

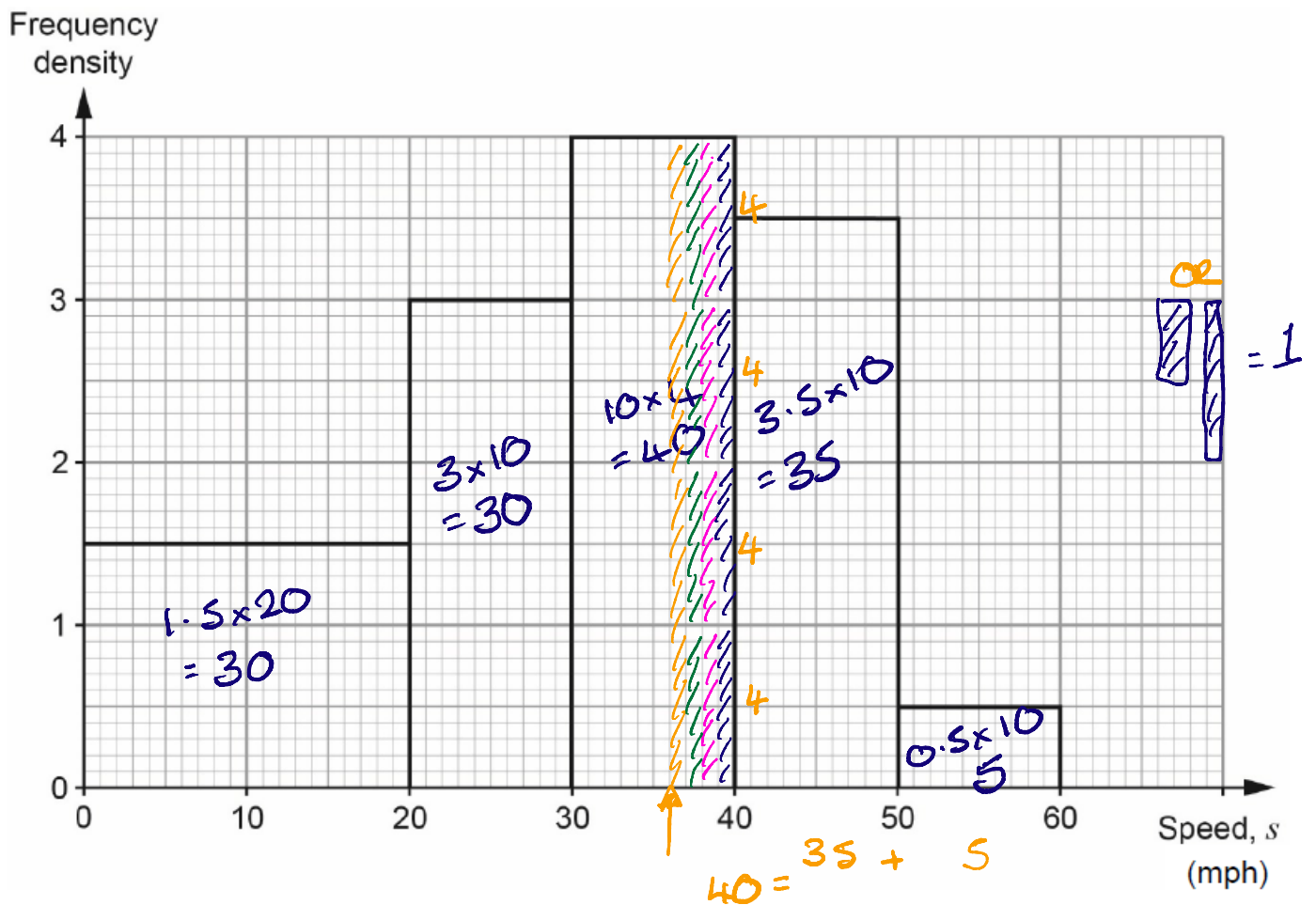
# Histograms (H)

A collection of 9-1 Maths GCSE Sample and Specimen questions from AQA, OCR, Pearson-Edexcel and WJEC Eduqas.

Name:	Mel@JustMaths
Total Marks:	

1. A survey was carried out to record the speeds of cars entering a village.

The histogram illustrates the results of the survey.



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

Speed, $s$ (mph)	$0 < s \leq 20$	$20 < s \leq 30$	$30 < s \leq 40$	$40 < s \leq 50$	$50 < s \leq 60$
Frequency	30	30	40	35	5

F. Density      1.5      3.0      4.0      3.5      0.5

[2]

- (b) 40% of the cars surveyed were fined for exceeding a certain speed as they entered the village.

Calculate an estimate of this speed.

$$\text{Total} = 140$$

$$40\% \text{ of } 140 = \underline{56}$$

$$10\% = 14$$

36mph.

