Surname	
Other Names	
Candidate's Signature	

GCSE 9 - 1 Questions

Histograms 2

Calculator Allowed

INSTRUCTIONS TO CANDIDATES

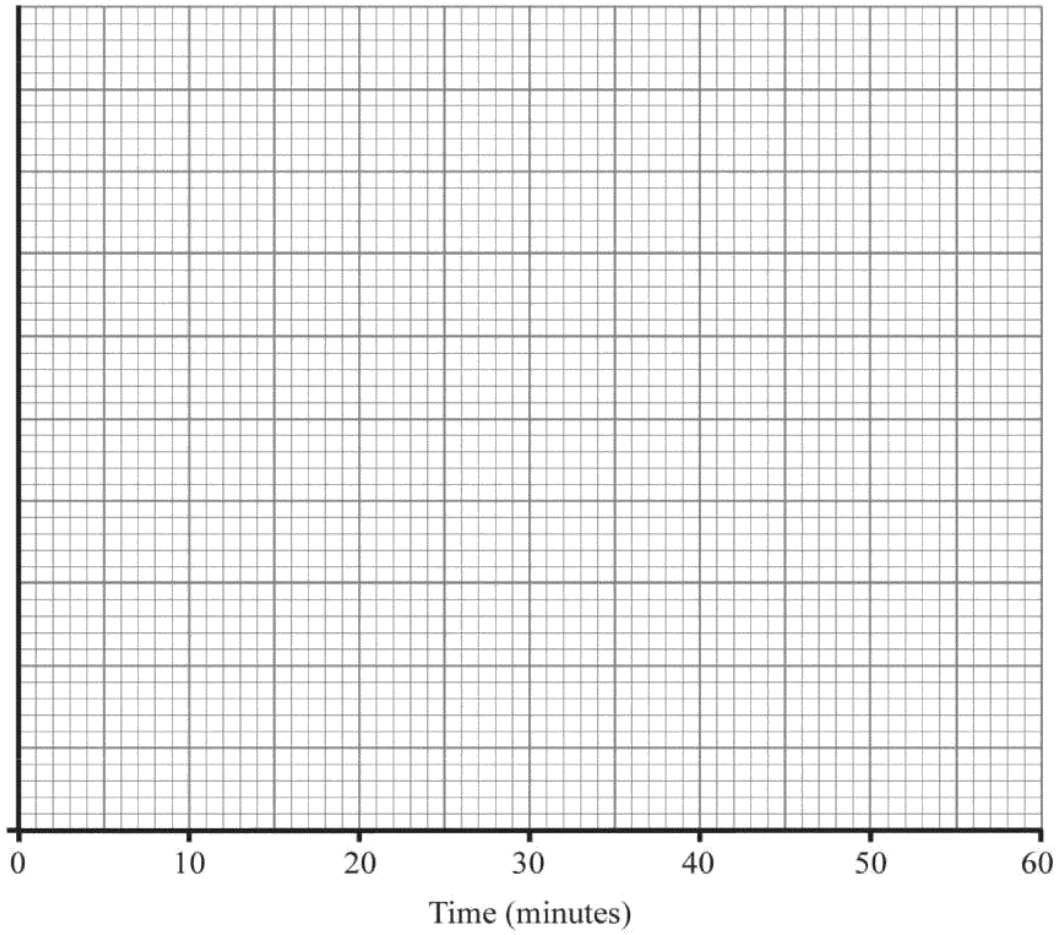
- Write your name in the space provided.
- Write your answers in the spaces provided in this question paper.
- Answer ALL questions.
- Any working should be clearly shown in the spaces provided since marks may be awarded for partially correct solutions.
- You should have a ruler, compass and protractor where required.

Total Marks :

1) The times taken by a group of men to complete a questionnaire were recorded.

Time (t minutes)	Frequency
$0 < t \leq 5$	36
$5 < t \leq 15$	60
$15 < t \leq 20$	49
$20 < t \leq 35$	30
$35 < t \leq 60$	25

Draw on the axes provided a clearly labelled histogram to illustrate this data.



[3]

2 The table gives information about the weights of 100 children.

Weight, w kg	Number of children
$20 \leq w < 30$	16
$30 \leq w < 35$	28
$35 \leq w < 40$	36
$40 \leq w < 60$	18
$60 \leq w < 65$	2

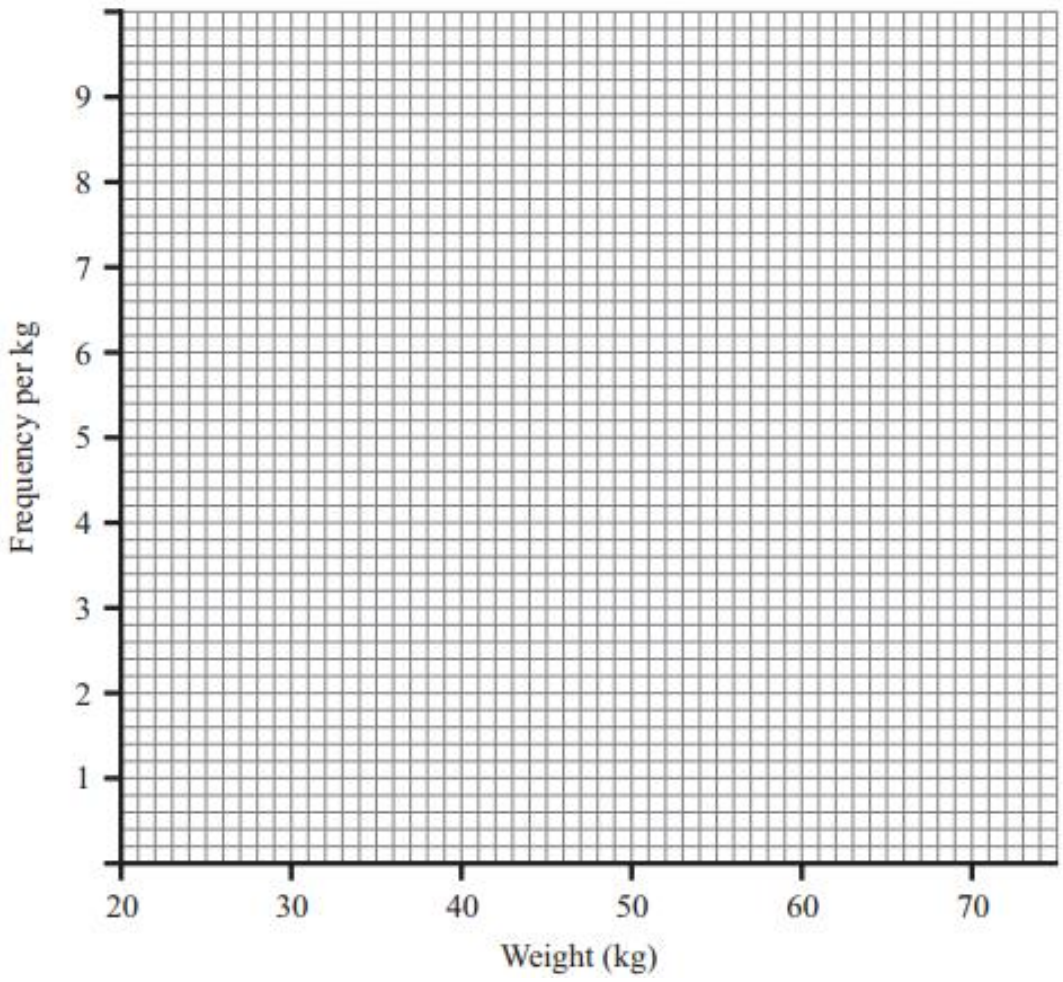
(a) Illustrate the data by drawing a histogram, **A**, on the graph paper opposite. [3]

(b) A stratified sample of 20 children was taken from those whose weight was less than 40 kg.

How many of the sample were taken from the interval $35 \leq w < 40$?

Answer _____ [2]

A



(c) The histogram **B**, already drawn, illustrates the weights of a different group of 100 children. Compare this histogram with the one you have drawn. Give **two** comparisons.

