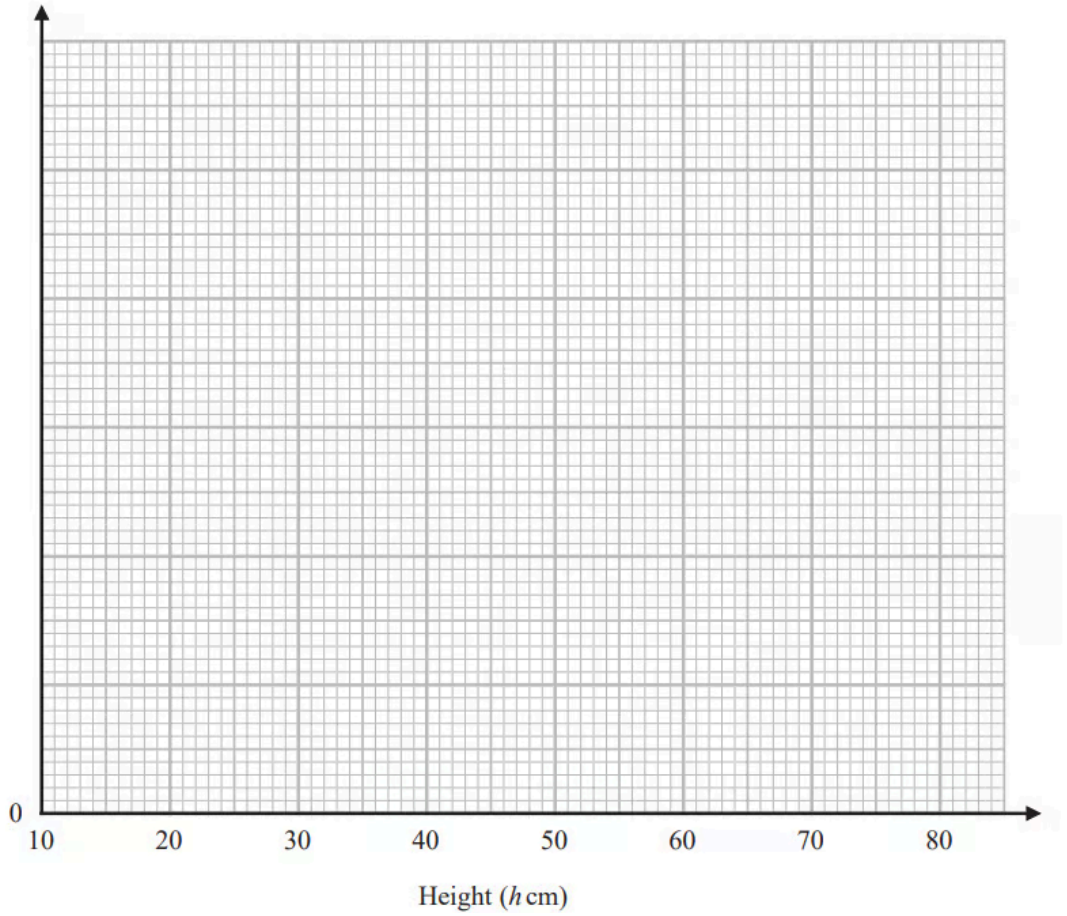
Work out an estimate for the probability that this flight was late by 5 minutes or less.

(2 marks)

7 (a) The table gives information about the heights, in centimetres, of some plants.

Height (h cm)	Frequency
$10 < h \leqslant 20$	35
$20 < h \leqslant 35$	45
$35 < h \leqslant 50$	75
$50 < h \leqslant 70$	40
$70 < h \leqslant 80$	8

On the grid, draw a histogram for this information.



(3 marks)

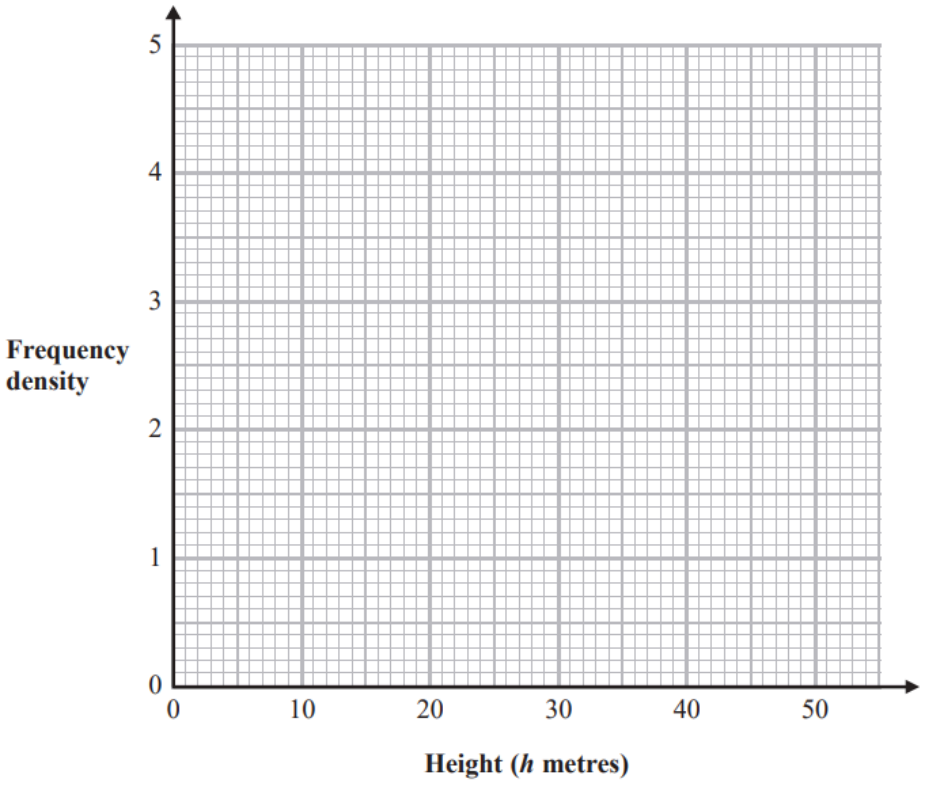
(b) Work out an estimate for the number of these plants with a height greater than 40cm.

(2 marks)

8 The table gives information about the heights of some trees.

Height (h metres)	Frequency
$0 < h \leqslant 20$	15
$20 < h \leqslant 35$	48
$35 < h \leqslant 40$	21
$40 < h \leqslant 50$	16

On the grid, draw a histogram for this information.

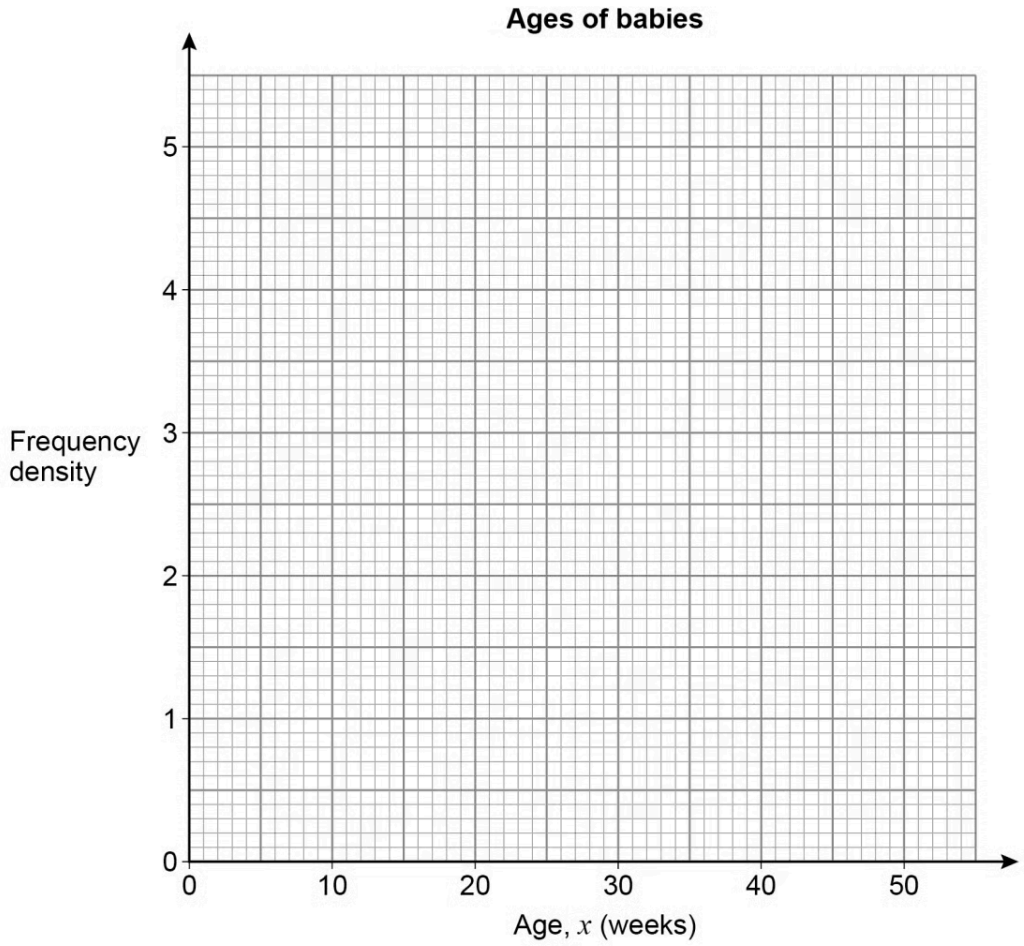


(3 marks)

9 Here is some information about the ages of babies at a clinic.

Age, x (weeks)	Frequency		
$0 \leqslant x < 5$	18		
$5 \leqslant x < 10$	23		
$10 \leqslant x < 20$	17		
$20 \leqslant x < 50$	21		

Draw a histogram to represent the information.



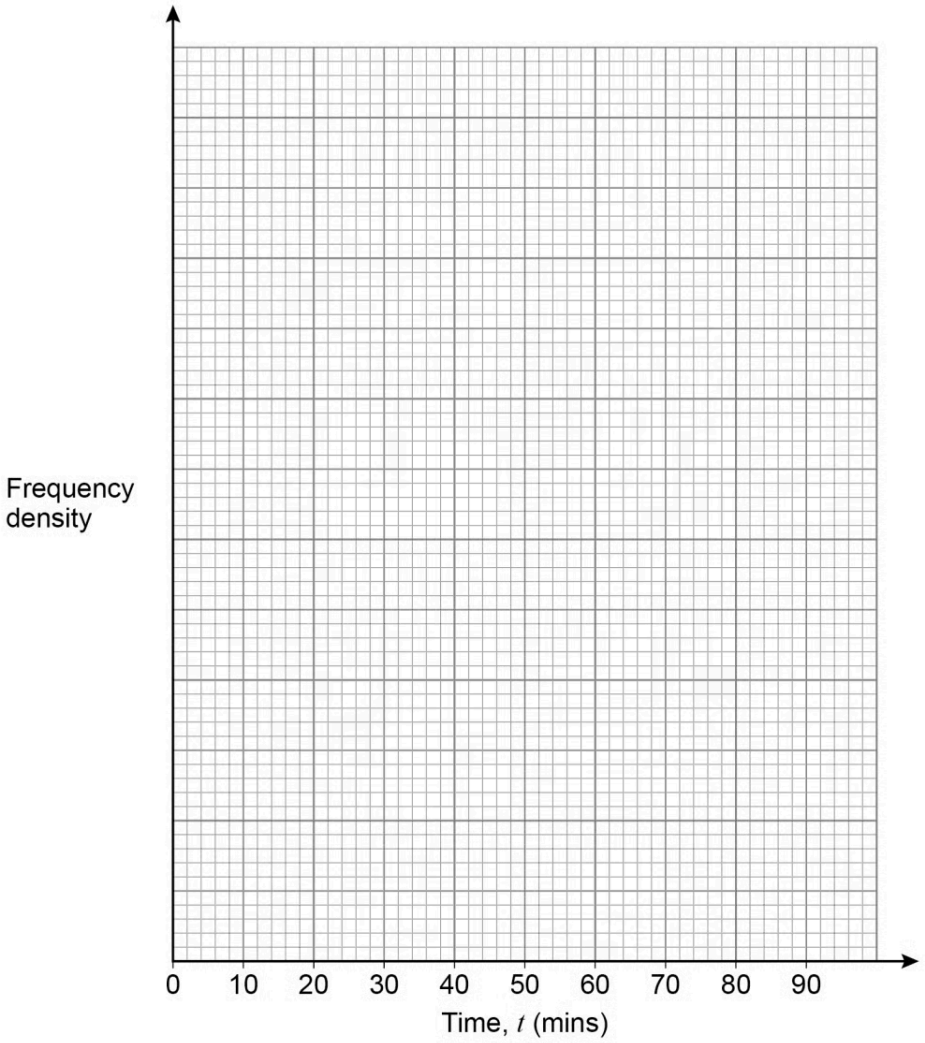
(4 marks)

10 200 people recorded the time they spent on social media one day.

The table shows the results.

Time, t (mins)	Frequency	Class width	
$0 \leqslant t < 30$	24		
$30 \leqslant t < 50$	76		
$50 \leqslant t < 60$	52		
$60 \leqslant t < 90$	48		

Draw a histogram to represent the results.

