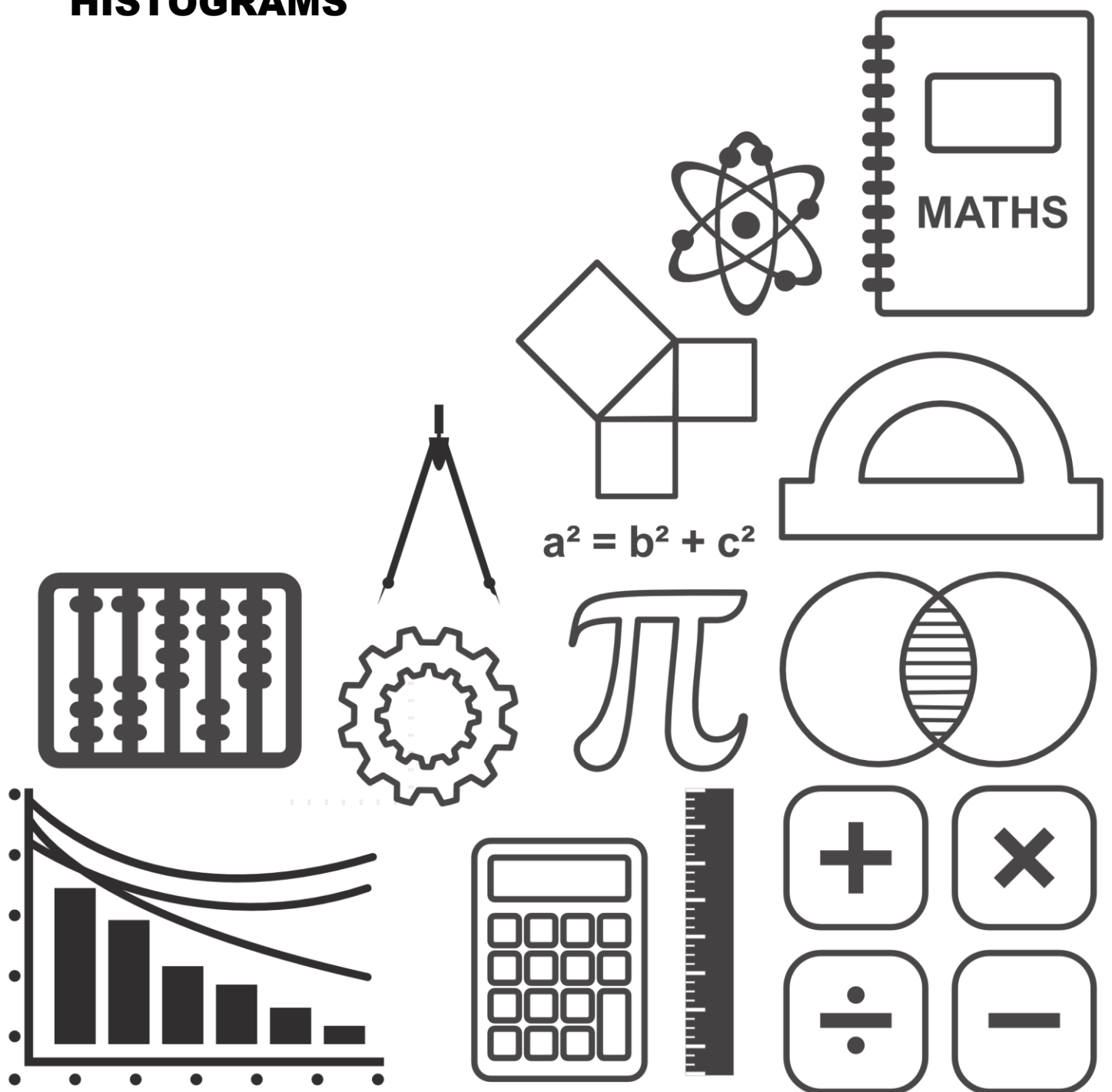


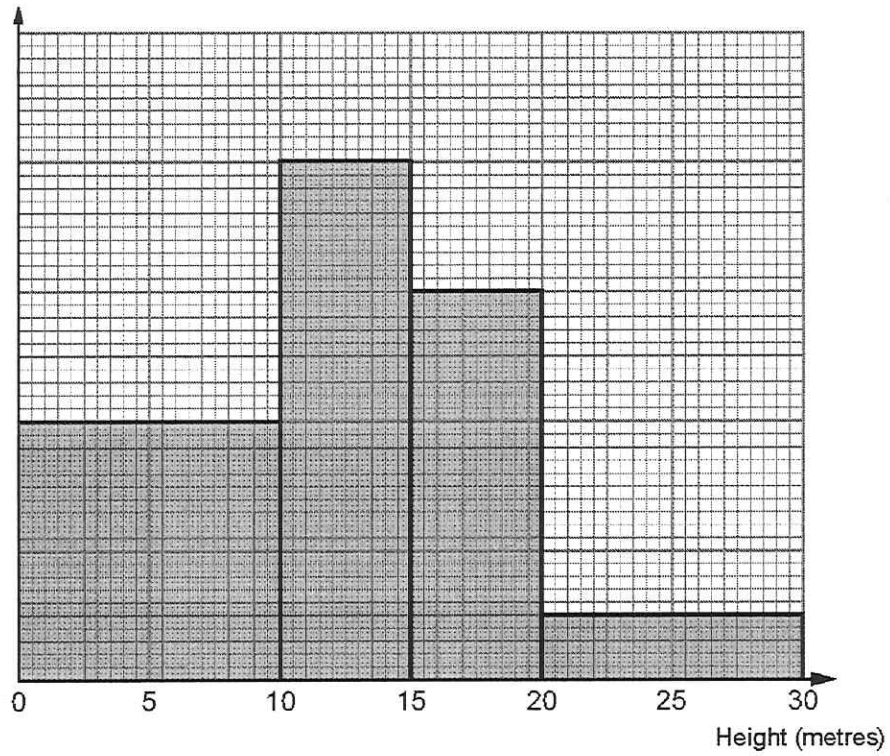
GCSE TOPIC BOOKLET HISTOGRAMS



1.

This histogram shows the distribution of