1. _____

_____ [1]

2. _____

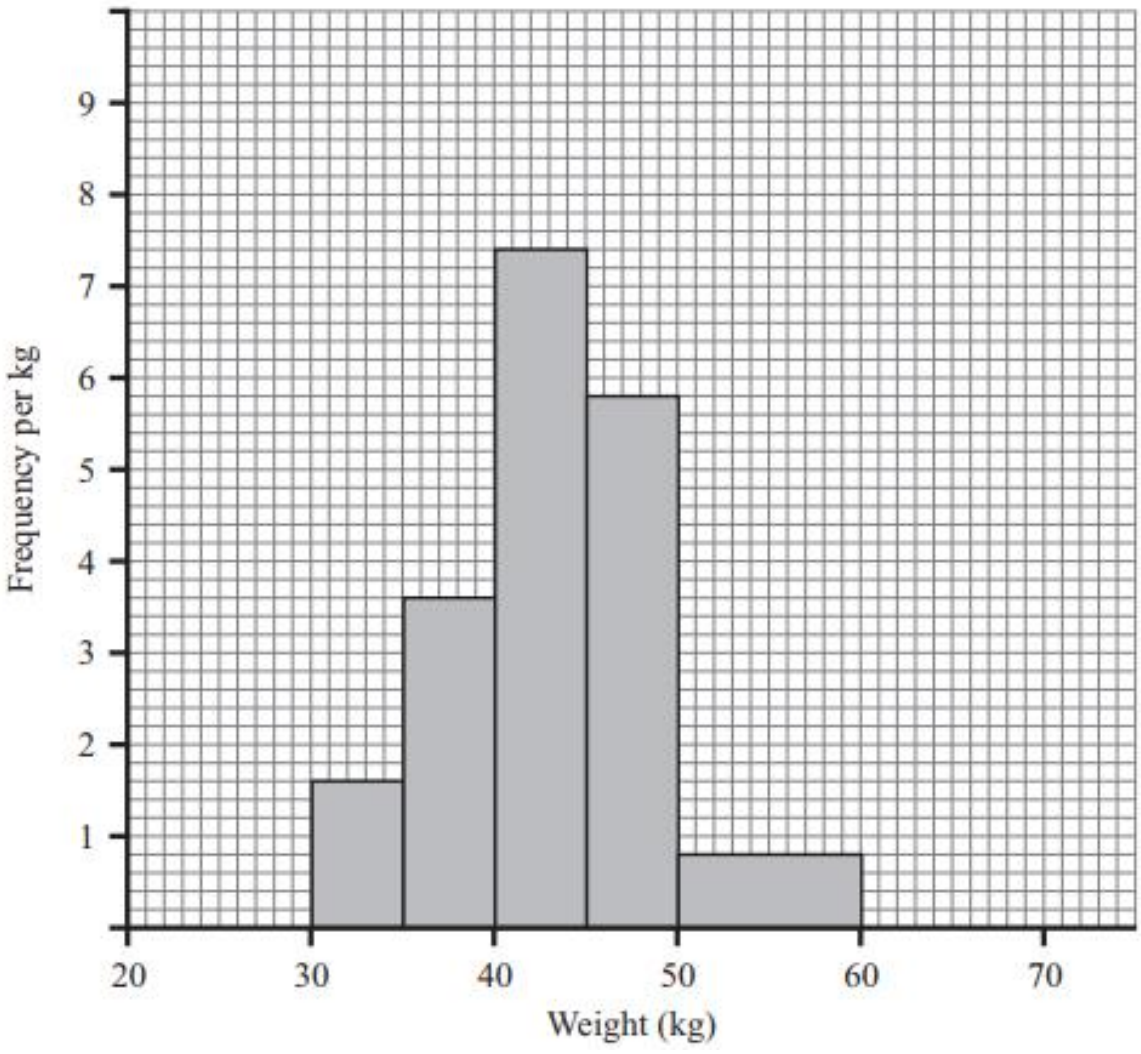
_____ [1]

(d) Suggest a reason for the difference in the two histograms.

Answer _____

[1]

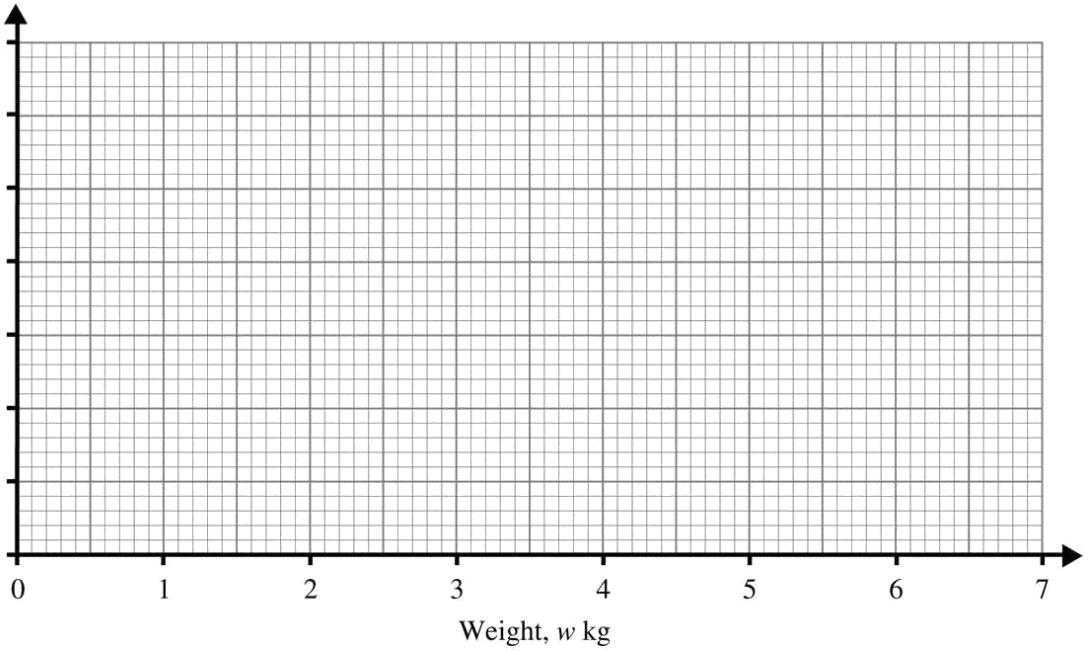
B



3) The table gives information about the weights of schoolbags.

Weight, w kg	Number of schoolbags
$2.0 \leqslant w < 3.0$	18
$3.0 \leqslant w < 3.5$	28
$3.5 \leqslant w < 4.0$	34
$4.0 \leqslant w < 6.0$	16
$6.0 \leqslant w < 6.5$	4

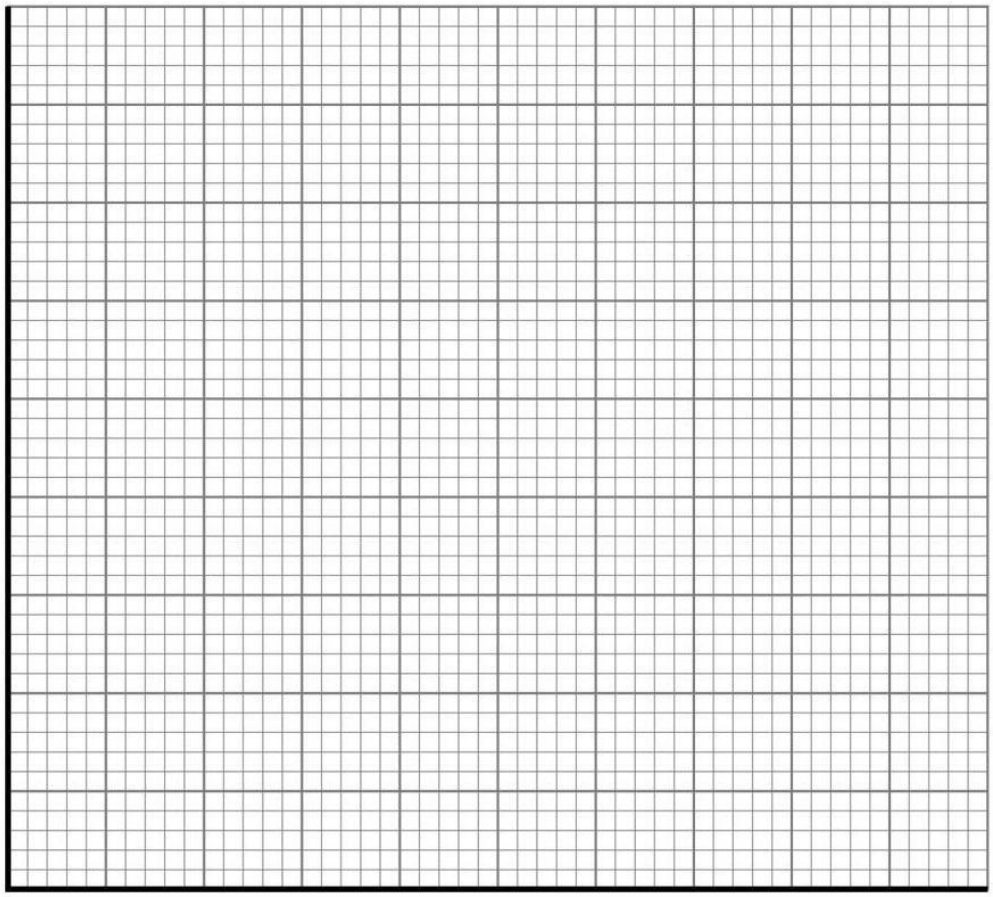
(a) Illustrate the data by drawing a histogram on the graph paper opposite, using the scale provided. [3]