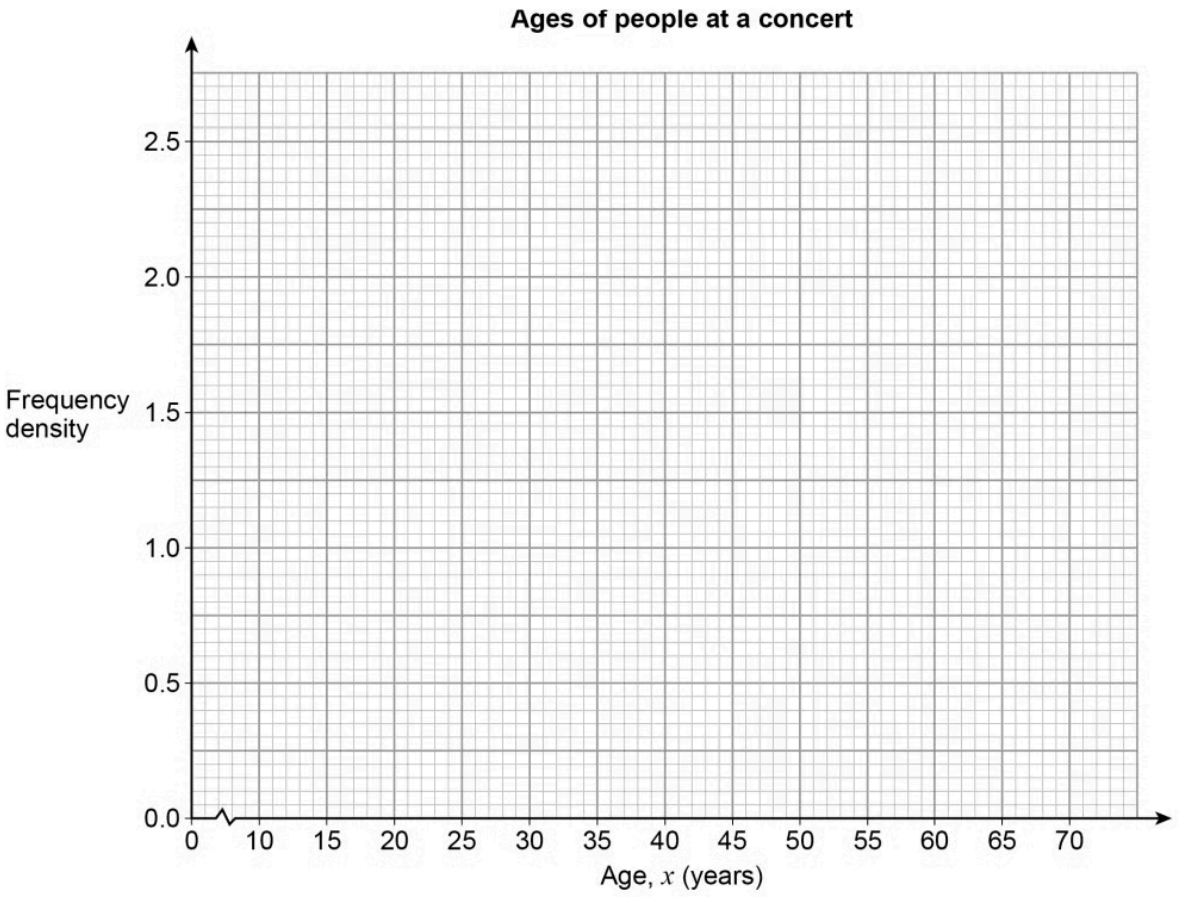


(4 marks)

11 Here is some information about the ages of people at a concert.

Age, x (years)	Frequency
$10 \leqslant x < 15$	8
$15 \leqslant x < 25$	24
$25 \leqslant x < 40$	30
$40 \leqslant x < 70$	39

Draw a histogram to represent the information.

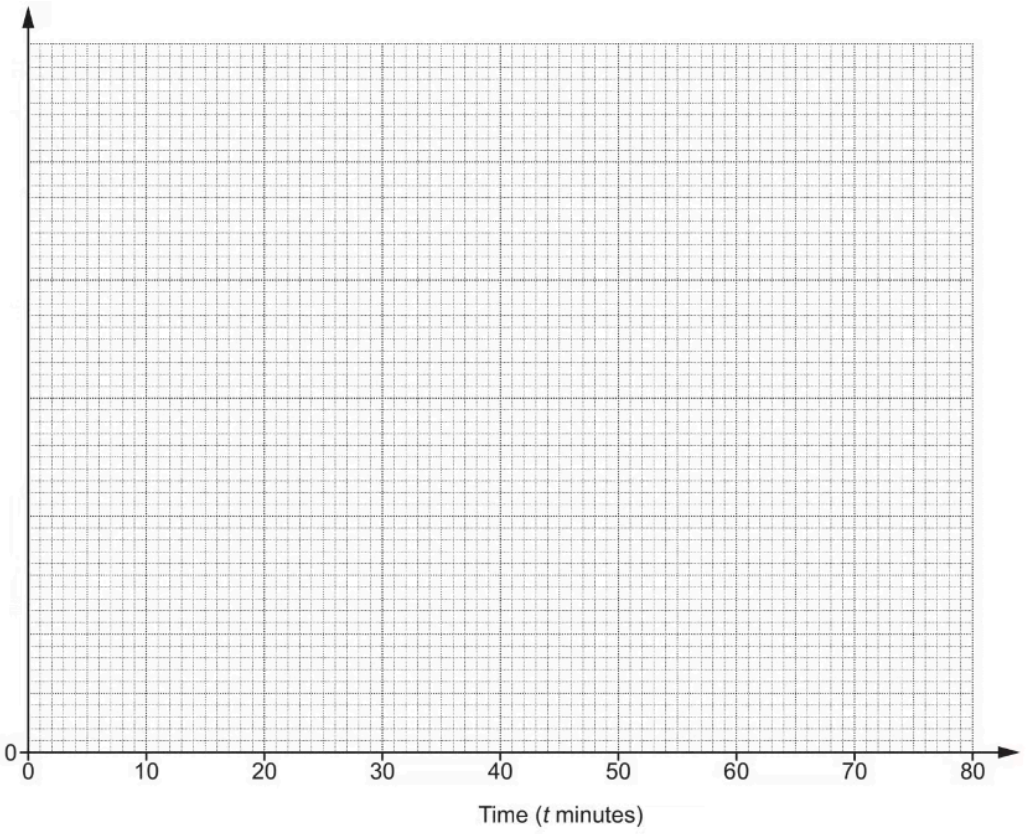


(3 marks)

12 Ceri records the time taken, t minutes, to travel to school for a sample of 168 students at her Academy.

Time taken (t minutes)	Frequency
$0 < t \leqslant 10$	54
$10 < t \leqslant 20$	50
$20 < t \leqslant 40$	44
$40 < t \leqslant 80$	20

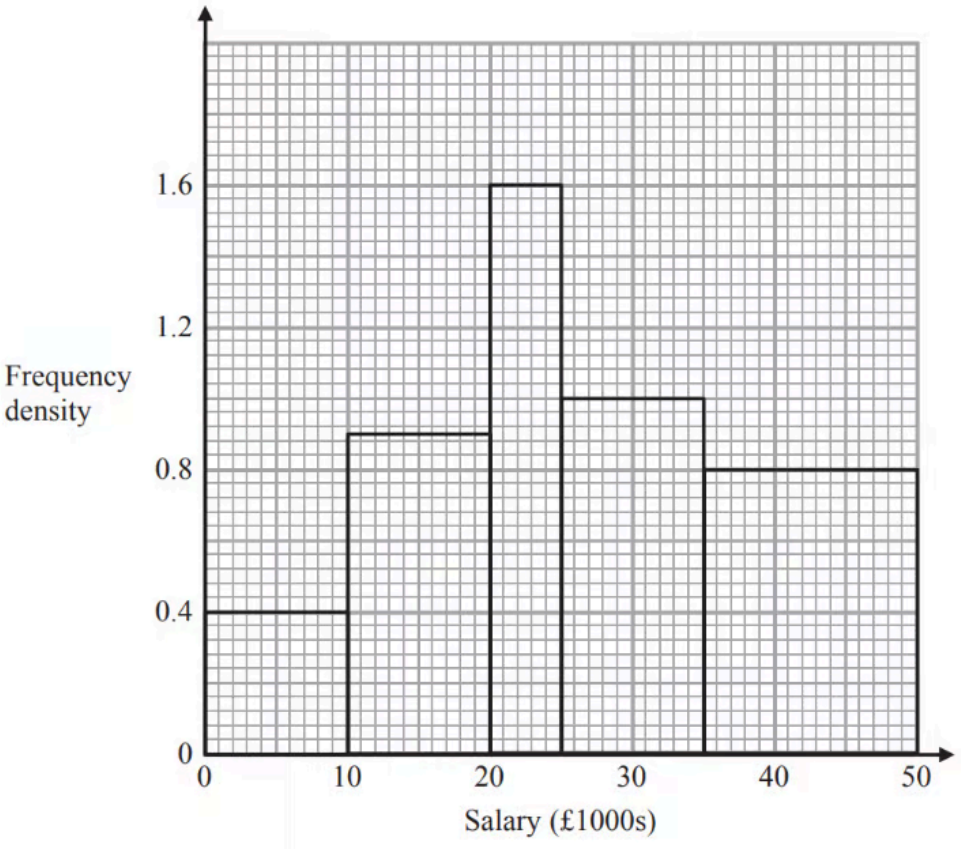
Draw a histogram to represent this information.



(4 marks)

Hard Questions

1 (a) The histogram shows some information about the salaries of a sample of people.



Use the histogram to complete the frequency table.

Salary (p) in £1000s	Frequency
$0 < p \leqslant 10$	4
$10 < p \leqslant 20$	
$20 < p \leqslant 25$	
$25 < p \leqslant 35$	
$35 < p \leqslant 50$	

(2 marks)

(b) Work out the proportion of people in the sample who have a salary greater than £40 000.

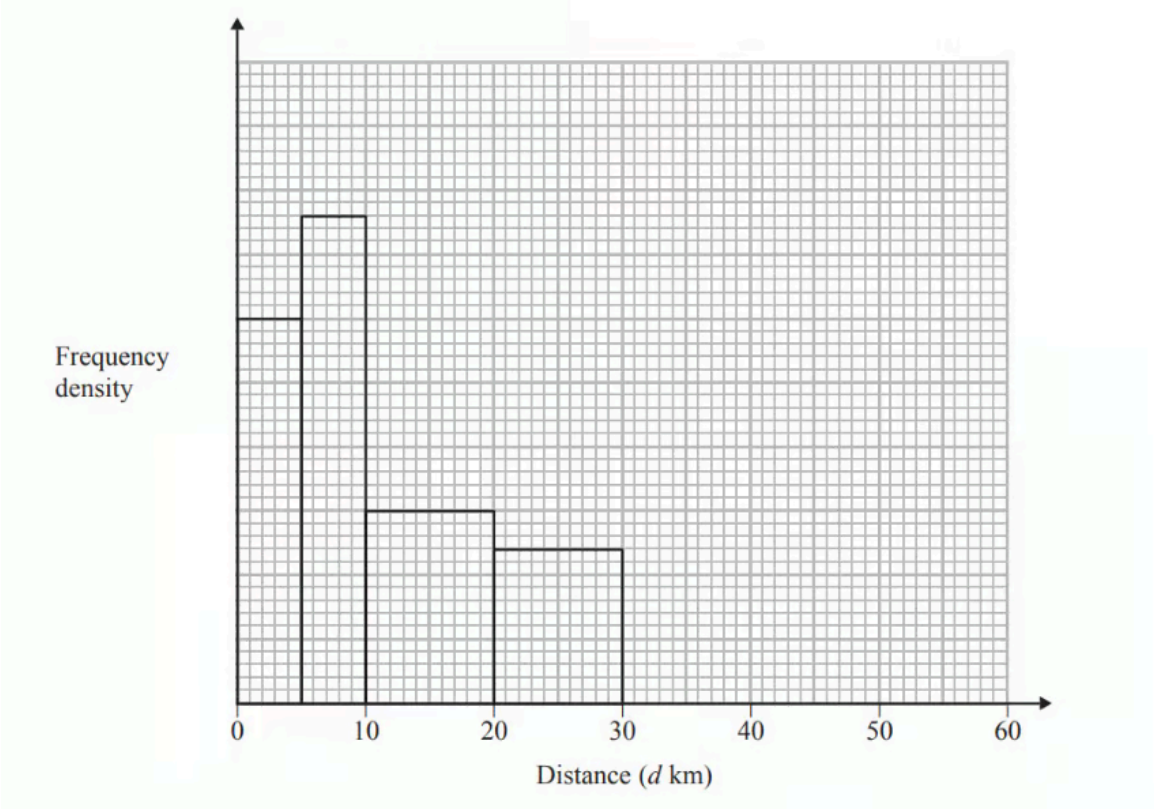
(2 marks)

(c) Find an estimate for the median salary.

(2 marks)

2 The incomplete histogram and table give some information about the distances some

people travel to work.



i) Use the information in the histogram to complete the frequency table.

Distance (d km)	Frequency
$0 < d \leqslant 5$	30
$5 < d \leqslant 10$	
$10 < d \leqslant 20$	
$20 < d \leqslant 30$	24
$30 < d \leqslant 50$	16

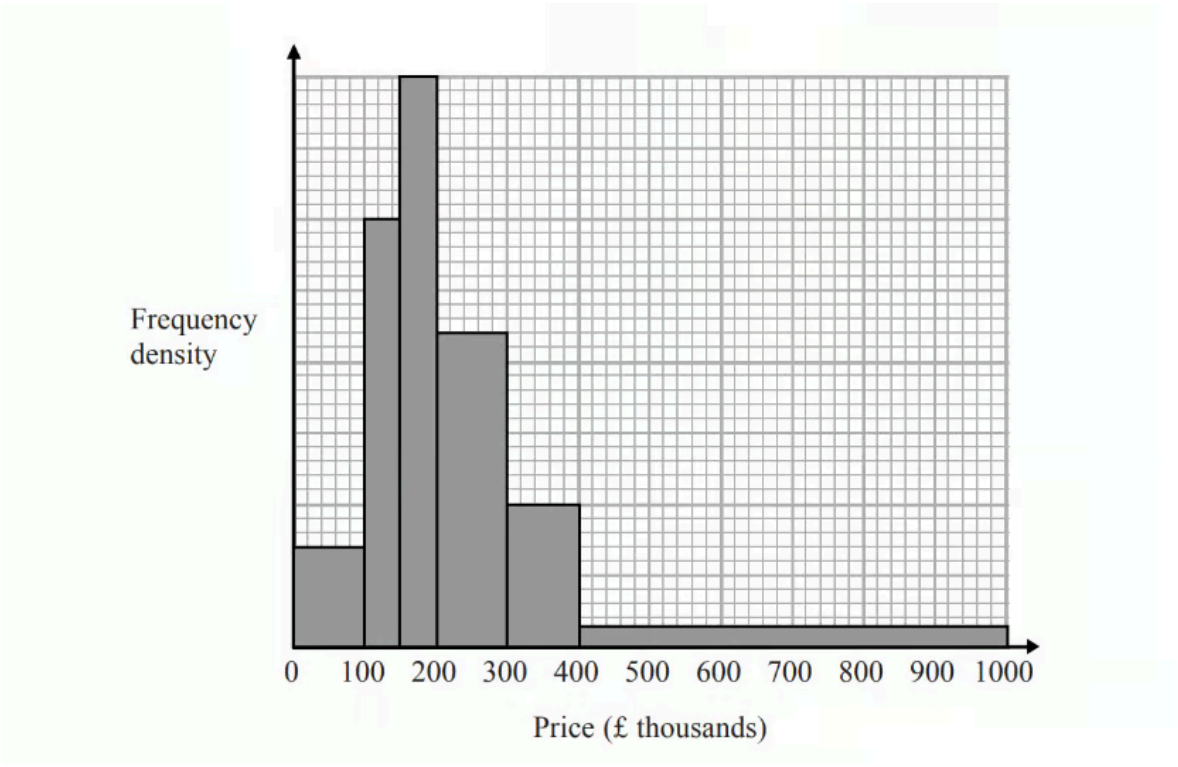
[2]

ii) Use the information in the table to complete the histogram.