heights, in metres, of 240 trees in a wood.

Frequency density

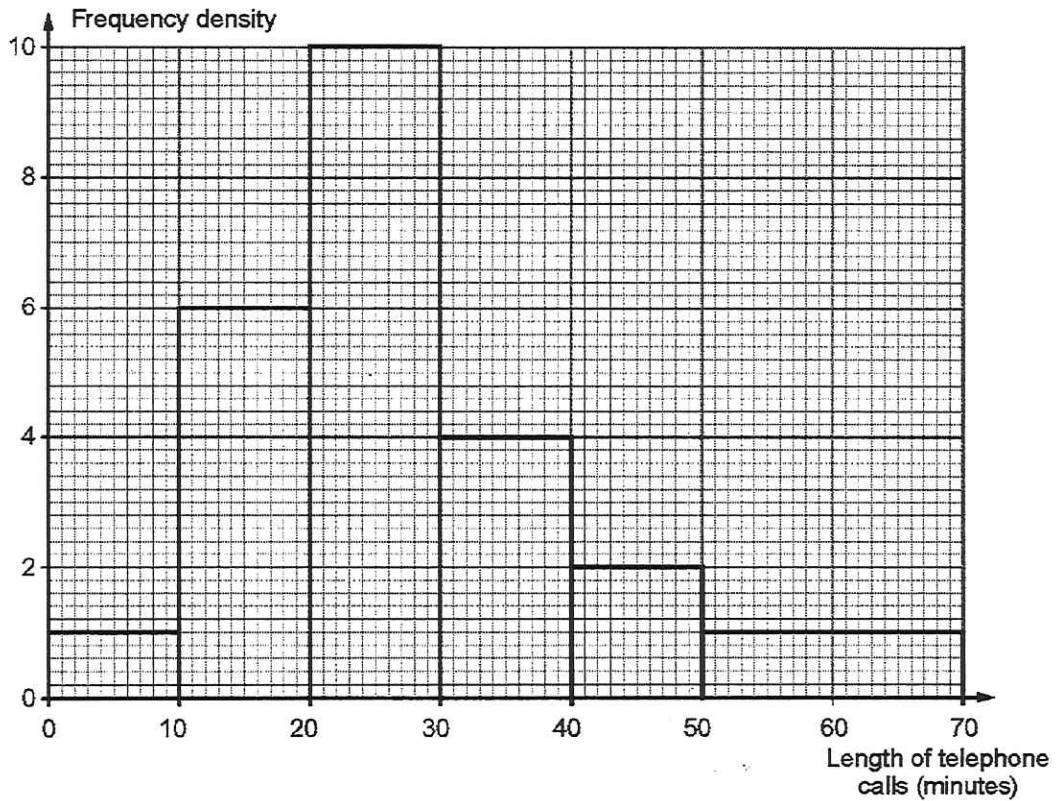


How many trees were between 10 and 15 metres in height?

[3]

2.