4) The numbers of days spent processing applications for passports were recorded:

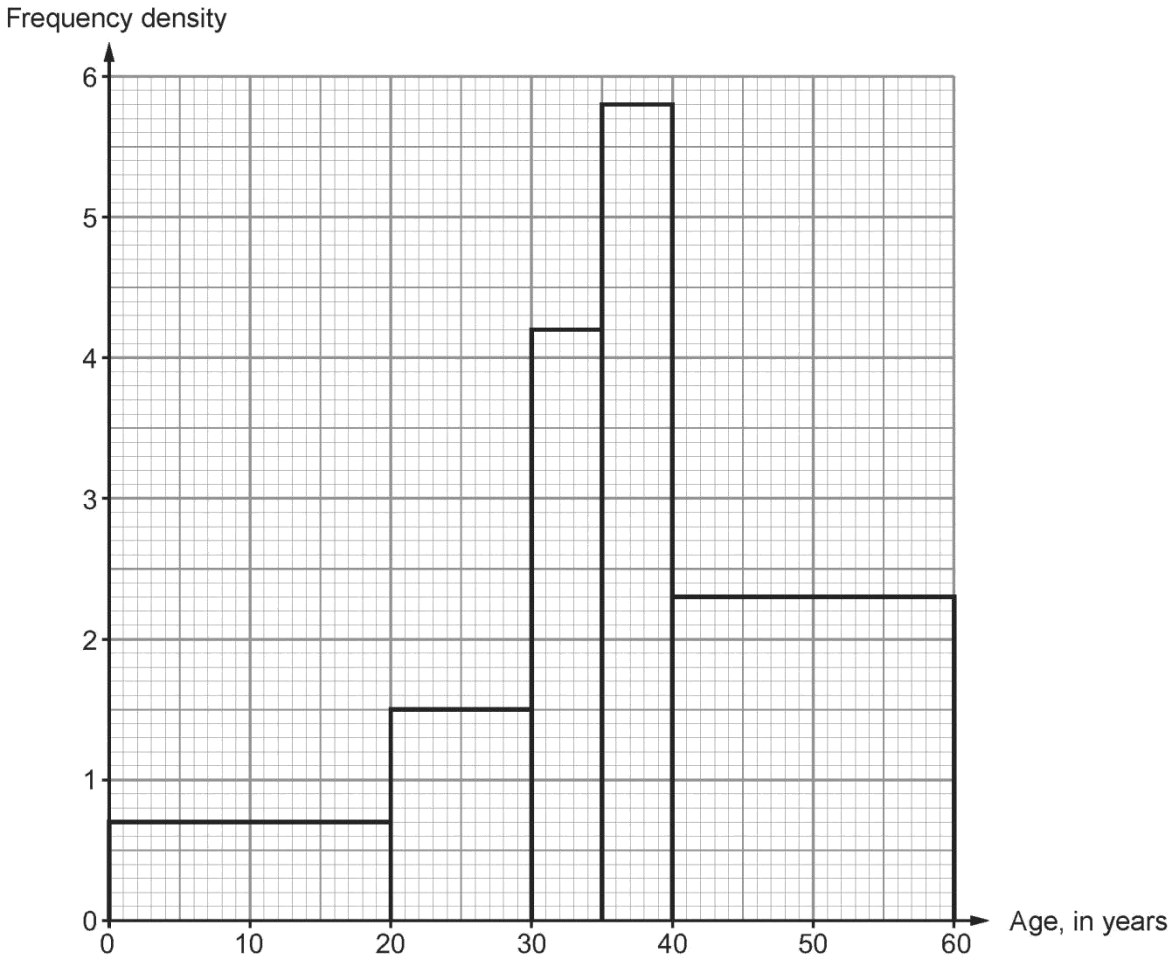
Number of days (D)	$0 < D \leqslant 10$	$10 < D \leqslant 15$	$15 < D \leqslant 20$	$20 < D \leqslant 35$
Frequency	30	45	33	12

(a) Draw a histogram on the graph paper.



[3]

5) The histogram below shows the ages of the people staying in a hotel one weekend.



(a) Use the histogram to complete the grouped frequency table below. [2]

Age in years	$0 \leqslant a < 20$	$20 \leqslant a < 30$	$30 \leqslant a < 35$	$35 \leqslant a < 40$	$40 \leqslant a < 60$
Frequency					

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(b) Calculate an estimate of the number of people whose ages are less than 24 years old. [2]

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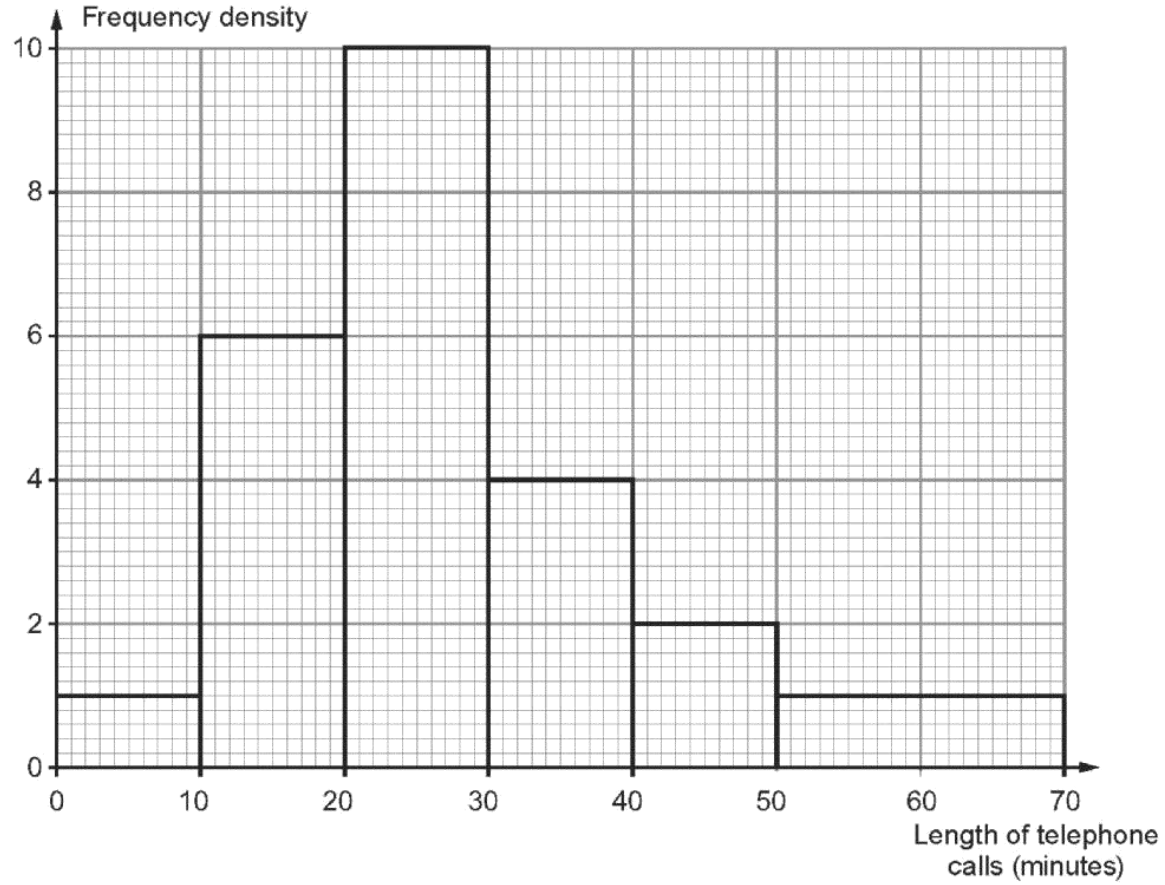
6) The histogram illustrates the lengths of telephone calls made to a computer helpline during one Friday evening.



(a) Calculate how many telephone calls were made to the computer helpline during the Friday evening. [3]

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(b) Calculate an estimate of the percentage of telephone calls that lasted longer than $\frac{3}{4}$ of an hour. [2]

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(c) Estimate the median length of a telephone call made to the computer helpline during the Friday evening.
Give your answer correct to 1 decimal place. [3]

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(d) The table below shows the number of minutes a different group of people spent watching programmes broadcast by *Hafod West TV* last Friday.