[1]

(3 marks)

3 The histogram gives information about house prices in a village in 2015.



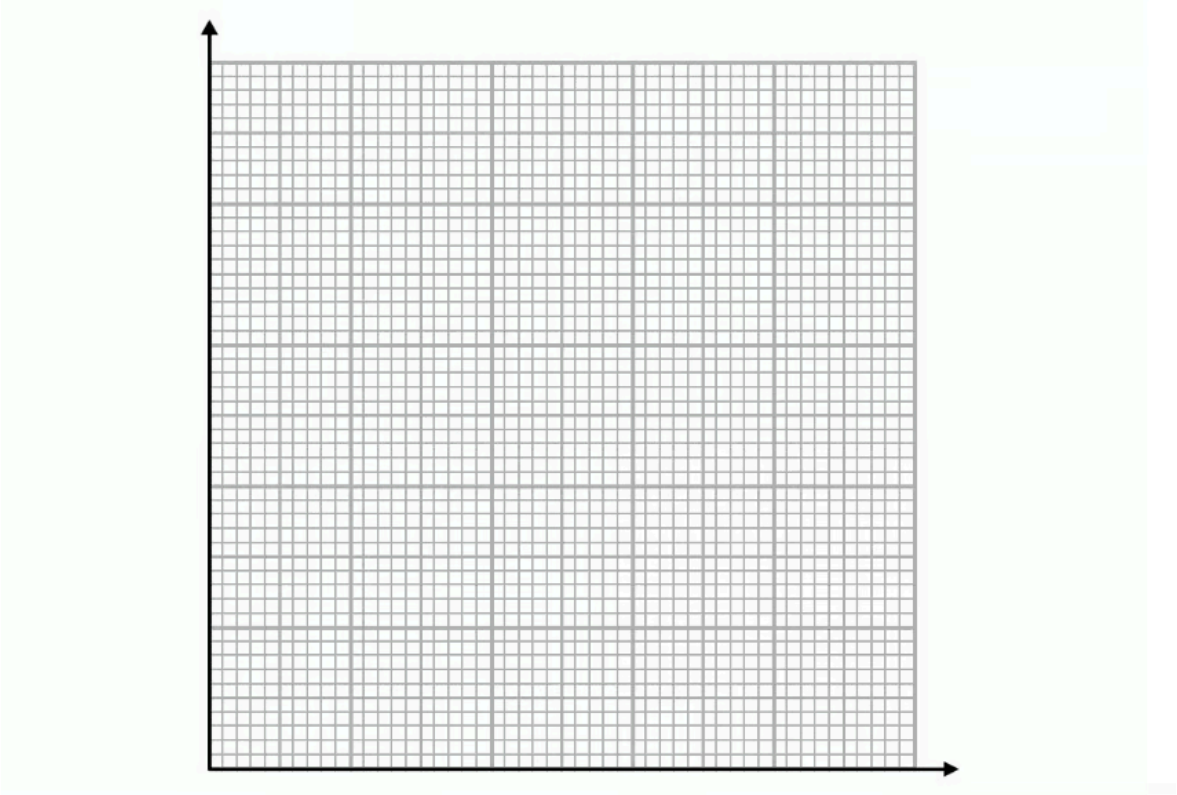
20 houses in the village have a price between £300000 and £400000.
Work out the number of houses in the village with a price under £200000.

(3 marks)

4 (a) The table gives information about the speeds, in km/h, of 81 cars.

Speed (s km/h)	Frequency
$90 < s \leqslant 100$	13
$100 < s \leqslant 105$	16
$105 < s \leqslant 110$	18
$110 < s \leqslant 120$	22
$120 < s \leqslant 140$	12

On the grid, draw a histogram for the information in the table.



(3 marks)

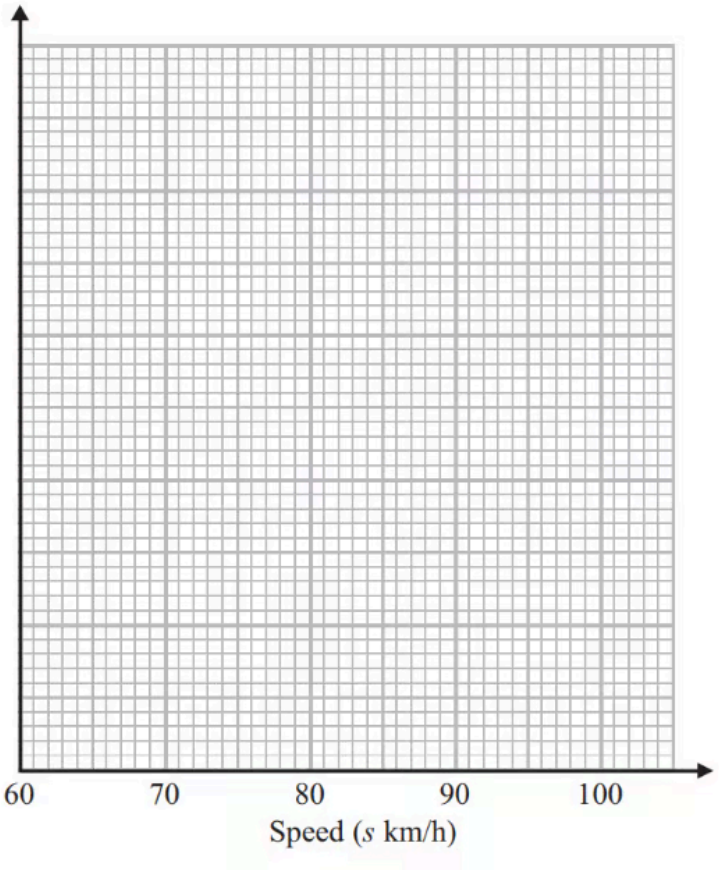
(b) Find an estimate for the median.

(2 marks)

5 (a) The table gives some information about the speeds, in km/h, of 100 cars.

Speed(s km/h)	Frequency
$60 < s \leqslant 65$	15
$65 < s \leqslant 70$	25
$70 < s \leqslant 80$	36
$80 < s \leqslant 100$	24

On the grid, draw a histogram for the information in the table.

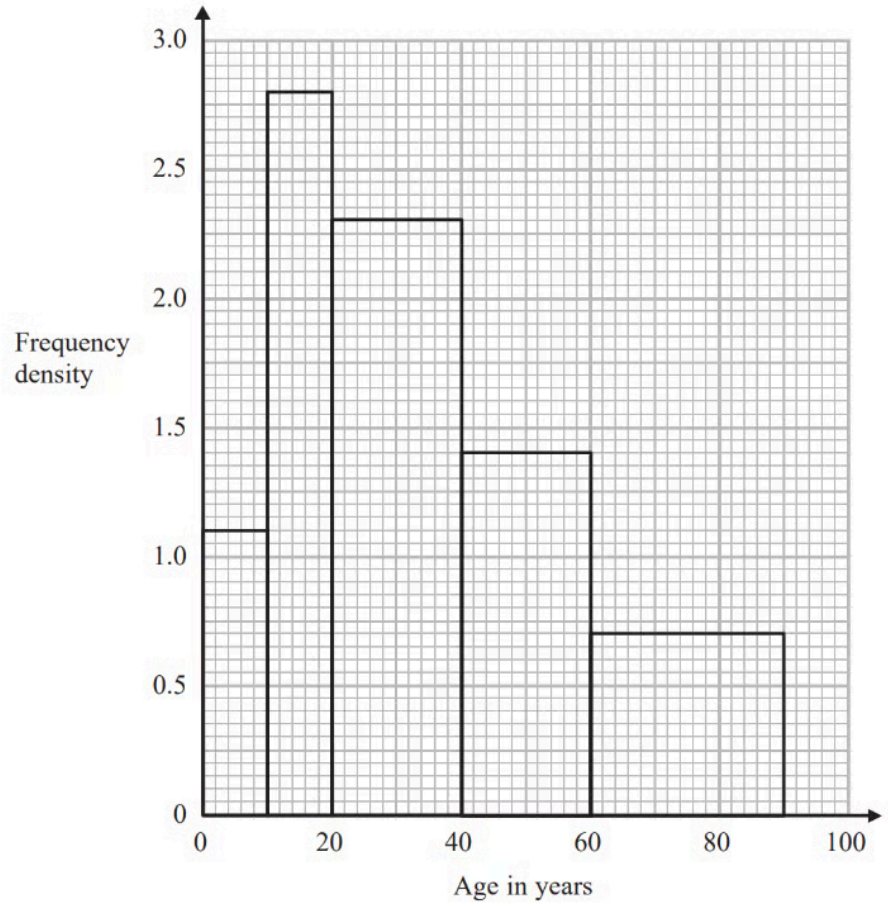


(3 marks)

(b) Work out an estimate for the number of cars with a speed of more than 85 km/h.

(2 marks)

6 The histogram shows some information about the ages of the 134 members of a sports club.

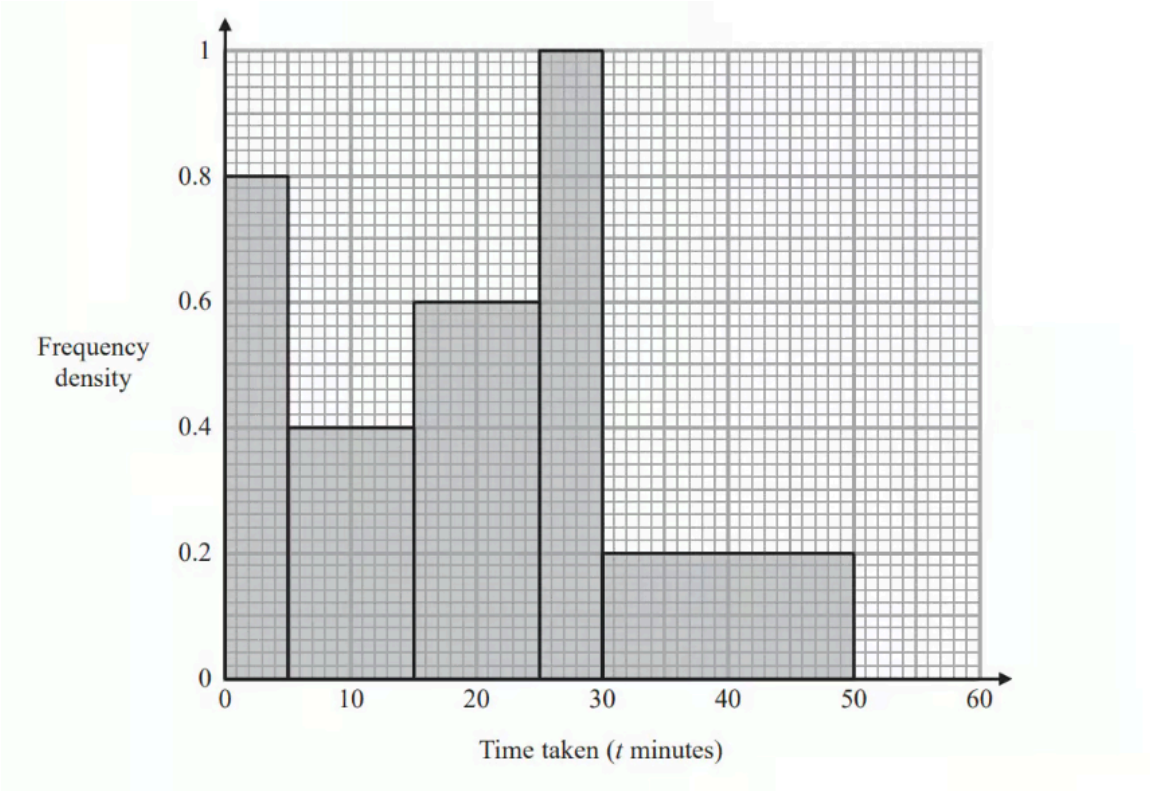


20% of the members of the sports club who are over 50 years of age are female.

Work out an estimate for the number of female members who are over 50 years of age.

(3 marks)

7 (a) The histogram shows information about the times taken by some students to finish a puzzle.



Complete the frequency table for this information.