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



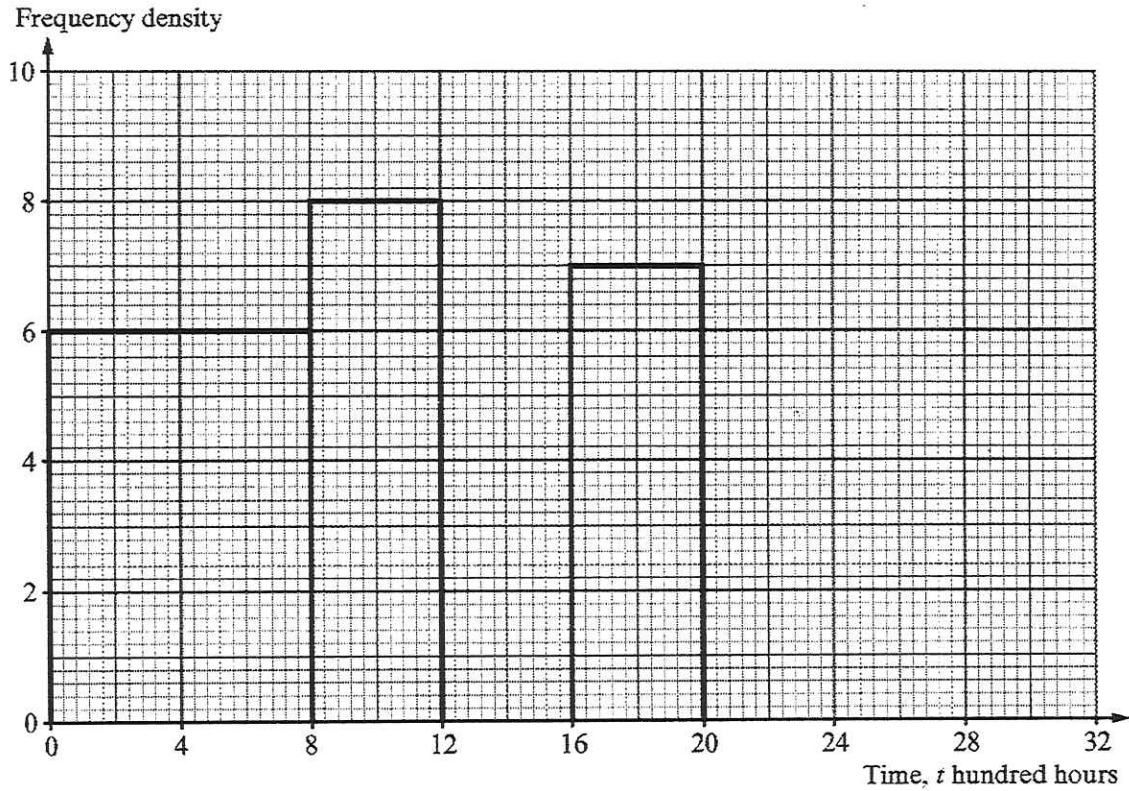
- (a) Calculate how many telephone calls were made to the computer helpline during the Friday evening. [3]

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

- (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]

The histogram and frequency table show some information about the time, in hundreds of hours, that a number of similar light bulbs lasted.

Time, t hundred hours	Number of light bulbs
$0 < t \leq 8$	48
$8 < t \leq 12$	
$12 < t \leq 16$	40
$16 < t \leq 20$	
$20 < t \leq 30$	20



(a) Complete the frequency table and the histogram

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[4]

(b) Find the estimate for the number of light bulbs that lasted between 2000 hours and 2400 hours.

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[1]

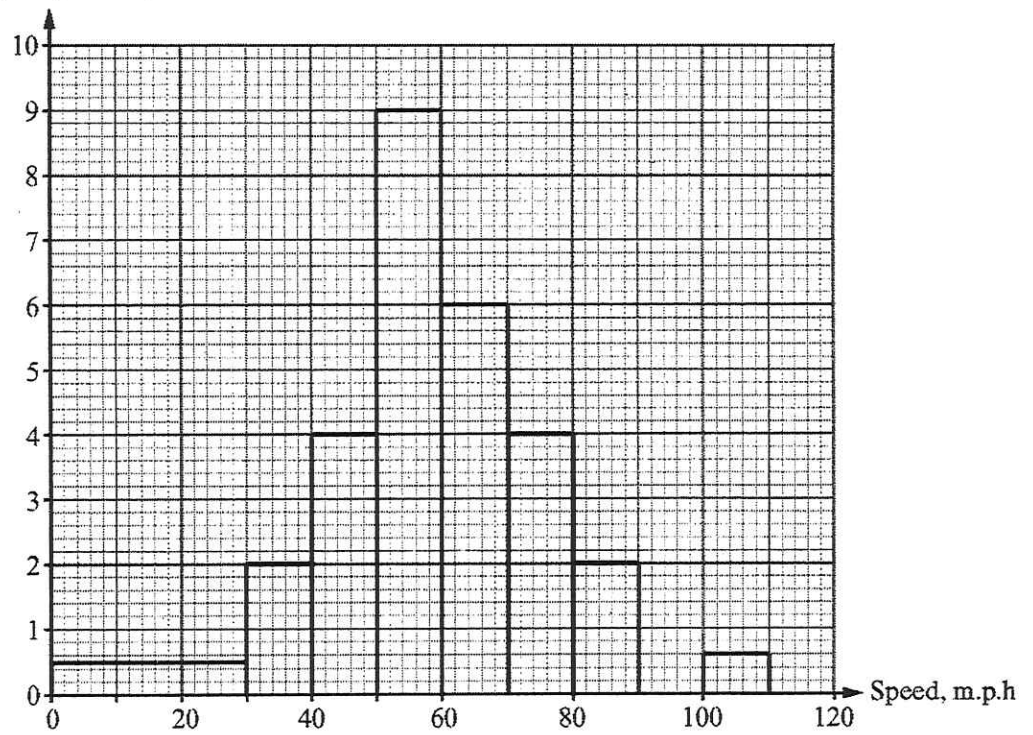
- (c) There are 56 bulbs that lasted less than y hundred hours.
Calculate an estimate for y .