Time (t minutes)	Frequency
$0 \leqslant t < 100$	6
$100 \leqslant t < 200$	36
$200 \leqslant t < 300$	24
$300 \leqslant t < 500$	4
$500 \leqslant t < 800$	6

(i) Draw a histogram, on the graph paper opposite, to represent this data. [3]

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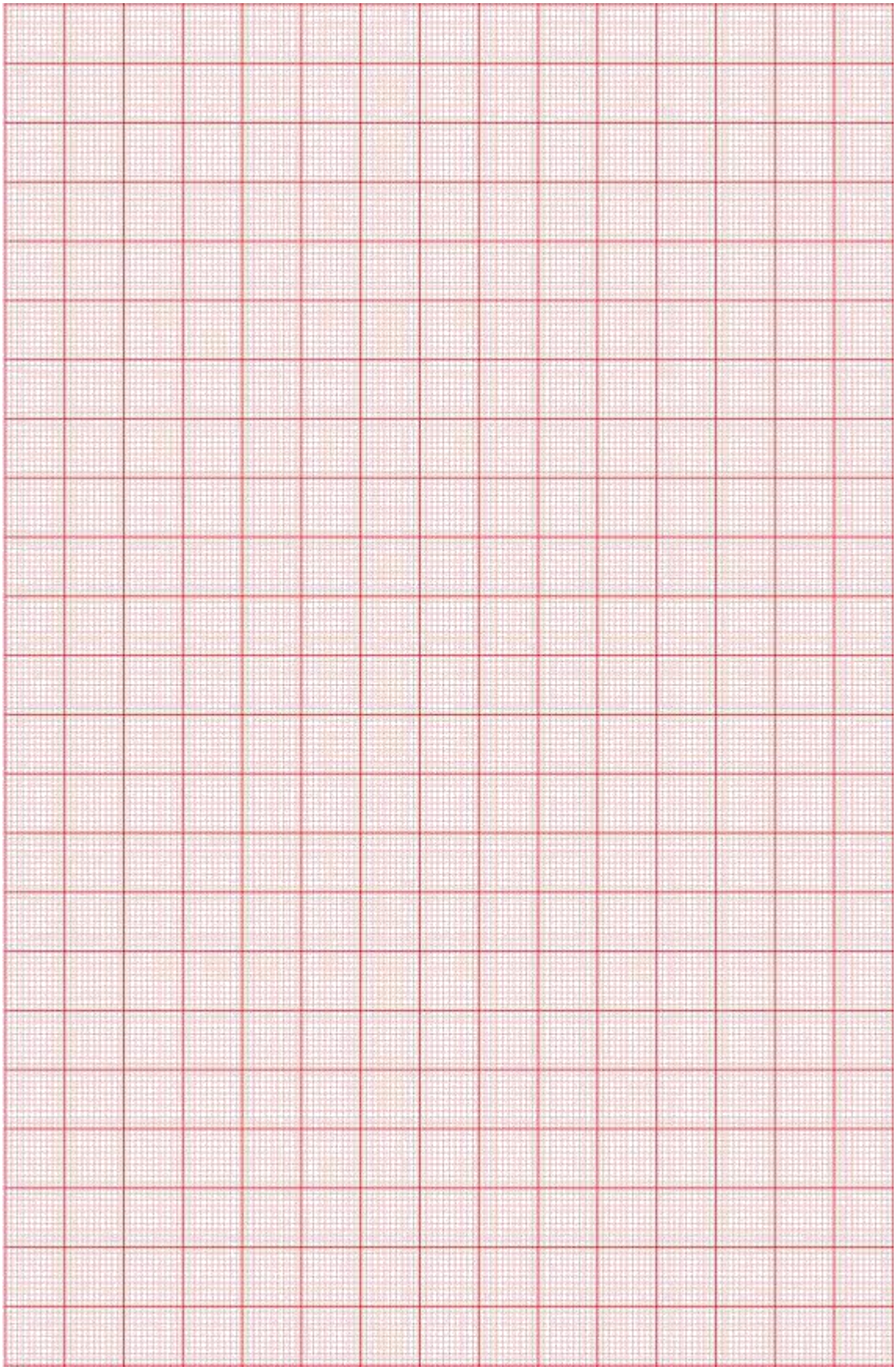
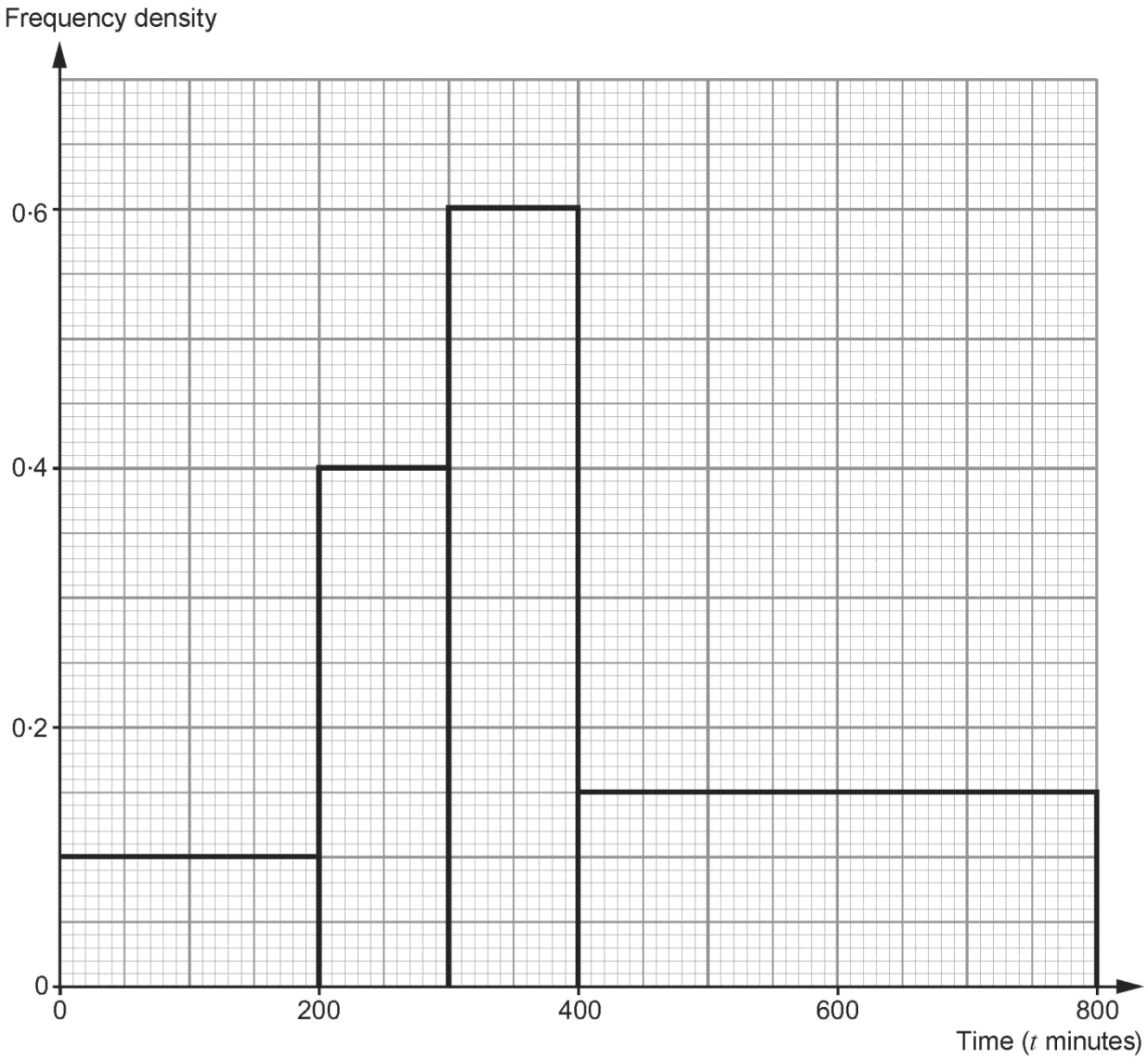


(e) After asking a number of people to complete a questionnaire, *Hafod West TV* published the histogram shown below.
It illustrates the number of minutes a group of people spent watching programmes broadcast on other television channels last Friday.