Time taken (t minutes)	Frequency
$0 < t \leqslant 5$	4
$5 < t \leqslant 15$	
$15 < t \leqslant 25$	
$25 < t \leqslant 30$	
$30 < t \leqslant 50$	

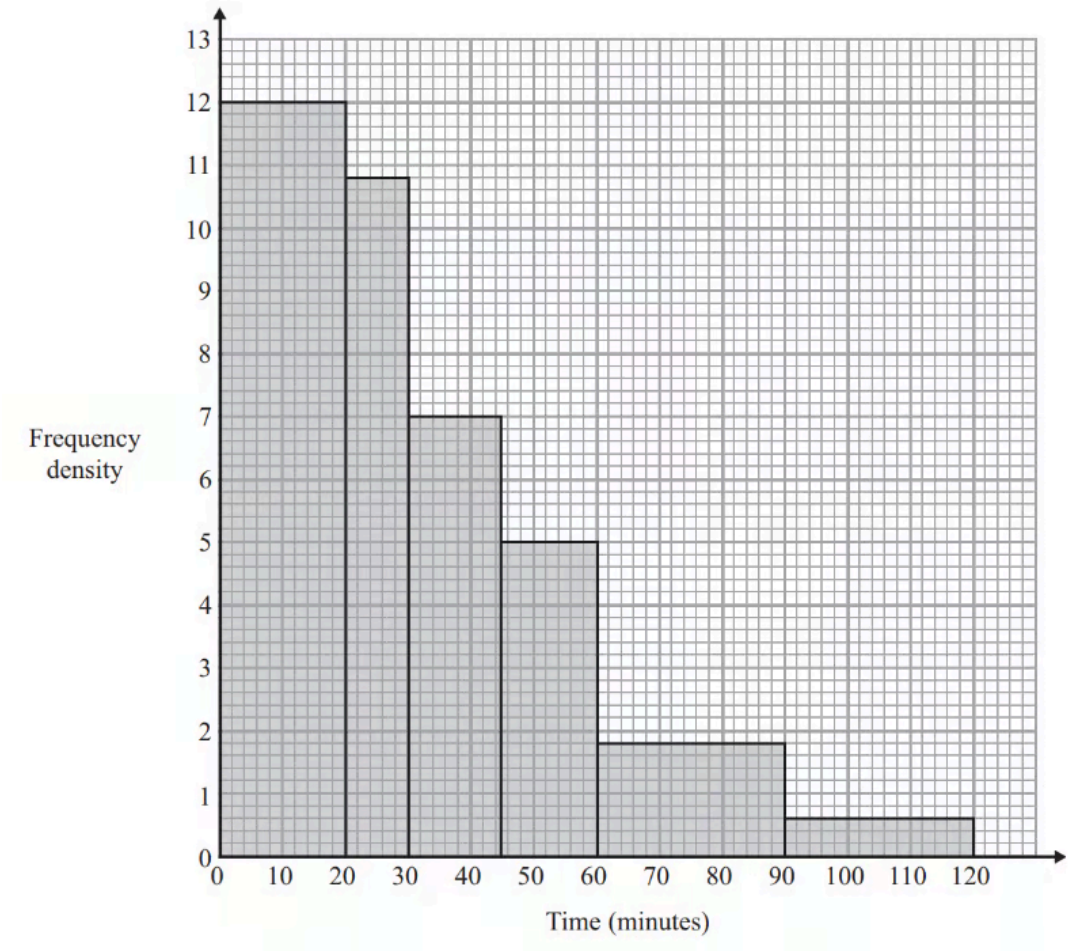
(2 marks)

(b) Find an estimate for the lower quartile of the times taken to finish the puzzle.

(2 marks)

8 The histogram shows information about the times, in minutes, that some passengers

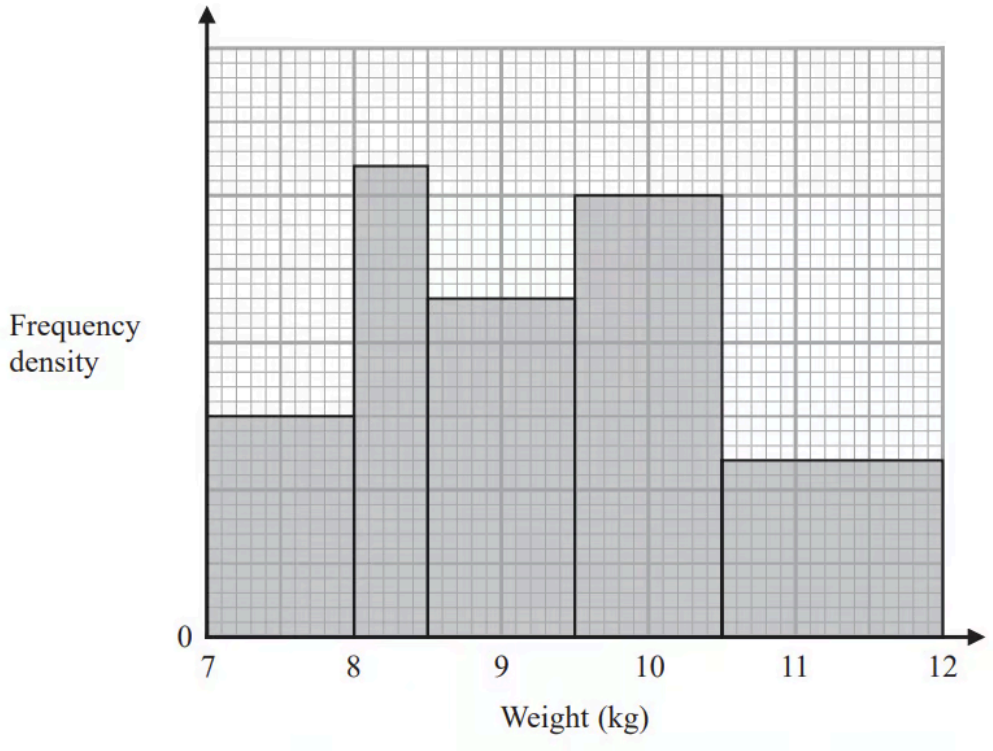
had to wait at an airport.



Work out the percentage of the passengers who had to wait for more than one hour.

(3 marks)

9

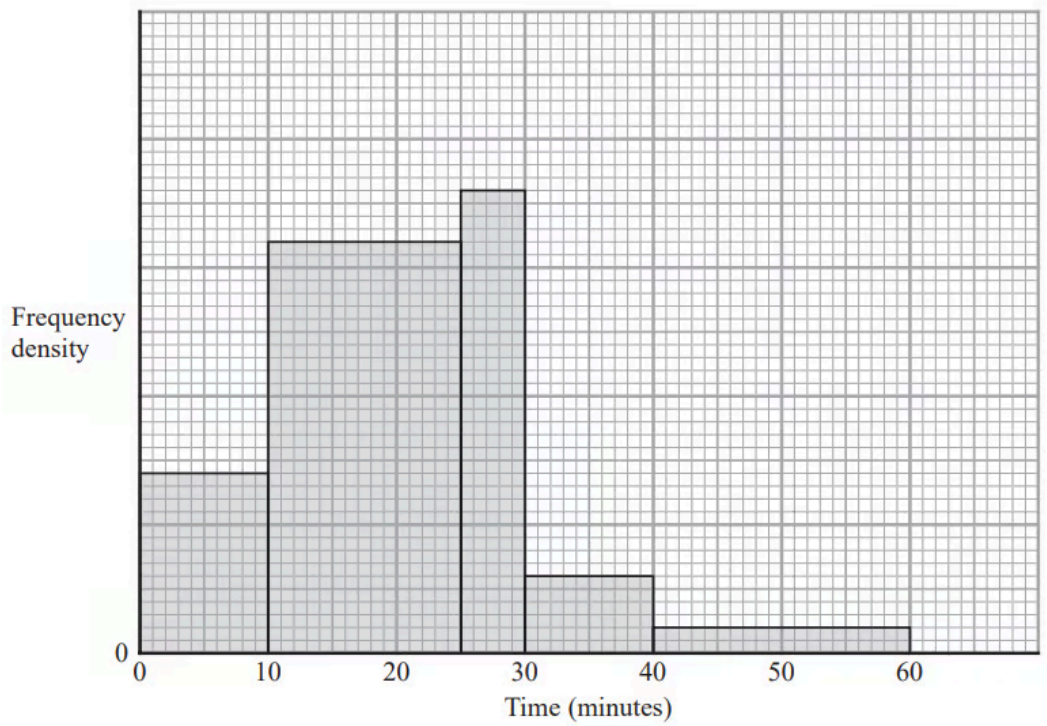


The histogram gives information about the weights, in kg, of all the watermelons in a field.
There are 16 watermelons with a weight between 8 kg and 8.5 kg.
Work out the total number of watermelons in the field.

(3 marks)

10 The histogram gives information about the times, in minutes, some customers had to

wait to be served in a restaurant.



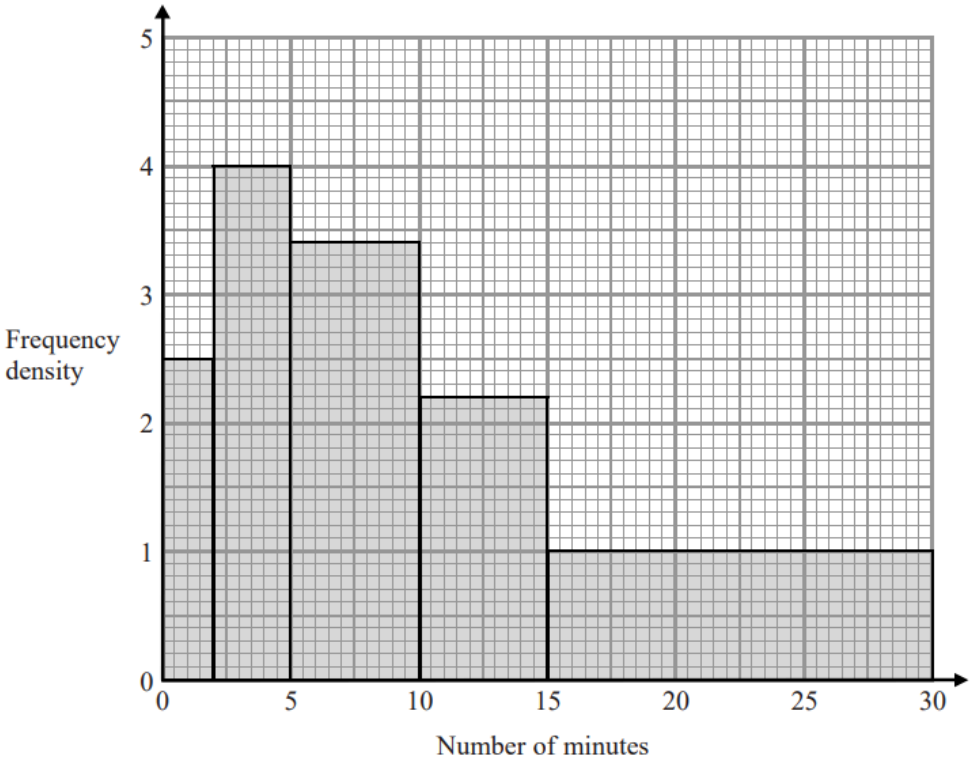
14 customers had to wait less than 10 minutes to be served.

Work out the number of customers who had to wait less than 60 minutes to be served.

(3 marks)

11 The histogram shows information about the numbers of minutes some people waited to

be served at a Post Office.



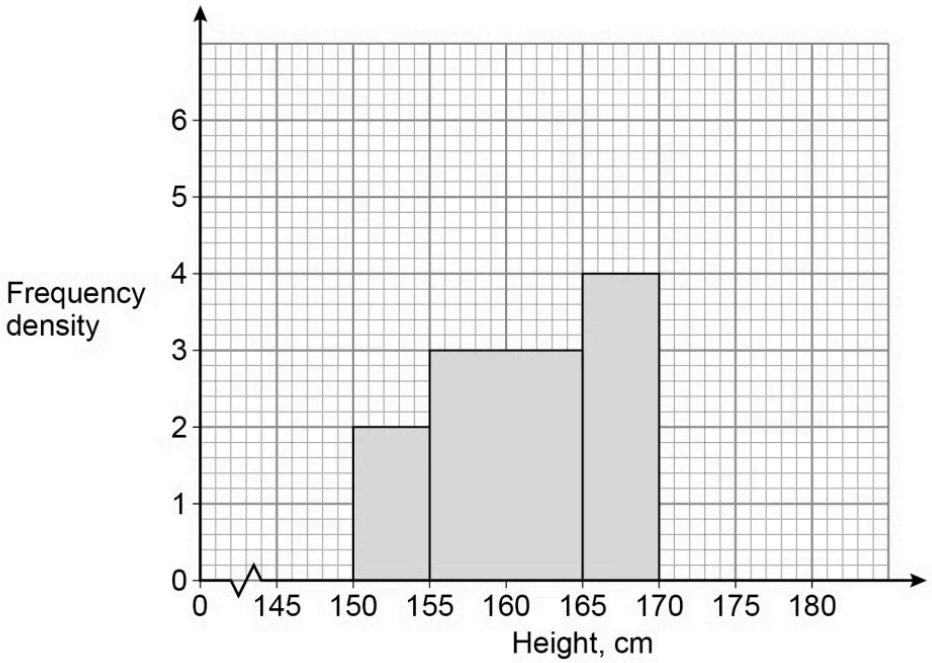
Work out an estimate for the proportion of these people who waited longer than 20 minutes to be served.

(3 marks)

12 A histogram is drawn to represent the heights of a sample of women.

Three of the four bars are shown.