[3]

4.

The histogram below shows the speeds of motorists as they enter a tunnel between 1 a.m. and 2 a.m.

Frequency density

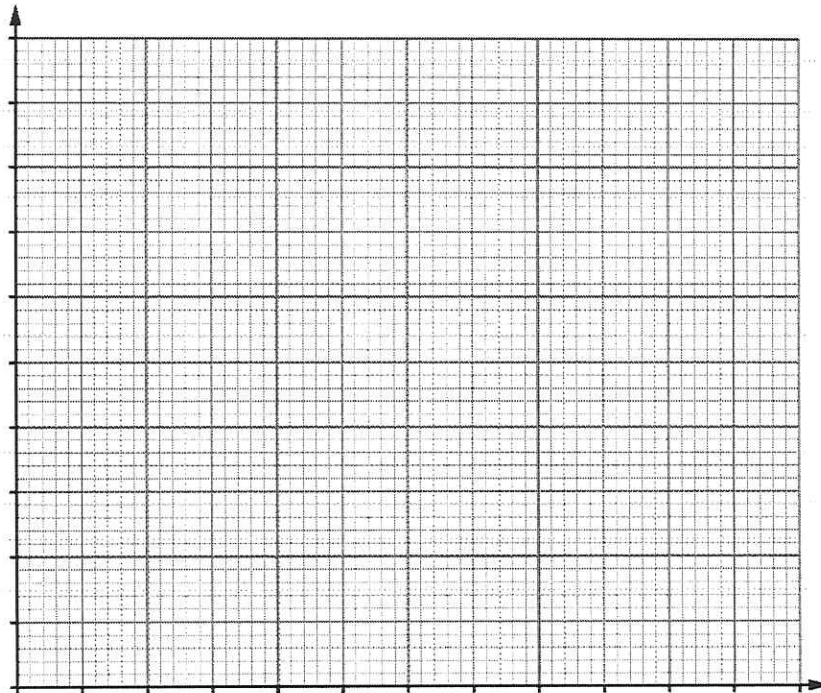


- (a) The speed limit on entering the tunnel is 70 m.p.h.
How many motorists were exceeding the speed limit on entering the tunnel?

[3]

- (b) In order to compare the speeds of motorists between 1 a.m. and 2 a.m. with other 1 hour periods, it is decided to group the data in equal intervals of width 30 m.p.h., starting at 0 m.p.h.
Construct a histogram to display these results meeting this new requirement.

[8]