(i) How many people answered the questionnaire? [3]

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(ii) How many people spent less than 250 minutes watching these other channels last Friday? [2]

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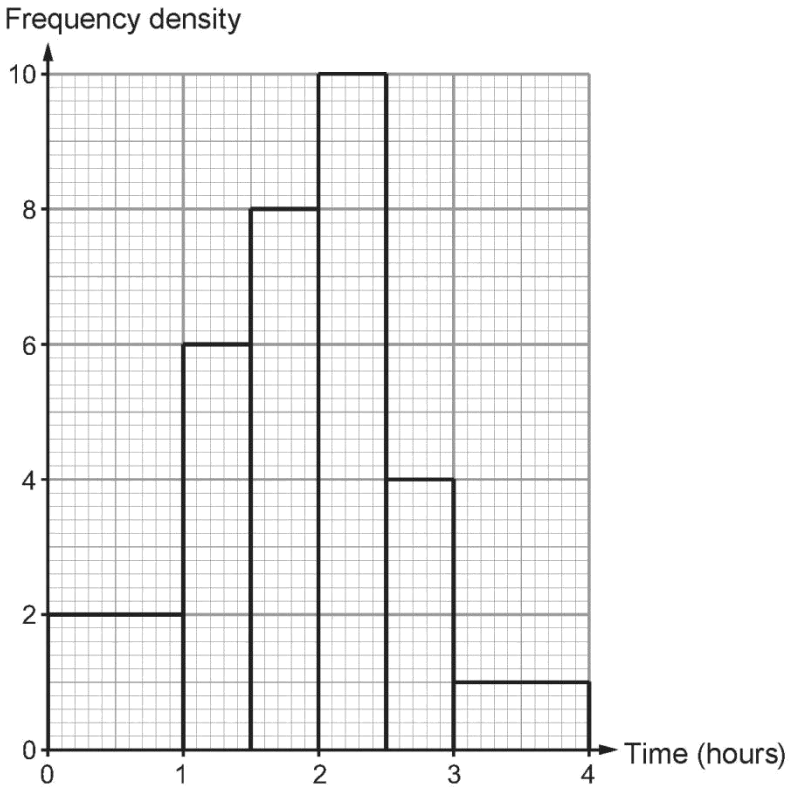
7) The *Big Fish Cymru* annual fishing competition is held on the west coast of Wales.

Information about **last year's** competition is displayed in the *Big Fish Cymru* booklet.
A section of this booklet is shown below.

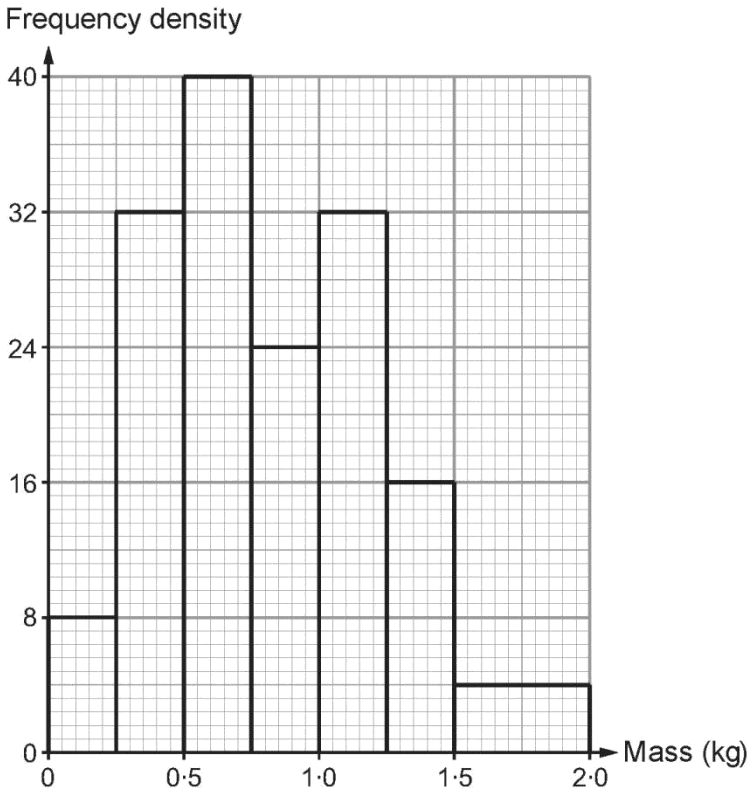
The competition organisers recorded the time taken for **each** angler to catch their **first** fish.

This is shown in the histogram on the right.



The competition organisers also recorded the mass of every fish caught.

This is shown in the histogram on the right.



(a) Last year, how many of the fish caught had a mass of less than 250 g? [1]

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(b) Last year, the final angler to catch their first fish did so after $3\frac{1}{2}$ hours.

How many **other** anglers took more than 3 hours to catch their first fish? [1]

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(c) The number of anglers taking part this year was three times as many as took part last year.
How many anglers took part in the competition this year? [4]

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Number of anglers this year was .....

(d) The median mass of the fish caught this year was 0·9 kg.

What is the difference, in kg, between the median mass of the fish caught this year and the median mass of the fish caught last year? [5]

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Difference in mass is ..... kg

(e) Approximately 10% of the anglers this year caught their first fish within 1 hour.

(i) How does this percentage compare with last year's percentage?
You must show all your working. [3]

(ii) Do you think it is fair to compare last year's competition results with this year's competition results?
You must give a reason for your answer. [1]

8) *(a)* As part of a quality control exercise in a supermarket, the time taken to scan 20 items was measured for each worker under the age of 40.
A printout of the histogram that illustrates the results obtained is shown below.

Unfortunately, the labelling of the frequency density axis was missing from the printout. It is known that there were 12 workers under the age of 40 that took more than 16 seconds to scan the 20 items.

(i) Complete the labelling of the scale on the frequency density axis.

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[3]

(ii) Calculate how many workers under the age of 40 took part in this quality control exercise.

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(iii) Calculate an estimate of the median time taken by a worker under the age 40 to scan 20 items.

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[4]

(b) As part of the quality control exercise in a supermarket, the time taken to scan 20 items was measured for each worker aged 40 or over.
The table below shows the results.

Time in seconds, t	$0 < t \leqslant 4$	$4 < t \leqslant 8$	$8 < t \leqslant 12$	$12 < t \leqslant 16$	$16 < t \leqslant 24$
Number of workers	0	2	36	24	8

Complete the scale on the frequency density axis and draw a histogram to illustrate the distribution on the graph paper below.

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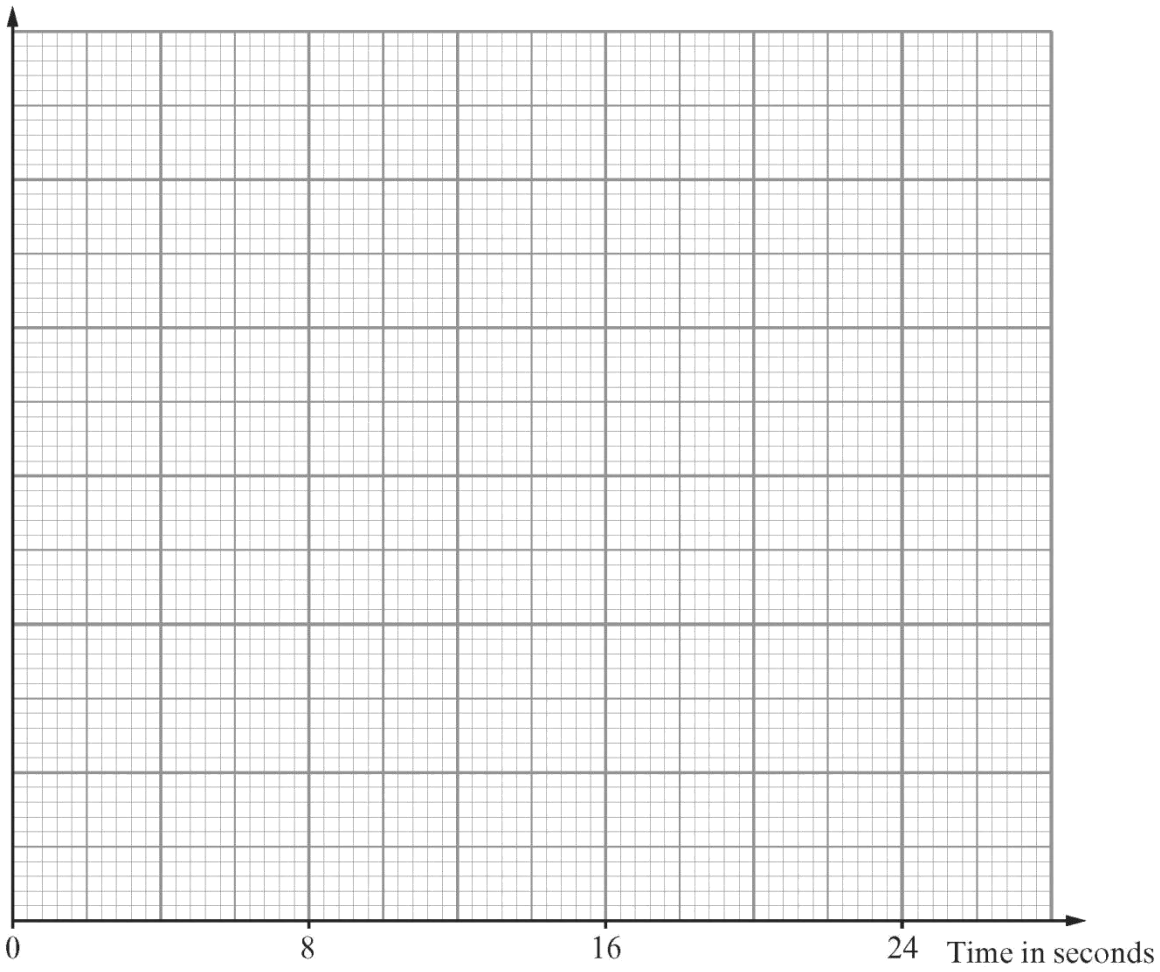
Frequency density



[3]

(c) Which of the two groups of workers is, on average, quicker at scanning 20 items in the supermarket? You must give a reason for your answer.