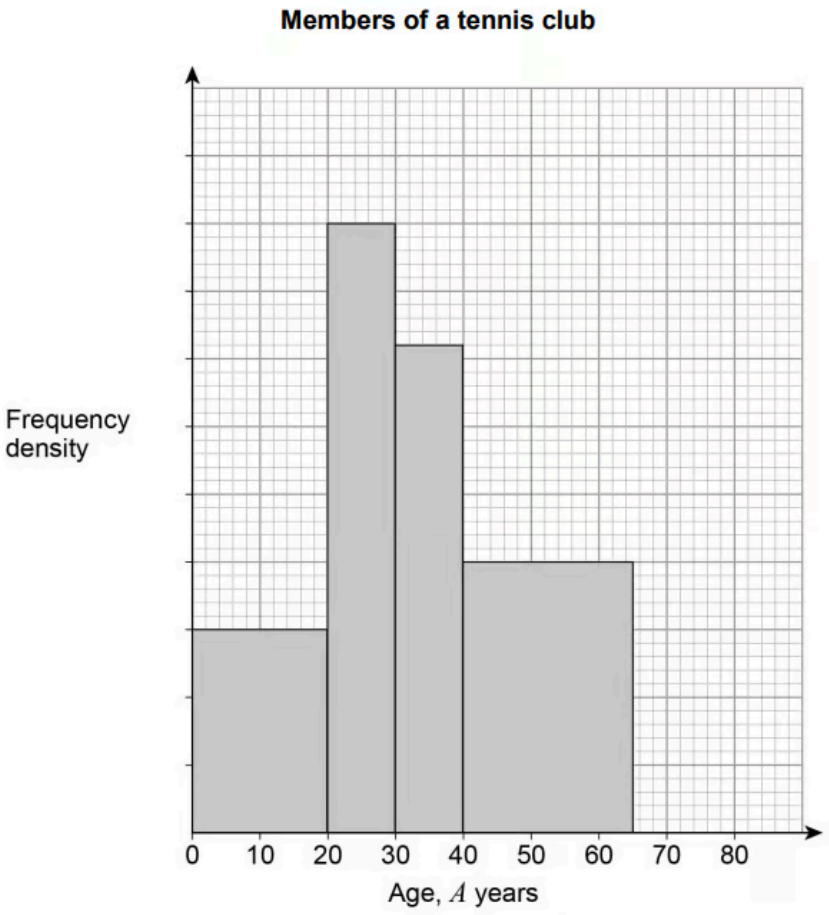
The bar for $170 \text{ cm} \leqslant \text{height} < 180 \text{ cm}$ is missing.



There are 74 women in the sample.
Complete the histogram.

(4 marks)

13 (a) Here is some information about a tennis club.



There are 30 members with $A < 20$
There are 12 members with $65 \leqslant A < 80$
There are no members with $A \geqslant 80$

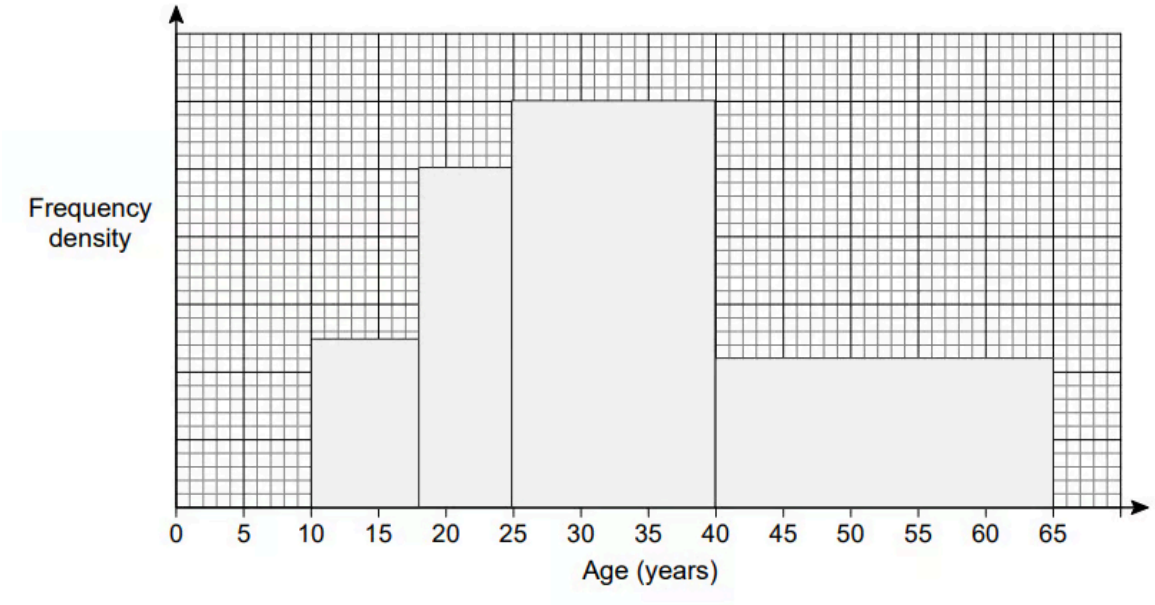
Complete the histogram.

(3 marks)

(b) Work out the total number of members of the club.

(2 marks)

14 The histogram shows the ages, in years, of members of a chess club.



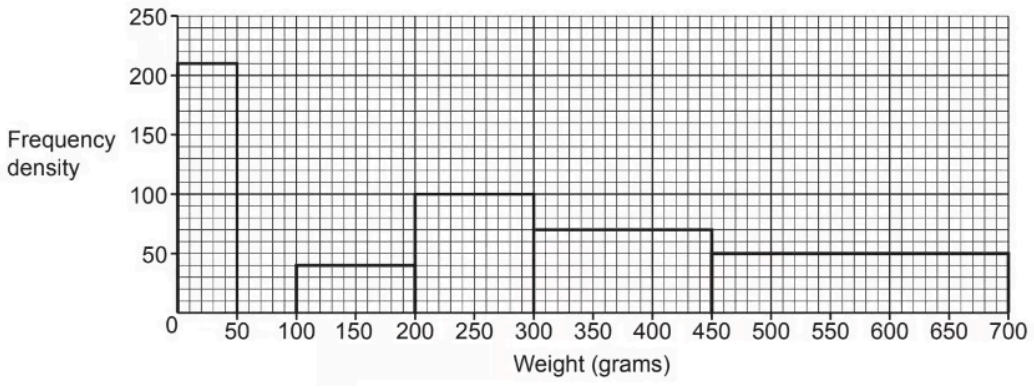
There are 22 members with ages in the range $40 \leqslant \text{age} < 65$.

Work out the number of members with ages in the range $25 \leqslant \text{age} < 40$.

(4 marks)

15 (a) The histogram shows information about the masses of some of the parcels handled by a

delivery company in one month.



Zoe says

There are fewer parcels weighing between 450g and 700g than parcels weighing between 300g and 450g.

Is Zoe correct?
Show how you decide.

(4 marks)

(b) The delivery company delivered 6500 parcels weighing between 50g and 100g.

Complete the histogram to show this information.

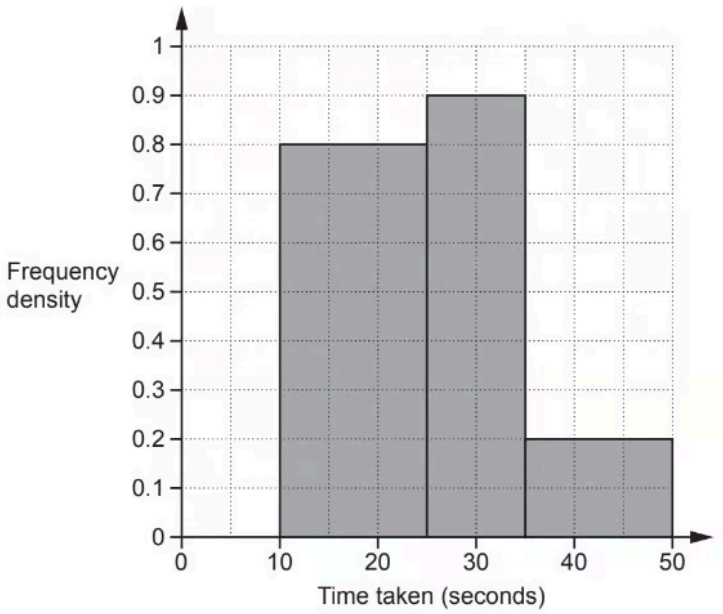
(2 marks)

(c) Zoe uses the histogram to calculate the number of parcels weighing between 200g and 250g.

Explain why Zoe's answer is unlikely to be reliable.

(1 mark)

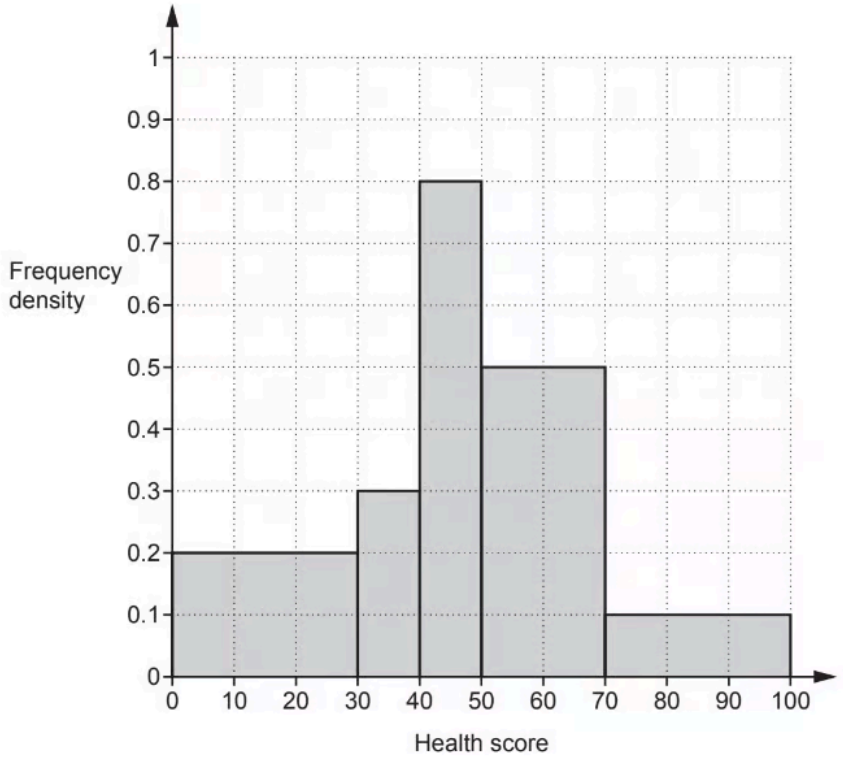
16 30 students completed a puzzle and their times were recorded. All of the students completed the puzzle in less than 50 seconds. The histogram shows information about some of their times.



Complete the histogram for those completing the puzzle in less than 10 seconds.

(5 marks)

17 The histogram summarises a health score for a group of people.



i) Estimate the fraction of the group who had a score of 45 or more.

[4]

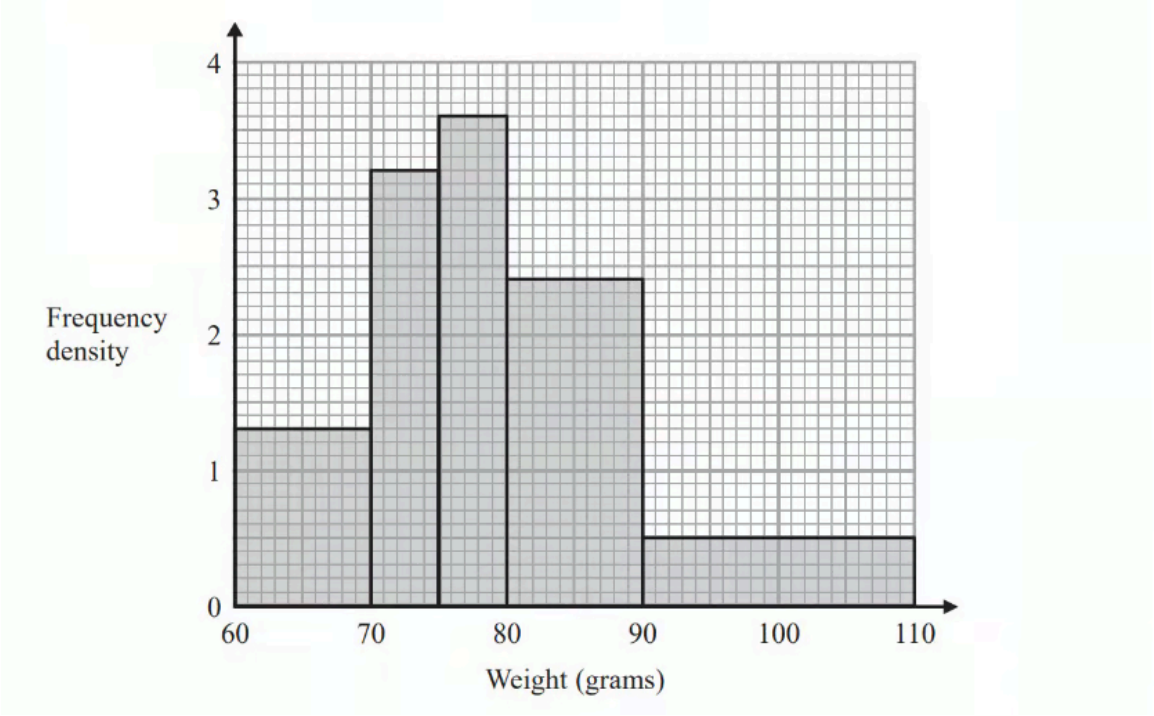
ii) What assumption did you make in answering part (i)?