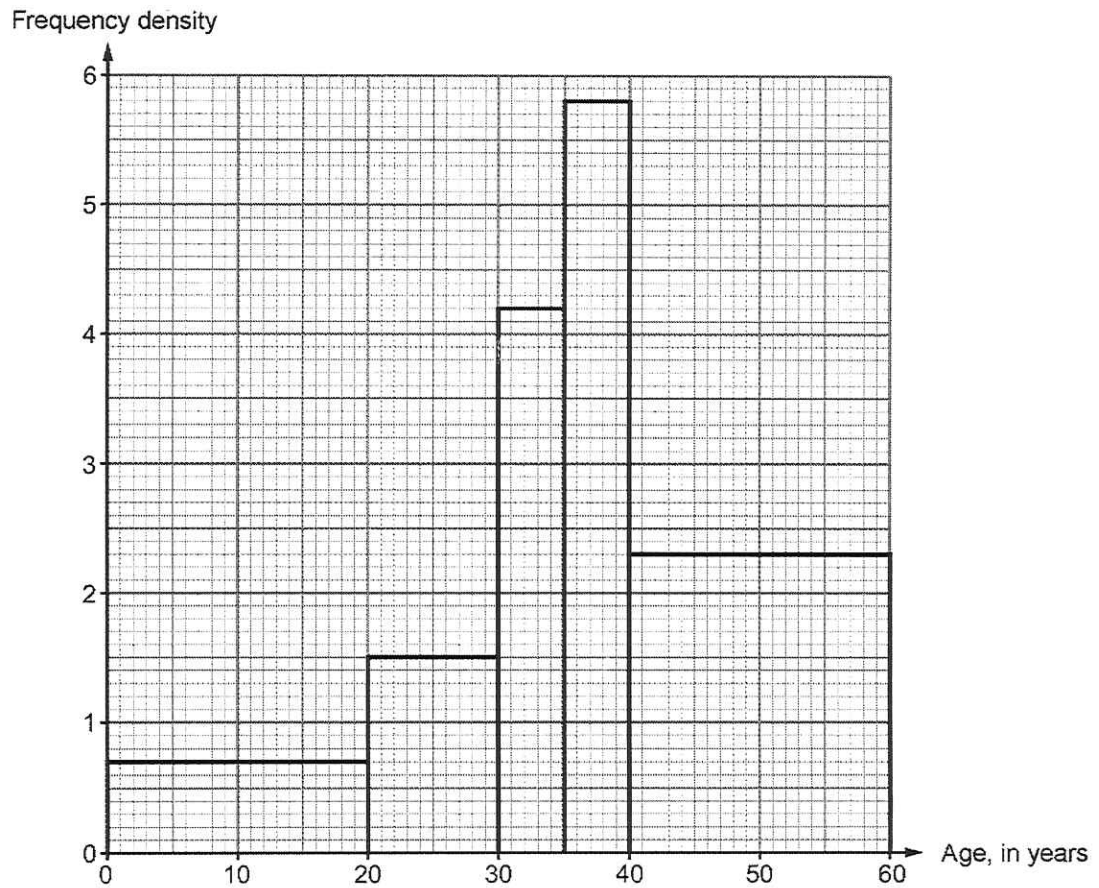


- (c) Given that the speed limit is 70 m.p.h., which of the two histograms is the more appropriate for the display of the data? You must give a reason for your answer.

[1]

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	$0 \leq a < 20$	$20 \leq a < 30$	$30 \leq a < 35$	$35 \leq a < 40$	$40 \leq a < 60$
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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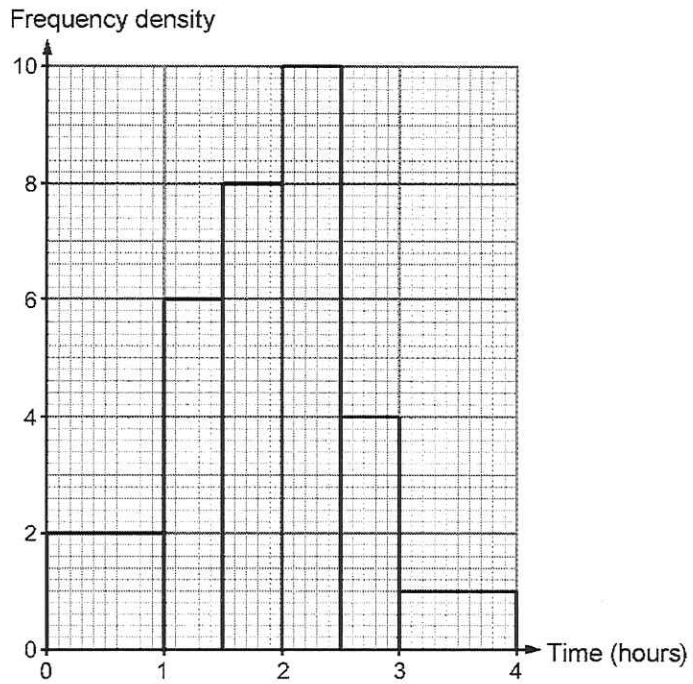
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6.

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.

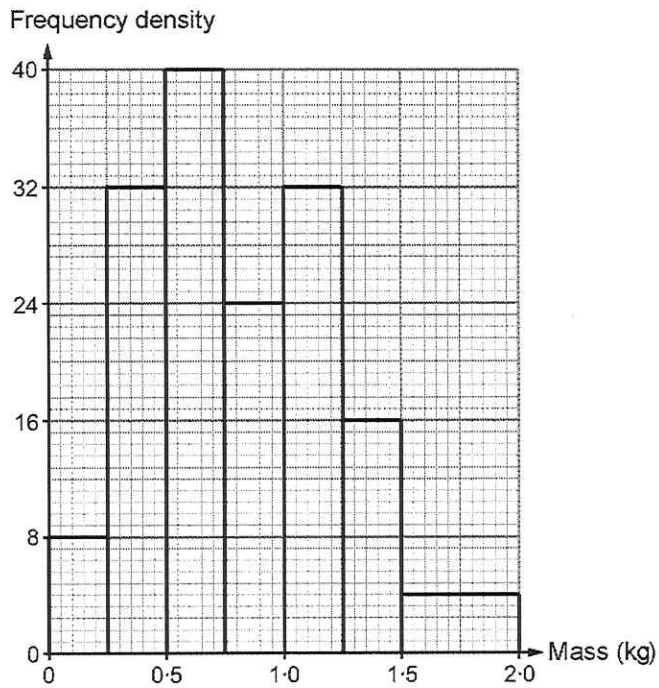
The competition organisers recorded the time taken for **each** angler to catch their **first** fish.

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 250g? [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 0.9kg.