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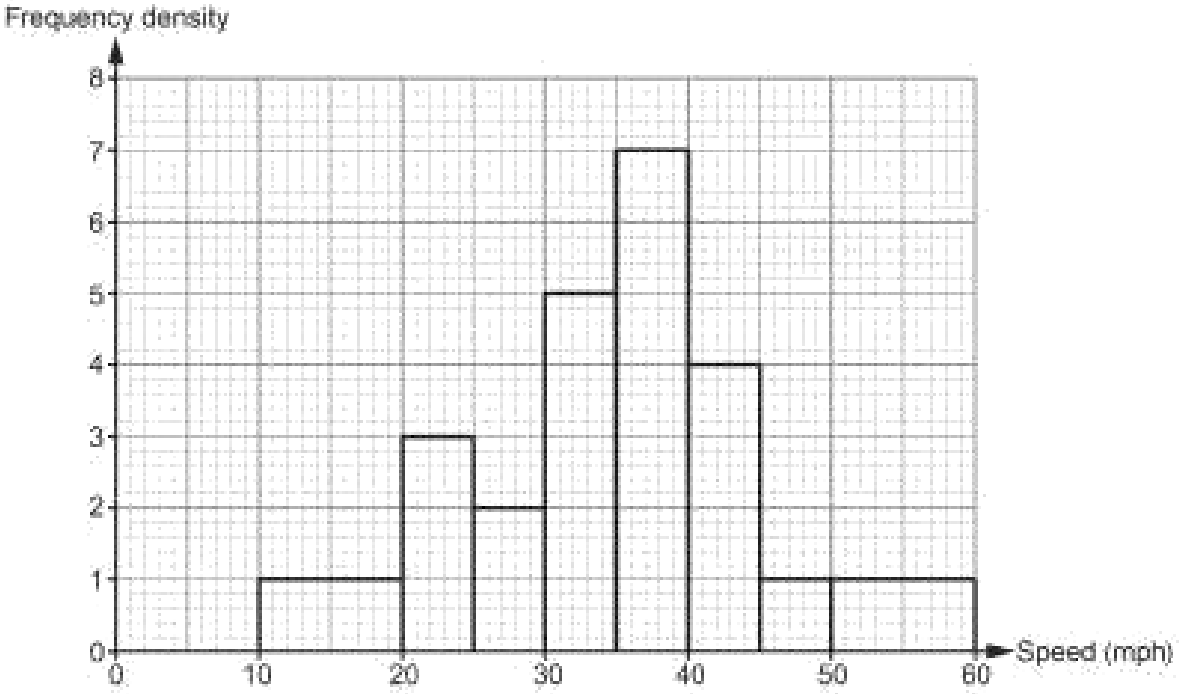
[1]

9) Bronwen has drawn a histogram to show the speeds of motorists as they passed a road junction between midnight and 1 a.m.



(a) Why do you think Bronwen's histogram has unequal class intervals? [1]

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(b) The speed limit as motorists pass the junction is 30 mph.

How many motorists were exceeding the speed limit as they passed the junction? [3]

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(c) It is being discussed if it would be safe to change the speed limit to 40 mph.

If this were to be done, how many fewer motorists would be exceeding the speed limit? [1]

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(d) In order to compare the speeds of motorists between midnight and 1 a.m. with other 1 hour periods, it is decided to group the data in equal class intervals of width 10 mph, starting at 0 mph.
Construct a **histogram** to display these results meeting this new requirement. [5]

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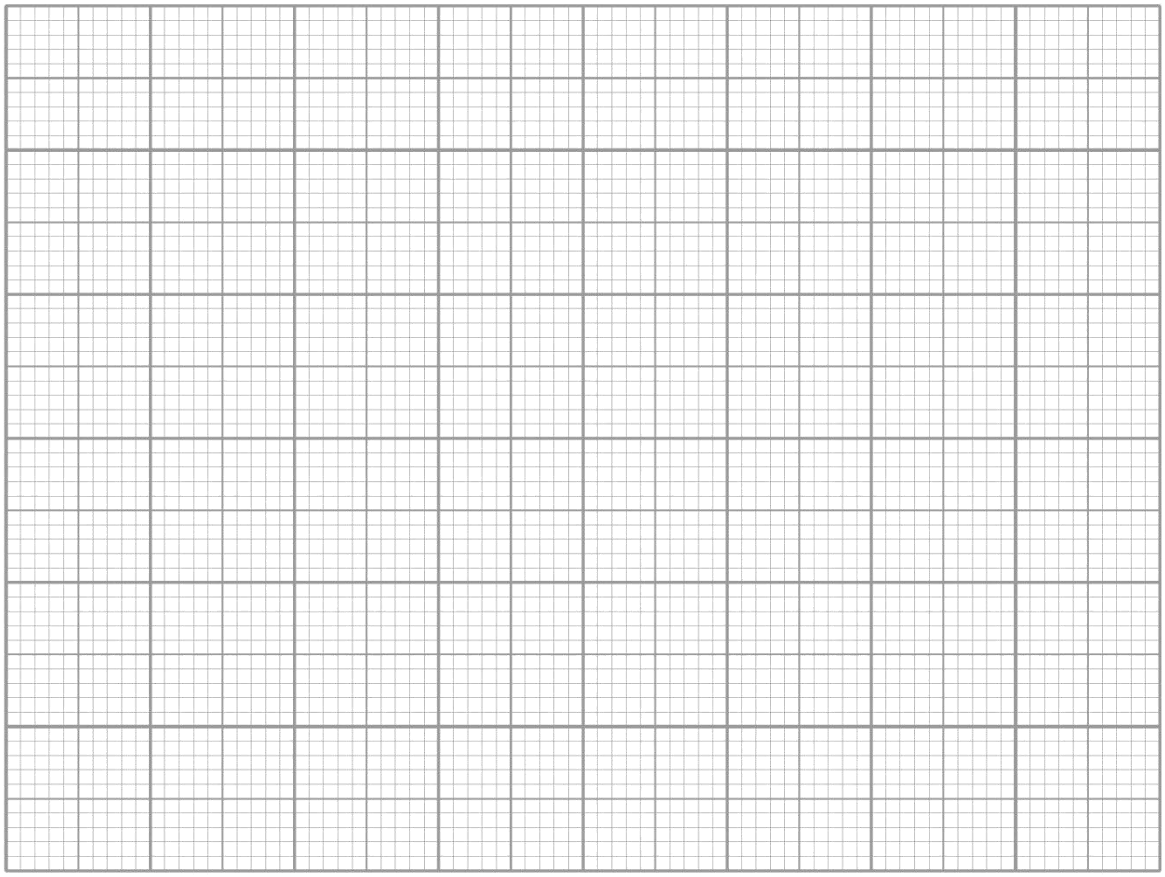
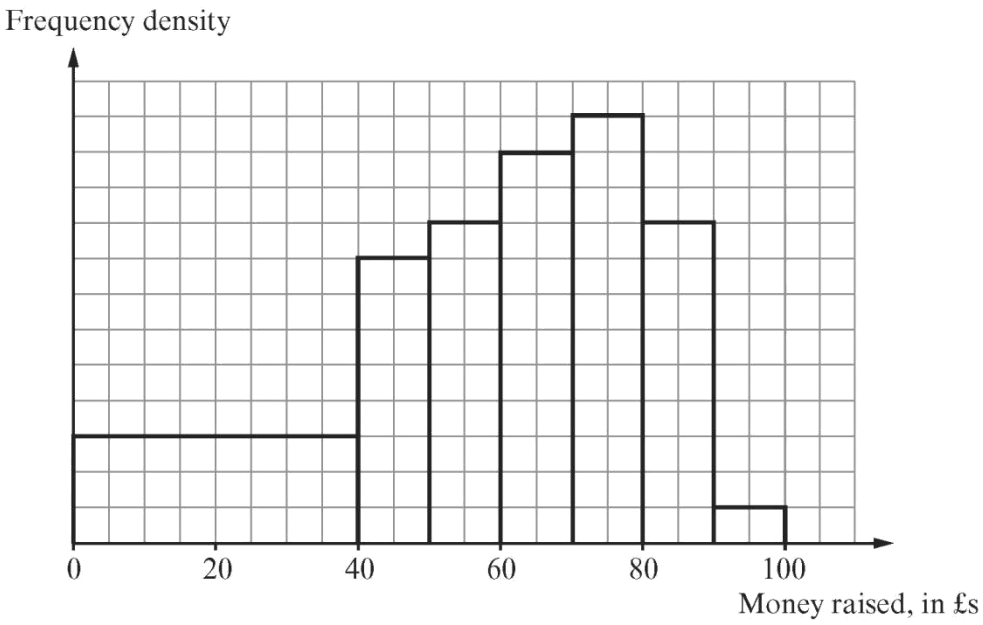


10) Jack arranged a raffle to raise money.
He has drawn a histogram to show the distribution of money raised from the raffle.