[1]

(5 marks)

Very Hard Questions

1 The histogram shows information about the weights, in grams, of some plums.



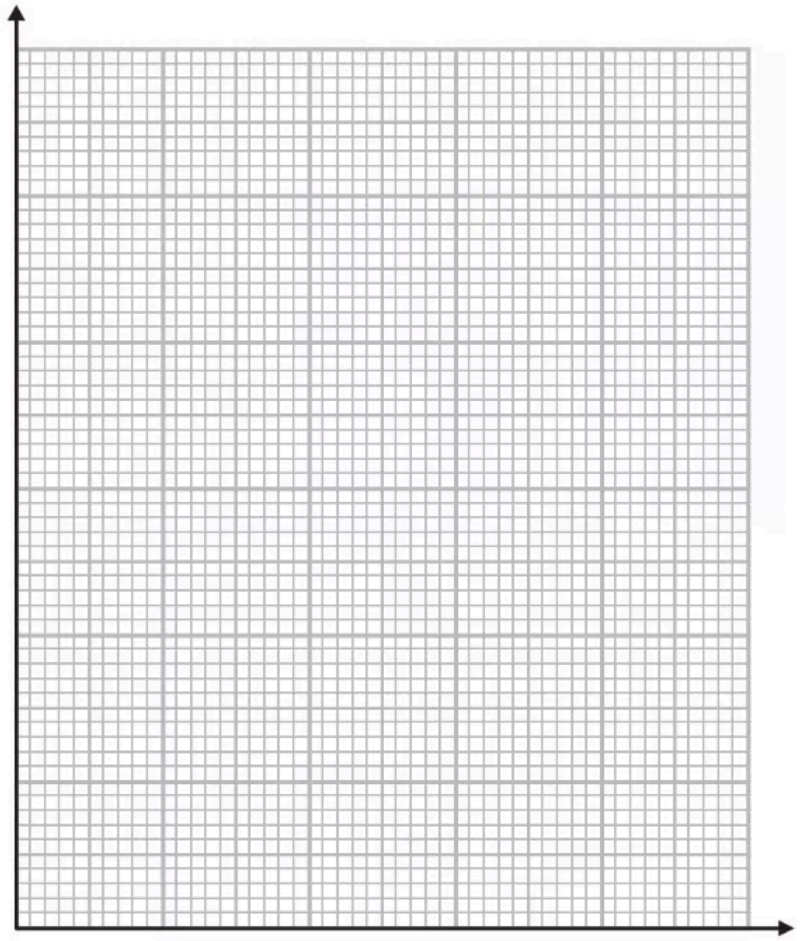
Work out an estimate for the proportion of these plums with a weight of less than 100 grams.

(3 marks)

2 (a) The table gives information about the heights of 150 students.

Height(h cm)	Frequency
$140 < h \leqslant 150$	15
$150 < h \leqslant 155$	30
$155 < h \leqslant 160$	51
$160 < h \leqslant 165$	36
$165 < h \leqslant 180$	18

On the grid, draw a histogram for this information.

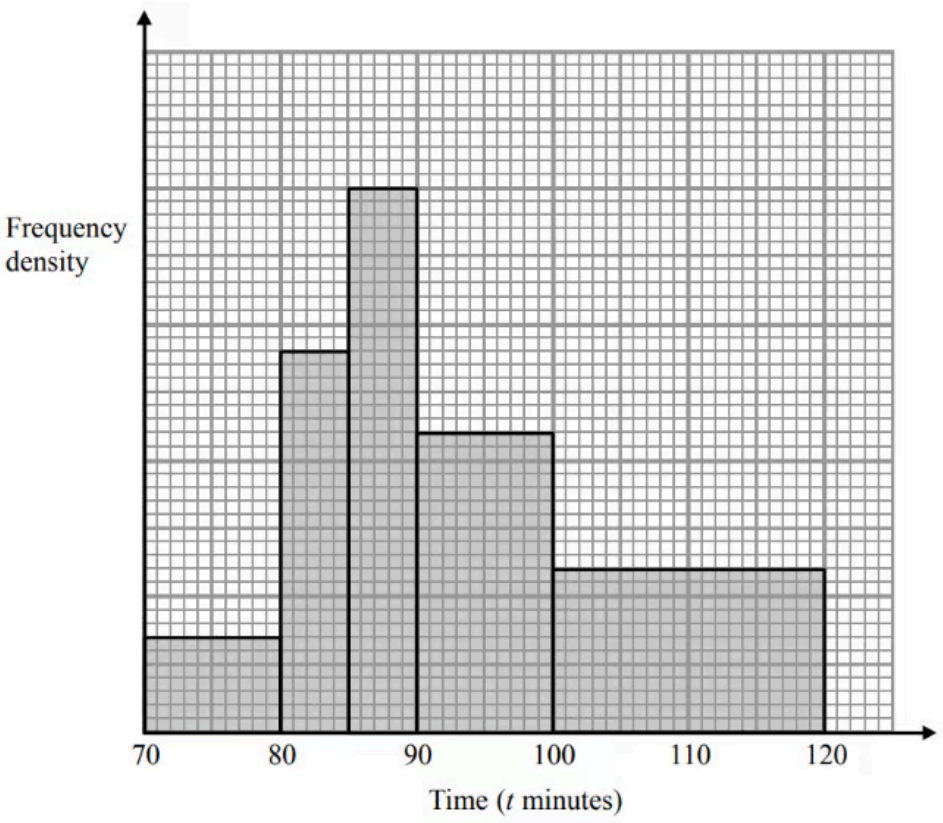


(3 marks)

(b) Work out an estimate for the fraction of the students who have a height between 150 cm and 170 cm.

(2 marks)

3 The histogram shows information about the time taken by cyclists to finish a cycle race.



7 cyclists took 80 minutes or less to finish the race.

i) Work out an estimate for the number of cyclists who took more than 105 minutes to finish the race.

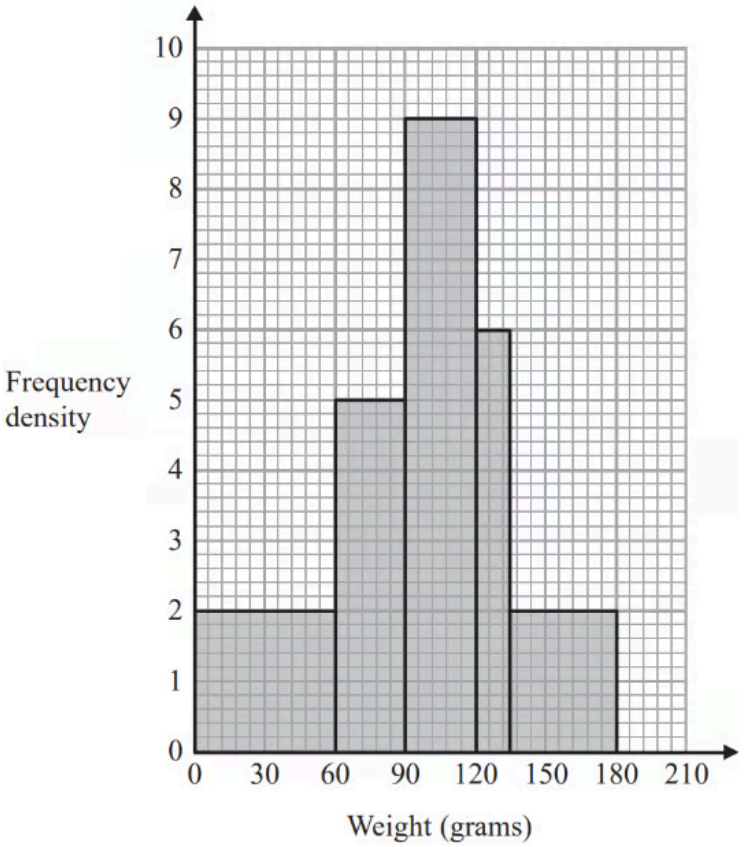
[3]

ii) Explain why your answer to part (i) is only an estimate.

[1]

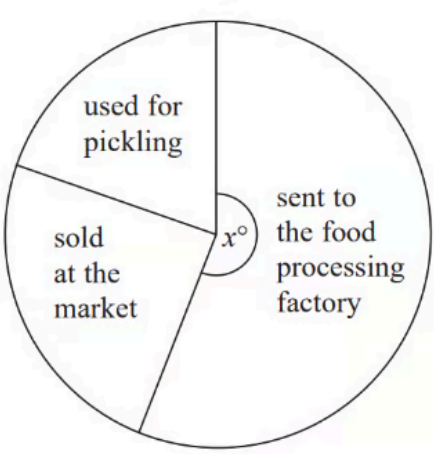
(4 marks)

4 The histogram gives information about the distribution of the weights of some onions grown by a farmer.



Onions less than 60 grams in weight are used for pickling. Onions greater than 120 grams in weight are sold at the market. The rest of the onions are sent to a food processing factory.

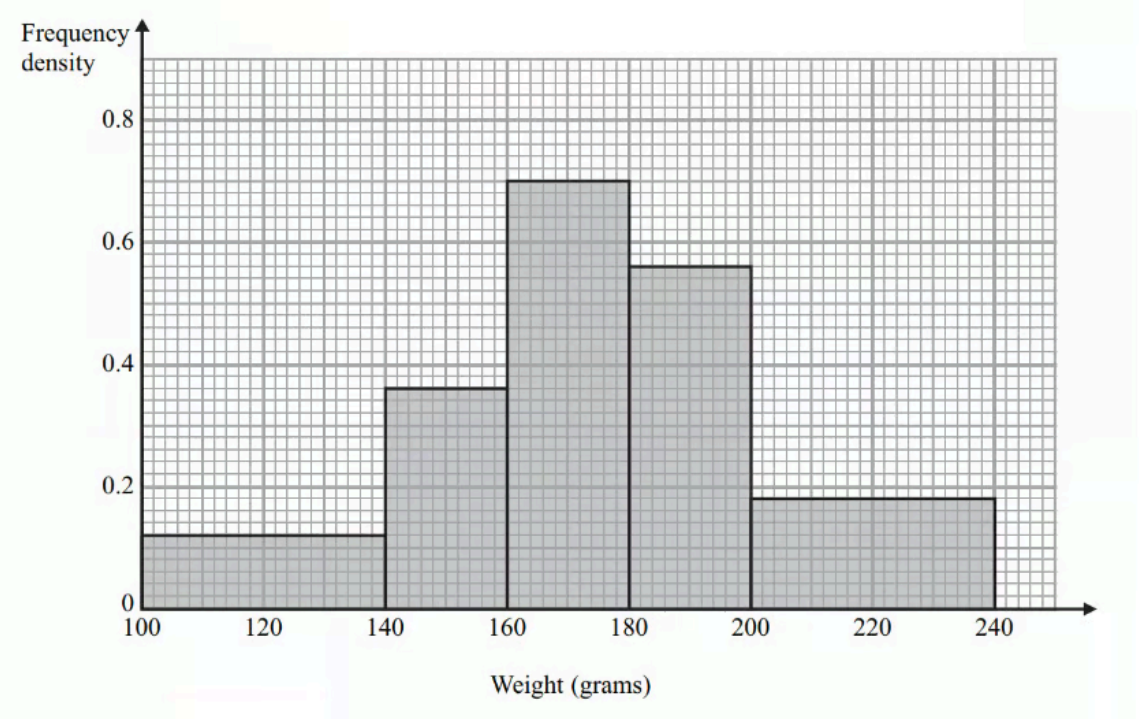
A pie chart is drawn using the information opposite to show what the farmer does with the onions he grows.



The angle of the sector for the onions sent to the food processing factory is $x°$.
Work out the value of x.

(4 marks)

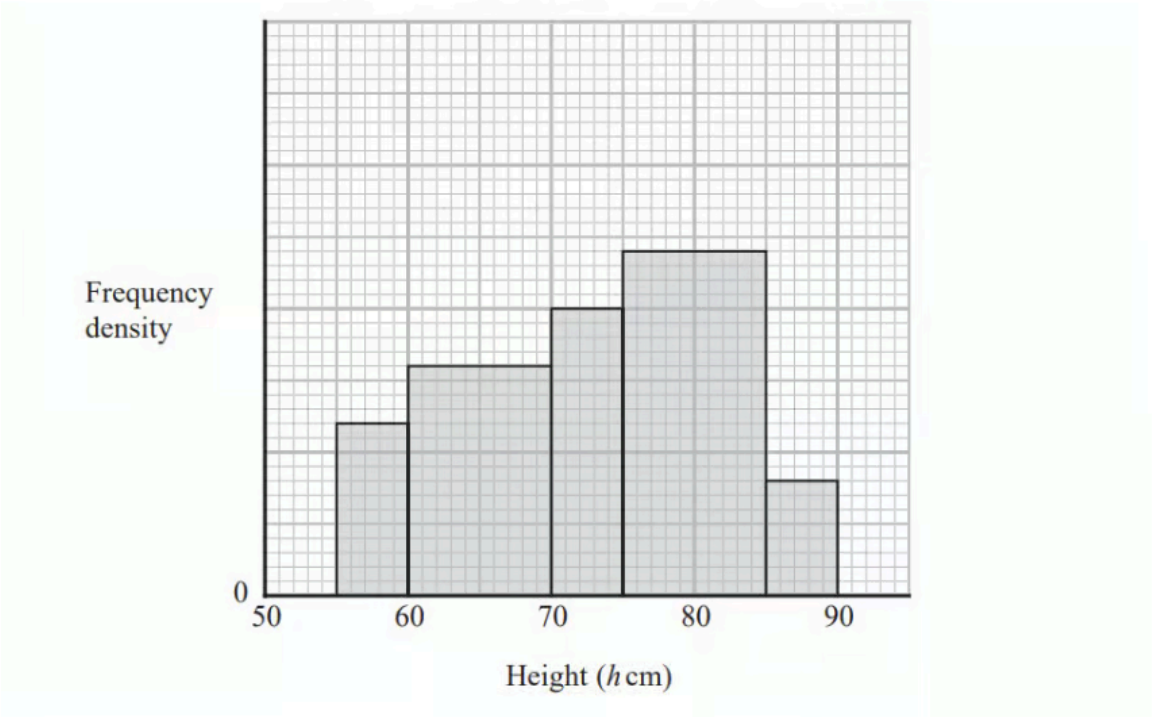
5 The histogram shows some information about the weights of a sample of apples.



Work out the proportion of apples in the sample with a weight between 140 grams and 200 grams.