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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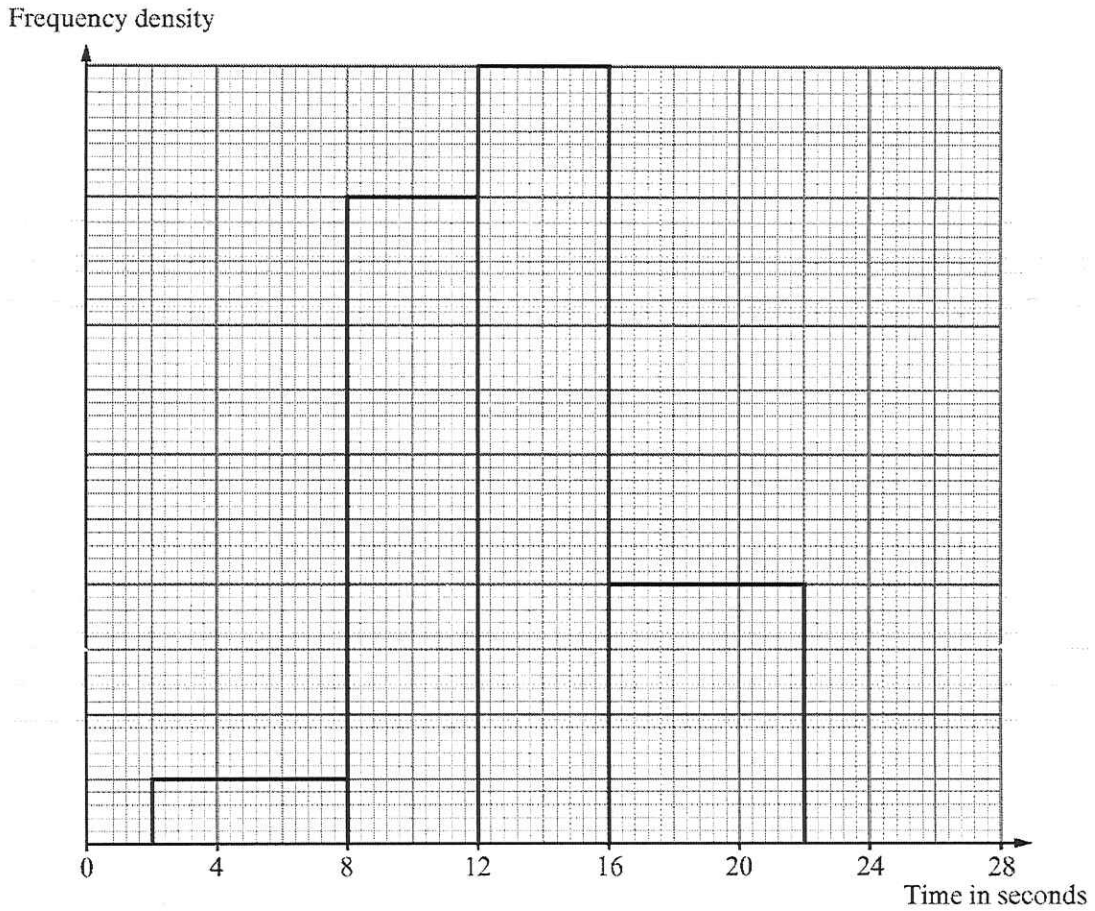
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Difference in mass is kg

7.

- (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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[2]

- (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]

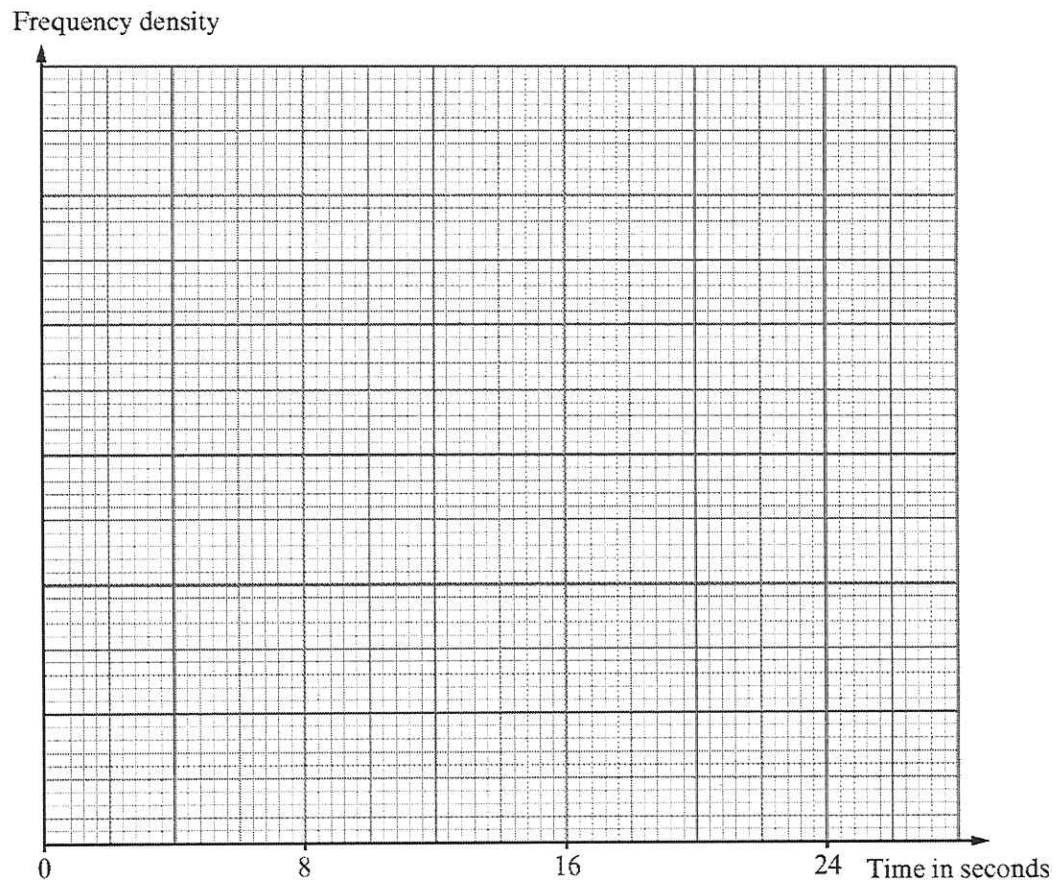
- (b) As part of the quality control exercise in a supermarket, the time taken to scan 20 items was measured for each worker aged 40 or over. The table below shows the results.