Jack has forgotten to write the scale on the vertical axis.
He knows that 40 people each raised £50 or less.
Calculate an estimate for the total money raised.

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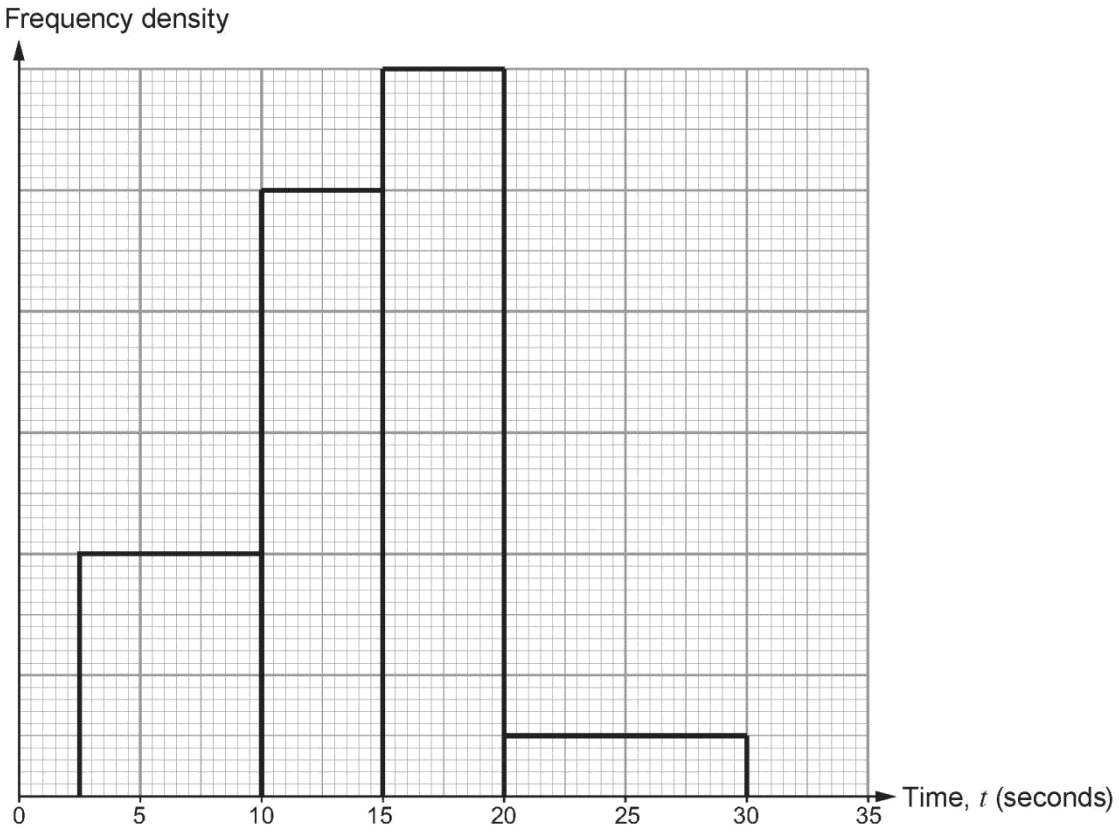
[6]

11) *(a)* At a supermarket, the time taken for customers to scan 5 items at a self-checkout was recorded.
A histogram that illustrates the results is shown below.
Unfortunately, the scale on the frequency density axis is missing.



It is known that 6 people took between 15 and 20 seconds to scan their 5 items.

(i) Complete the scale on the frequency density axis. [3]

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(ii) How many people were timed scanning their 5 items? [2]

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(b) The time taken for staff to scan 5 items was also recorded.

The table below shows the results.

Time, t (seconds)	$0 < t \leqslant 4$	$4 < t \leqslant 8$	$8 < t \leqslant 12$	$12 < t \leqslant 16$	$16 < t \leqslant 24$
Number of staff	0	2	24	8	4

Complete the scale on the frequency density axis and draw a histogram to illustrate the distribution on the graph paper below. [3]

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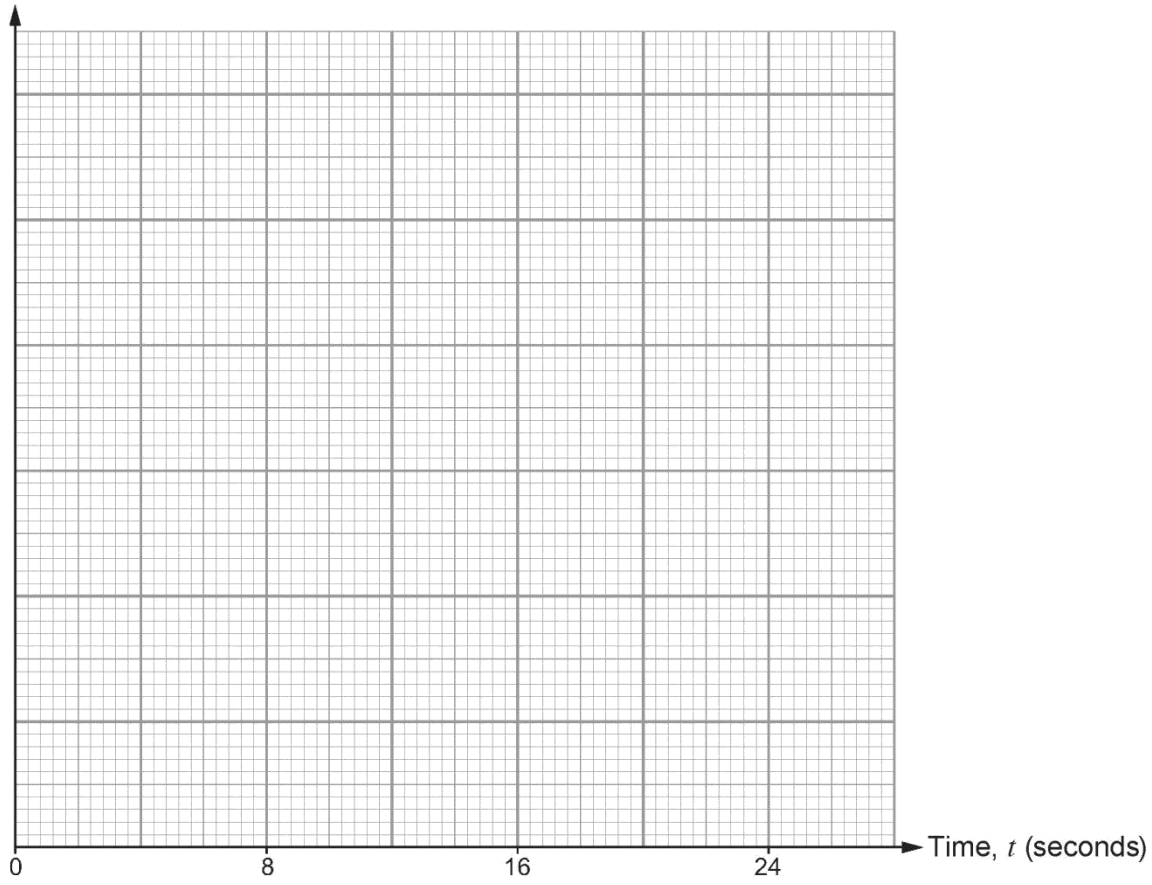
Frequency density



(c) On average, which of the two groups of people, customers or staff, were quicker at scanning 5 items?
Tick the appropriate box.

Customers ☐ Staff ☐

You must use the histograms to explain your answer. [1]

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12) The lengths of the worms collected in a one square metre area of woodland were measured. The results are summarised in the grouped frequency distribution below.