(4 marks)

6 The histogram gives information about the heights, h cm, of some tomato plants.



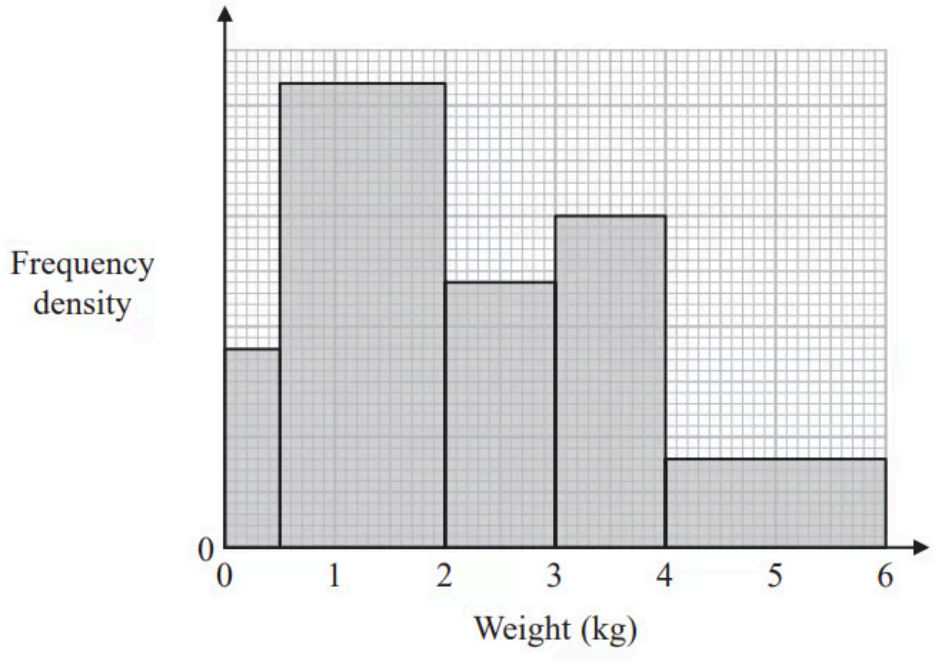
There are 12 tomato plants for which $75 < h \leqslant 85$
One of the tomato plants is selected at random.

Find an estimate for the probability that this tomato plant has a height greater than 82.5 cm.

(4 marks)

7 (a) A postman records the weight of each parcel that he delivers.

The histogram shows information about the weights of all the parcels that the postman delivered last Monday. No parcels weighed more than 6 kg.



63 of the parcels that the postman delivered last Monday each had a weight between 0.5 kg and 2 kg.

Work out the total number of parcels the postman delivered last Monday.

(3 marks)

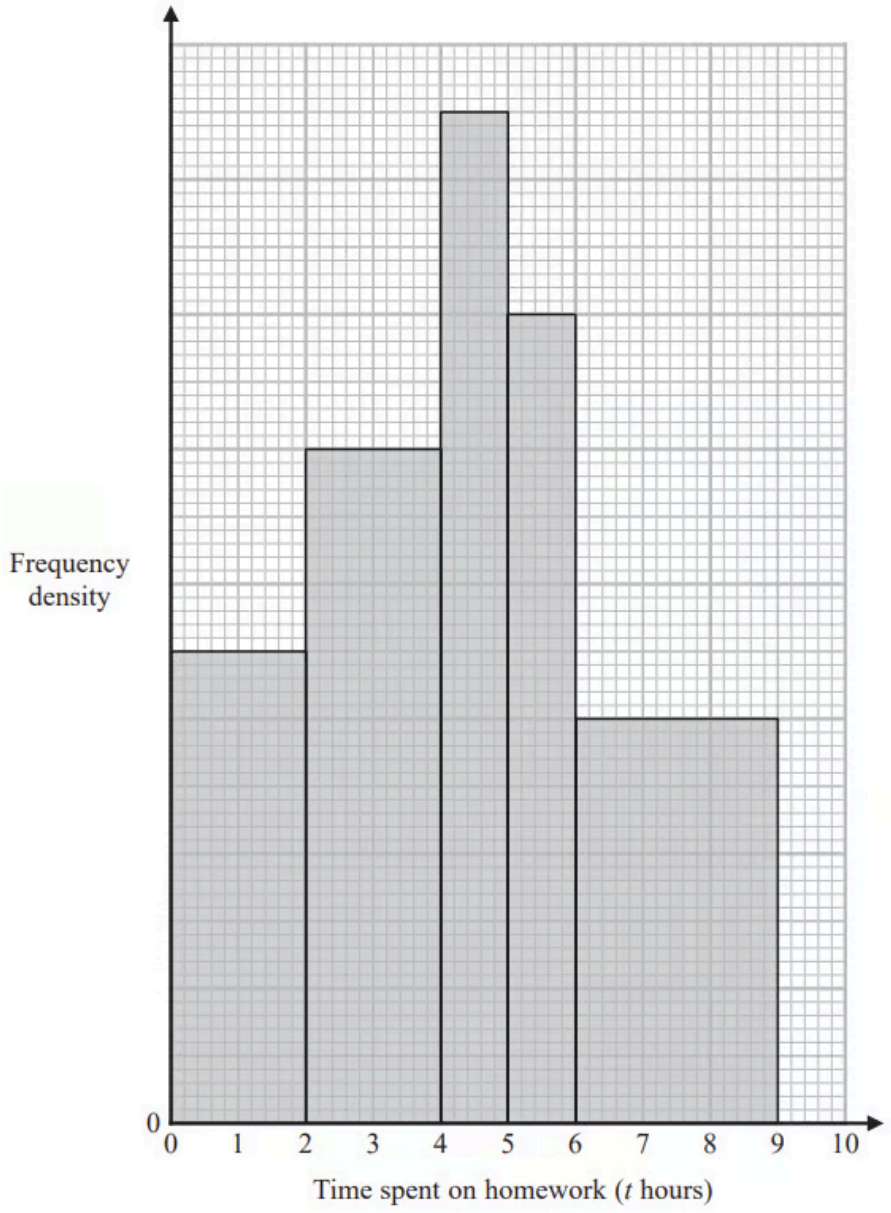
(b) The postman picks at random two of the records of the parcels he delivered last Monday.

Work out an estimate for the probability that each parcel weighed more than 2.25 kg.

(3 marks)

8 The histogram and the table give some information about the amounts of time, in hours, that Year 11 students at Bergdesh Academy spent, in total, on their homework last week.

No student in Year 11 spent longer than 9 hours on their homework.



Time spent on homework (t hours)	Frequency
$0 < t \leqslant 2$	28
$2 < t \leqslant 4$	
$4 < t \leqslant 5$	
$5 < t \leqslant 6$	
$6 < t \leqslant 9$	

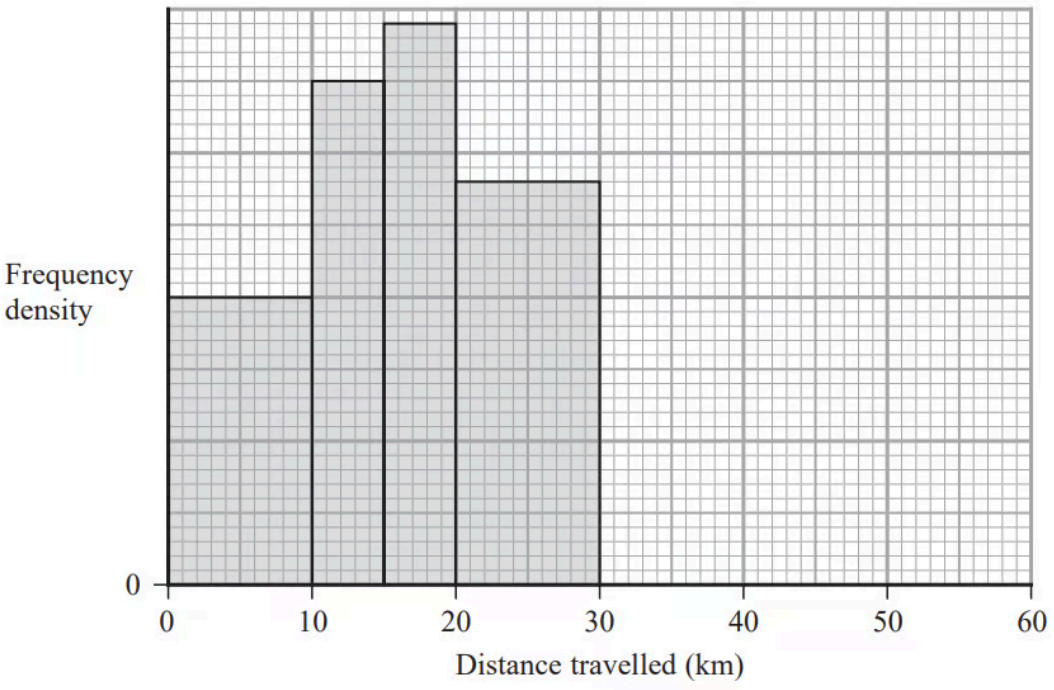
Using the information in the histogram and in the table, work out an estimate for the mean amount of time the Year 11 students spent on their homework last week.
Give your answer in hours correct to 3 significant figures.

..... hours

(5 marks)

9 The incomplete table and incomplete histogram give information about the distance travelled, in order to get to work, by each person working in a large store.

Distance (d km)	Frequency
$0 \leqslant d < 10$	40
$10 \leqslant d < 15$	
$15 \leqslant d < 20$	
$20 \leqslant d < 30$	
$30 \leqslant d < 60$	30

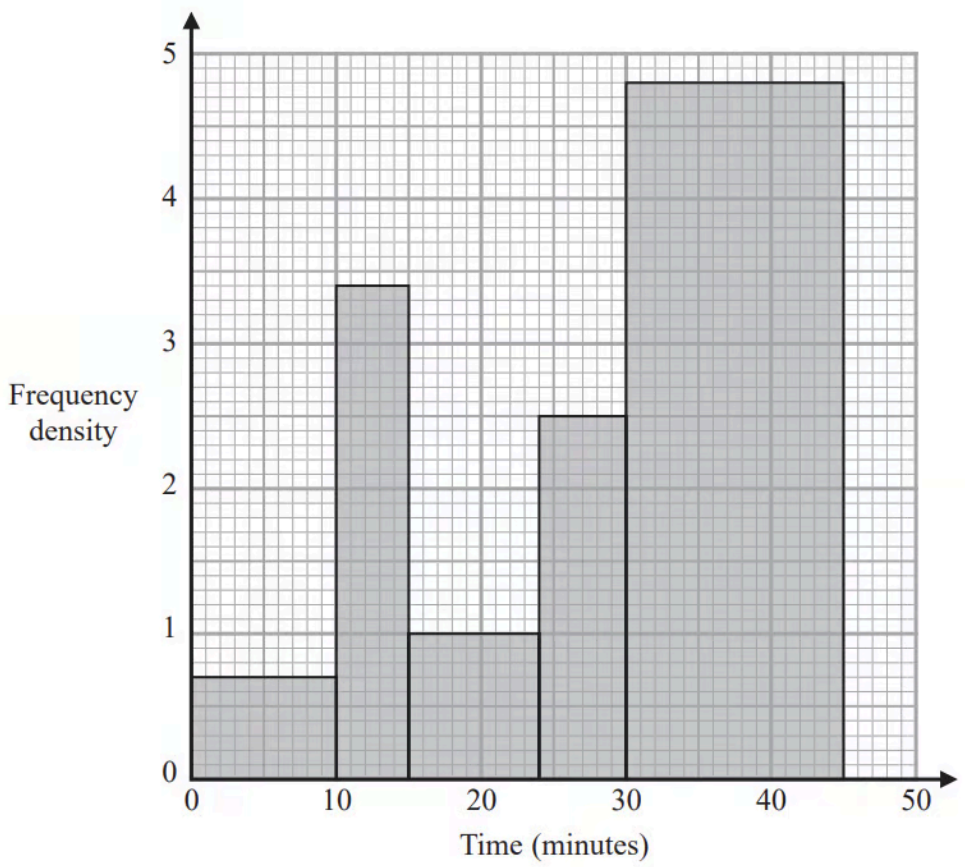


One of the people working in the store is chosen at random.

By completing the table and histogram, work out an estimate for the probability that the distance travelled by this person, in order to get to work, was greater than 25 km.

(5 marks)

10 (a) The histogram gives information about the times, in minutes, that some customers spent in a supermarket.



Work out an estimate for the proportion of these customers who spent between 17 minutes and 35 minutes in the supermarket.

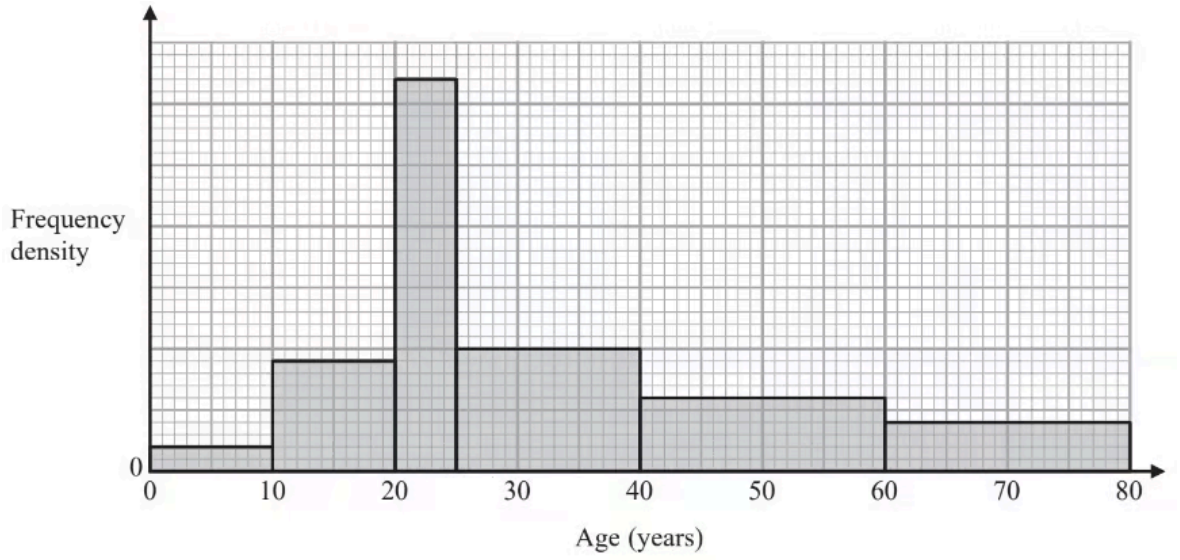
(3 marks)

(b) One of the customers is selected at random.