Time in seconds, t	$0 < t \leq 4$	$4 < t \leq 8$	$8 < t \leq 12$	$12 < t \leq 16$	$16 < t \leq 24$
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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[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.

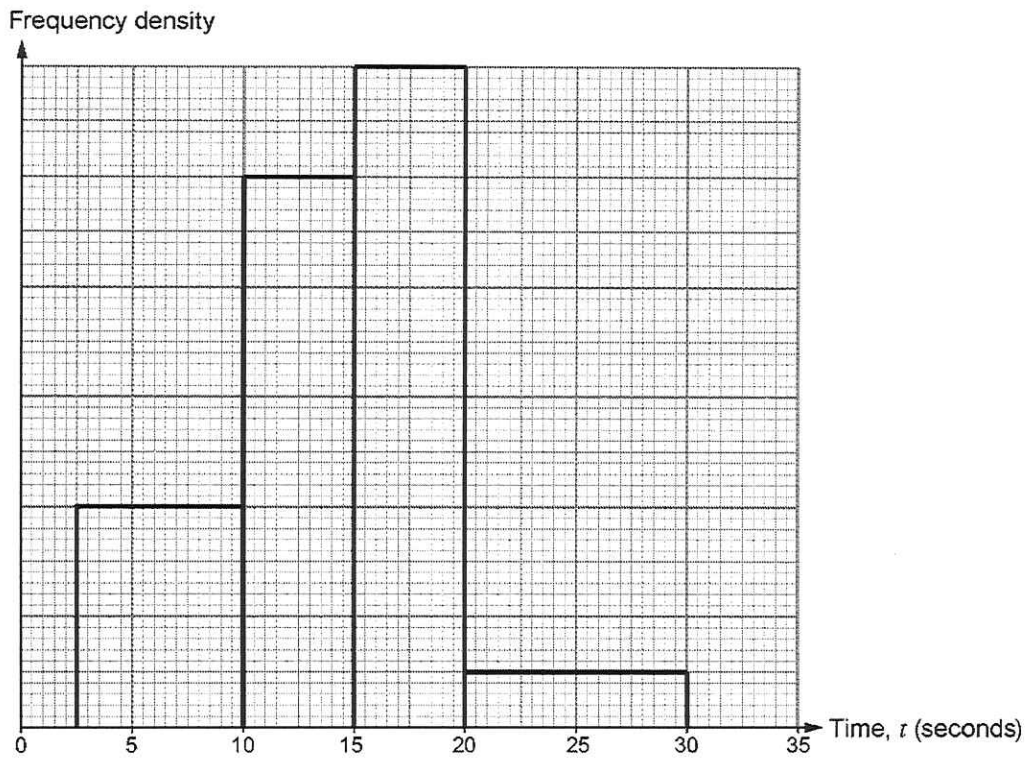
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[1]

8. (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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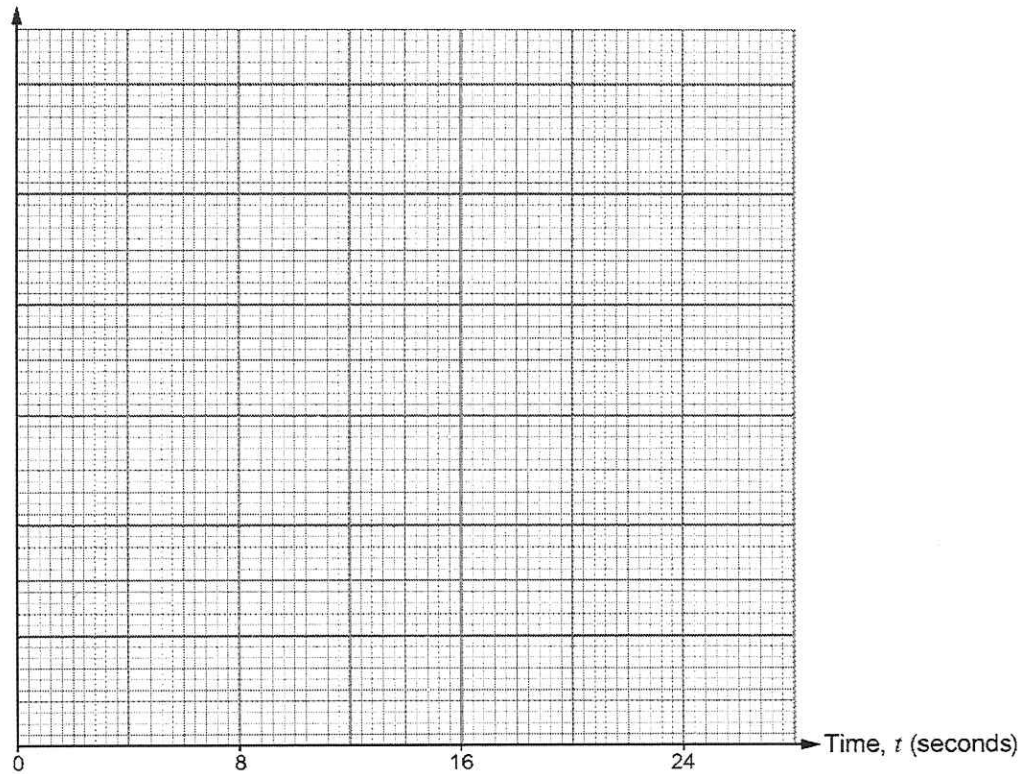
- (b) The time taken for staff to scan 5 items was also recorded.