Length, l (mm)	Frequency
$0 < l \leqslant 10$	4
$10 < l \leqslant 20$	2
$20 < l \leqslant 30$	10
$30 < l \leqslant 40$	20
$40 < l \leqslant 50$	24
$50 < l \leqslant 60$	24
$60 < l \leqslant 70$	0
$70 < l \leqslant 80$	2

It is decided by the team recording the lengths of the worms that:

- groups $0 < l \leqslant 10$ and $10 < l \leqslant 20$ should be combined
- groups $60 < l \leqslant 70$ and $70 < l \leqslant 80$ should be combined.

(a) Explain why you think this decision was made and whether you think it is a sensible idea. [1]

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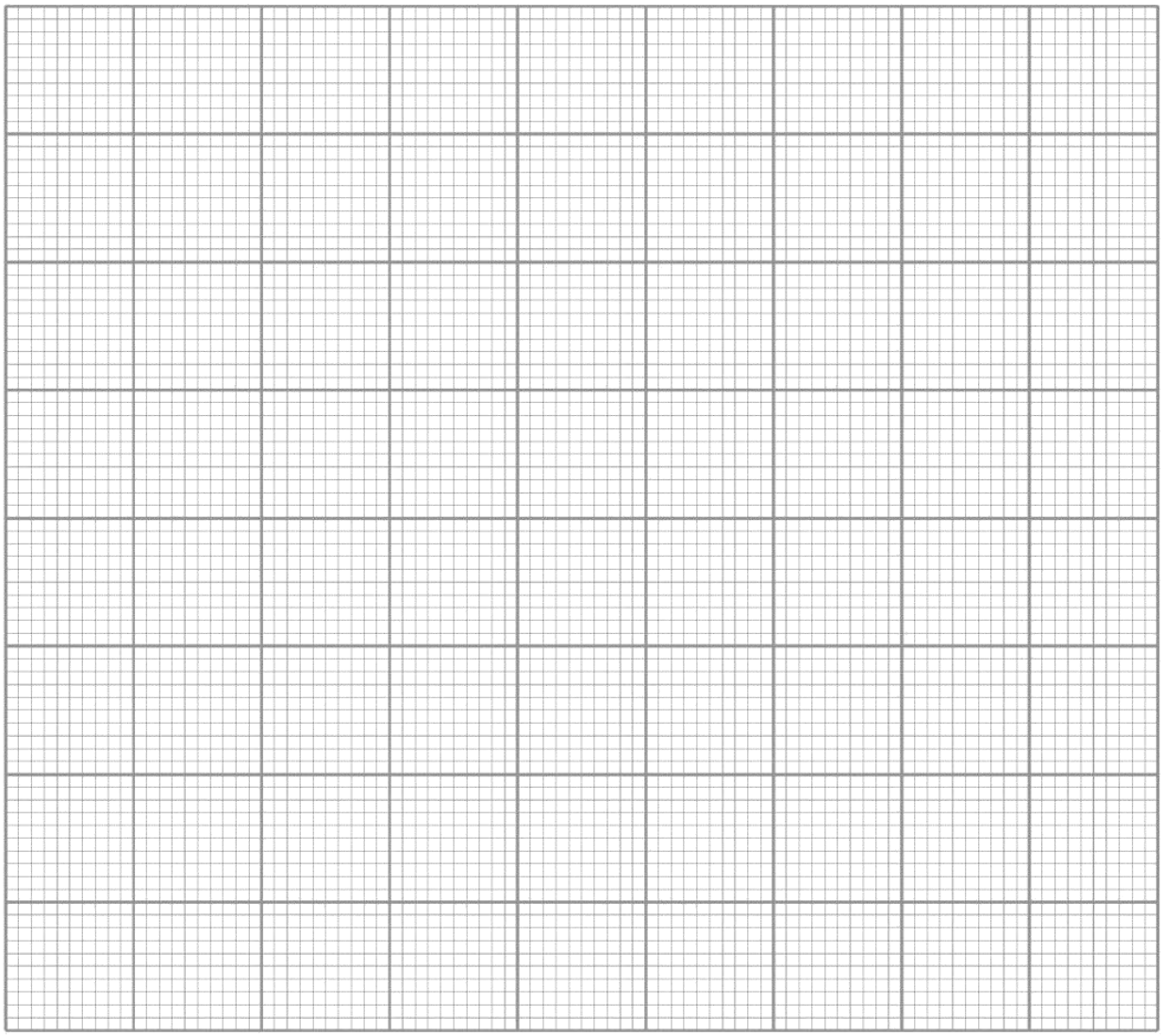
(b) Complete the table below and draw a histogram to display the results for the lengths of the worms, keeping to the decision made for combining the results. [4]

Length, l (mm)	Frequency	Frequency density
$0 < l \leqslant 20$		
$20 < l \leqslant 30$		
$30 < l \leqslant 40$		
$40 < l \leqslant 50$		
$50 < l \leqslant 60$		
$60 < l \leqslant 80$		



(c) Write down an estimate for the median length of the worms.
You **must** show your working. [4]

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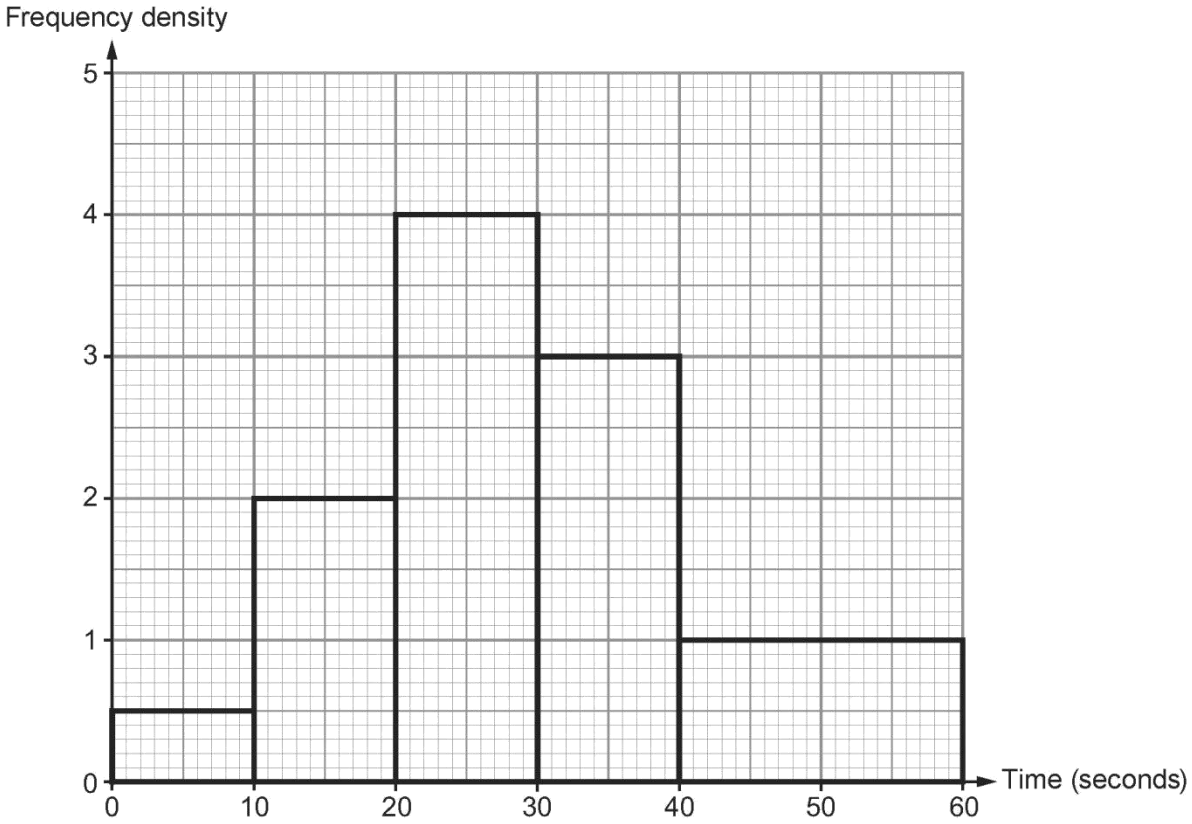
13) A cinema investigates the time taken for people to be served at the pay desk.
They carried out a survey between 2 p.m. and 2:30 p.m. on a Thursday.
The histogram shows the results of the survey.



(a) How many people were served at the pay desk? [3]

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..... people

(b) Calculate an estimate for the number of people who were served in less than 12·5 seconds. [2]

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..... people

(c) The cinema target is to serve 80% of people in less than 40 seconds per person. How many more people than the target were served in less than 40 seconds? [3]

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..... extra people above the target