Given that this customer had spent more than 30 minutes in the supermarket, find the probability that this customer spent more than 36 minutes in the supermarket.

(2 marks)

11 The histogram shows information about the ages of all the passengers travelling on a plane.
No one on the plane is older than 80 years.



A passenger on the plane is picked at random.

Work out an estimate for the probability that this person is older than 55 years.

(3 marks)

12 A sample of 50 eggs is taken from Farm A.

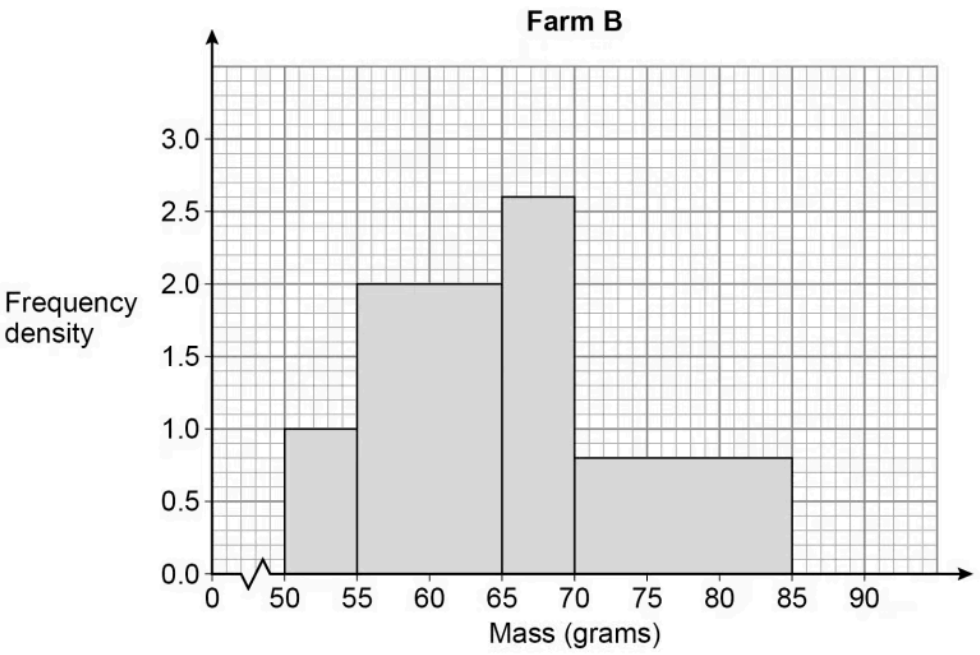
The table shows information about the masses of the eggs from Farm A.

Farm A

Mass, m (grams)	Frequency
$53 < m \leqslant 58$	8
$58 < m \leqslant 63$	19
$63 < m \leqslant 68$	15
$68 < m \leqslant 73$	8

A sample of 50 eggs is taken from Farm B.
The histogram shows information about the masses of the eggs from Farm B.

Farm B



For medium eggs, 53 g < mass < 63 g

The Farm A sample has more medium eggs than the Farm B sample.

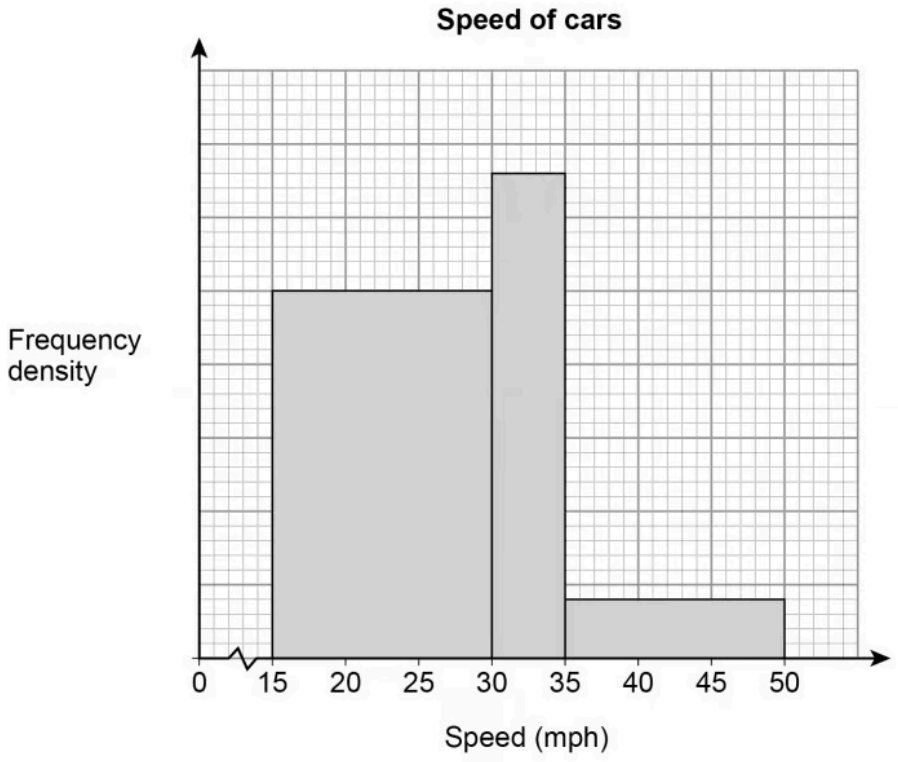
Using the table and the histogram, estimate how many more.

You **must** show your working.

(4 marks)

13 (a) The histogram shows information about the speed of cars as they pass a checkpoint.

The scale on the frequency density axis is missing.



The histogram shows information about 480 cars.

How many cars does the first bar represent?

(4 marks)

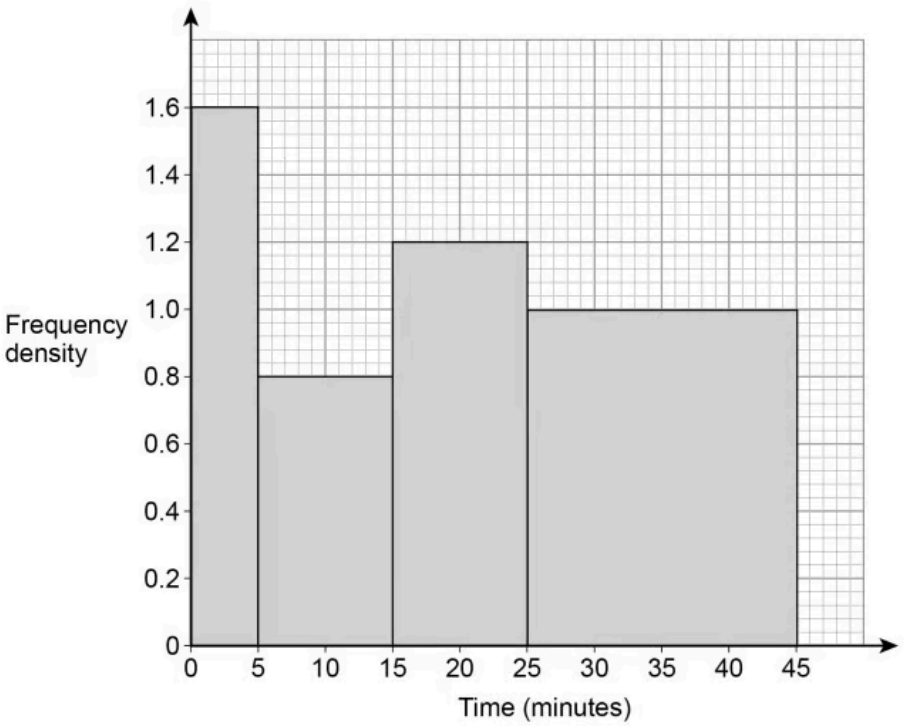
(b) Cars with a speed greater than 40 mph are over the speed limit.

Use the histogram to estimate the number of cars that are over the speed limit.

(2 marks)

14 48 students completed some homework.

This histogram shows information about the times taken.



Work out an estimate of the interquartile range.
You **must** show your working.

..... minutes

(4 marks)

15 (a) The masses, m kg, of some parcels are shown below.

4	15	14	11	12	3	1	18	13	2	16	10

Jack constructs this grouped frequency table to record the masses.

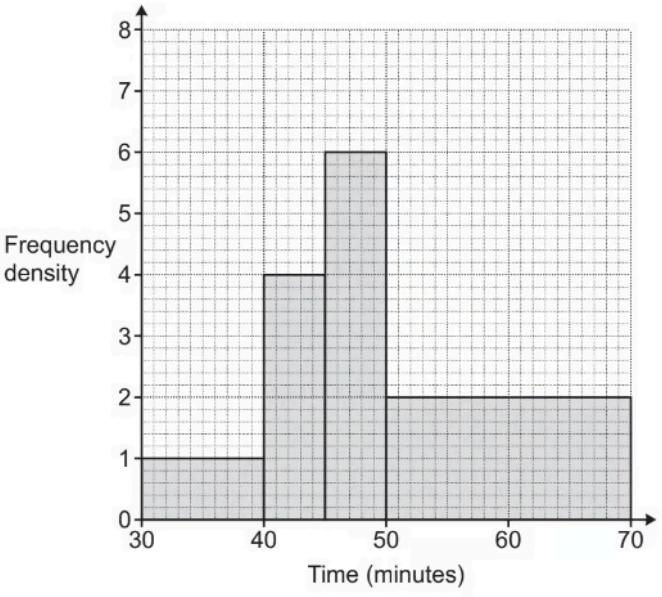
Mass (m kg)	Tally	Frequency
$0 \leqslant m \leqslant 5$		
$5 \leqslant m \leqslant 10$		
$10 \leqslant m \leqslant 15$		
$15 \leqslant m \leqslant 20$		

Explain why Jack's table is unsuitable to record the masses.

(1 mark)

(b) The histogram summarises the times taken, in minutes, by some students to complete a

race.



Show that 70 students took between 45 and 70 minutes to complete the race.

(2 marks)

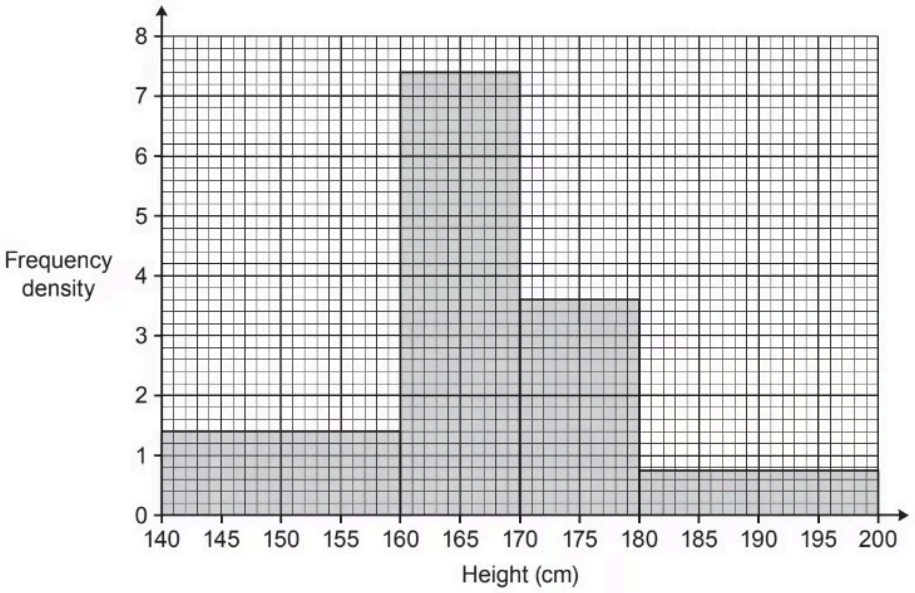
(c) Calculate an estimate of the mean time taken to complete the race.

Show your working.

.....min

(5 marks)

16 The histogram summarises the heights of the 153 members of a swimming club.



Members of a rowing club have a median height of 172 cm.

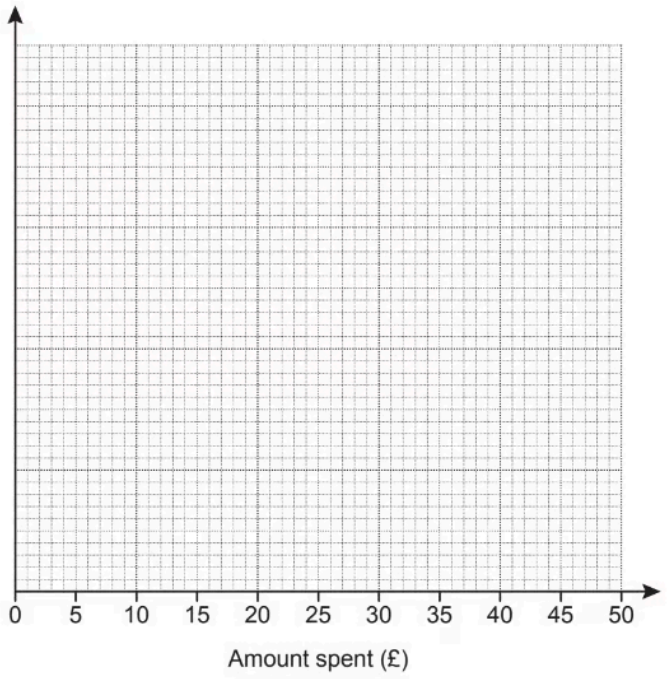
Which club has the greater median height?
You must show all your working.

(5 marks)

17 (a) Ana records the amount of money spent by 140 customers in her shop on one day

Amount spent $(£a)$	Frequency
$0 < a \leqslant 5$	35
$5 < a \leqslant 10$	42
$10 < a \leqslant 15$	20
$15 < a \leqslant 20$	18
$20 < a \leqslant 30$	14
$30 < a \leqslant 50$	11

Draw a histogram to represent this information.



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(4 marks)

(b) Ana wants to offer a discount to the customers who spend the most money in her shop.

Voucher Save 10% when you spend more than £...

She wants to give the discount to approximately 25% of her customers.

Suggest a suitable amount of money for Ana to use on her voucher.

Justify your decision.

(4 marks)