The table below shows the results.

Time, t (seconds)	$0 < t \leq 4$	$4 < t \leq 8$	$8 < t \leq 12$	$12 < t \leq 16$	$16 < t \leq 24$
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]

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

☐

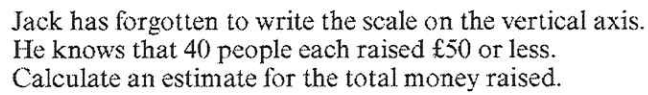
Staff

☐

You must use the histograms to explain your answer.

[1]

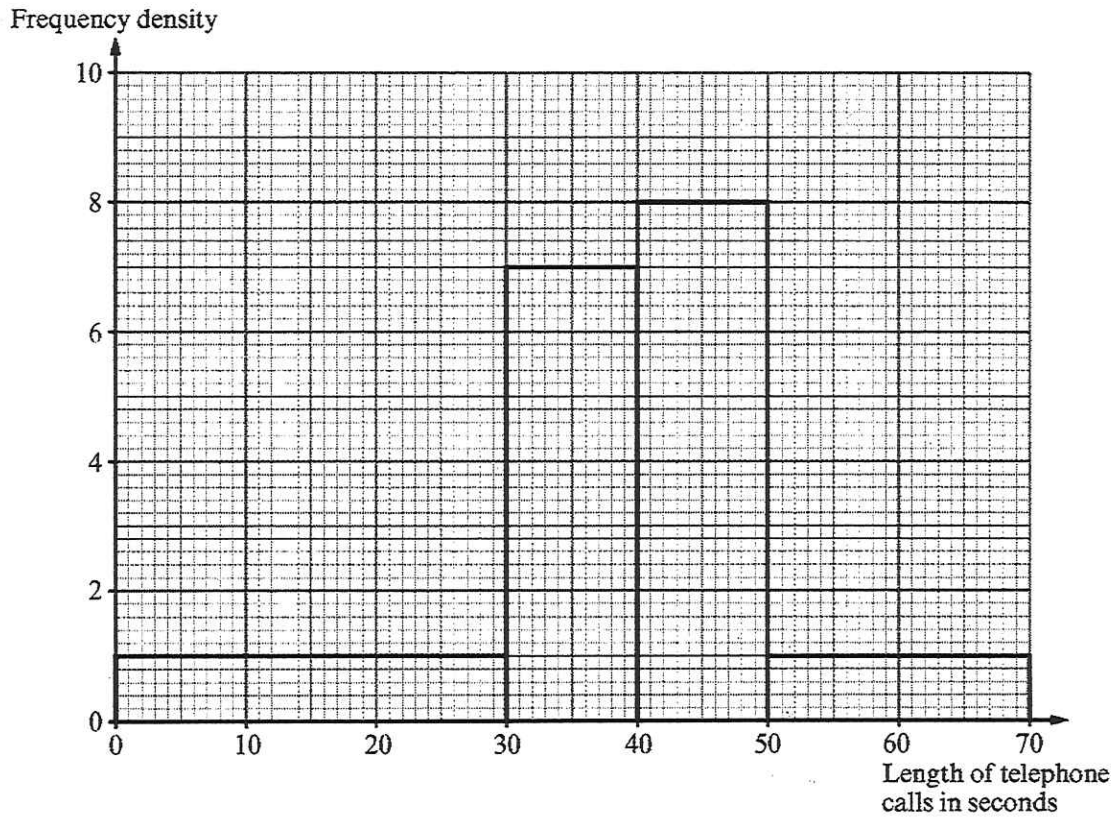
Frequency density

[illegible]

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10.

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



- (a) Calculate how many telephone calls were made to the computer helpline during the Tuesday evening.

[3]

- (b) Estimate the median length of a telephone call made to the computer helpline during the Tuesday evening.

[2]