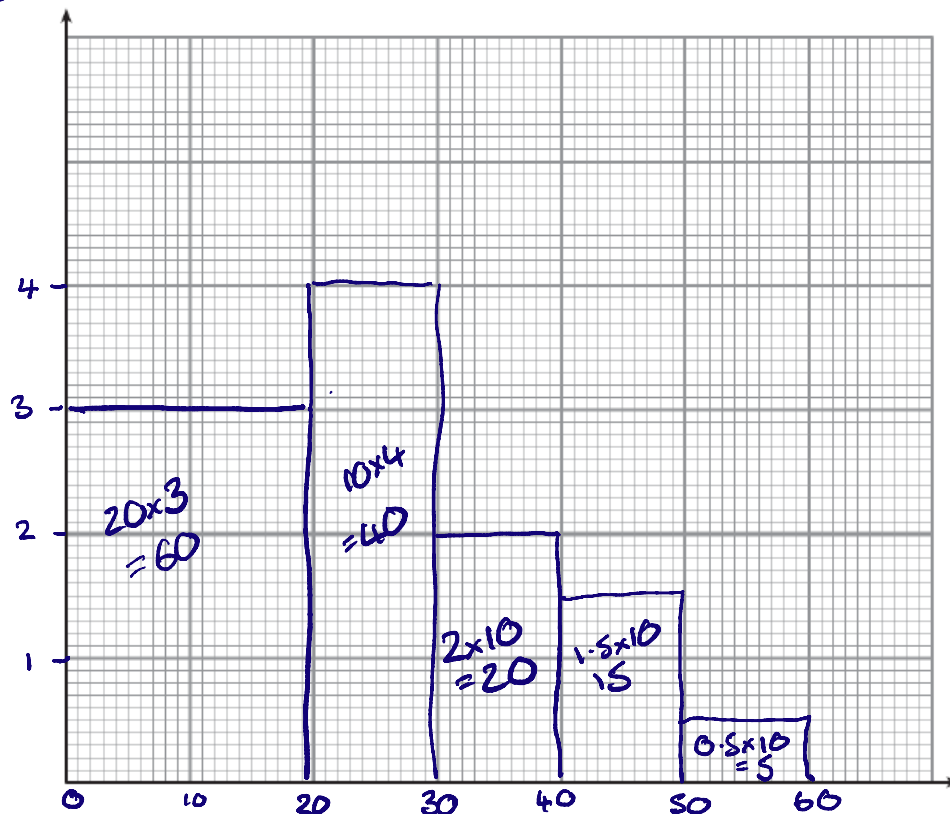
[4]

- (c) A further survey was carried out after the placement of a speed camera warning sign.

width	20	10	10	10	10
Speed, $s$ (mph)	$0 < s \leq 20$	$20 < s \leq 30$	$30 < s \leq 40$	$40 < s \leq 50$	$50 < s \leq 60$
Frequency	60 $\uparrow$	40 $\uparrow$	20 $\downarrow$	15 $\downarrow$	5 $-$
F.D.	3	4	2	1.5	0.5

Draw a histogram to illustrate the results of this survey.

previous  $\rightarrow$



median  
class interval  
 $30 < s \leq 40$   
 $20 < s \leq 30$

[3]

- (d) Compare the two histograms. Do you consider the speed camera warning sign to have been effective?

Give a reason for your answer.

Yes. the interval in which the median lies has gone from  $30 < s \leq 40$  to  $20 < s \leq 30$

[1]

2. Bhavna recorded the lengths of time, in hours, that some adults watched TV last week.

The table shows information about her results.

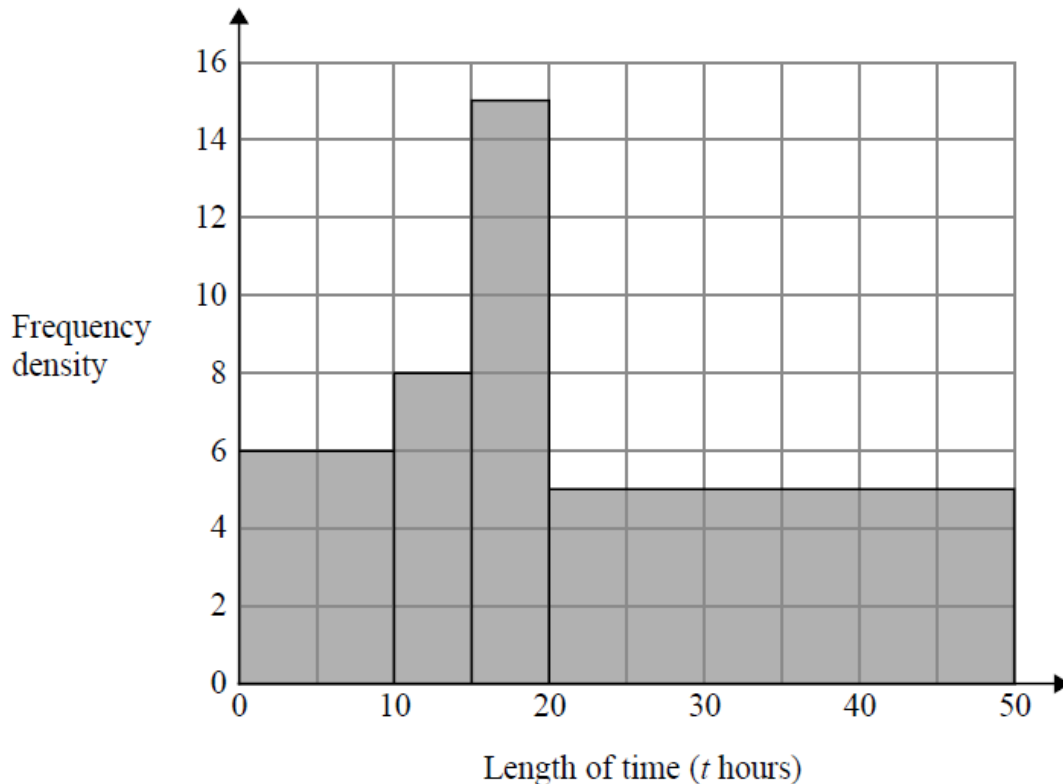
F.D  
0.6  
1.6  
3  
0.25

width

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

$8 \div 5$   
 $1.6$   
 $8 \overline{) 12.8}$

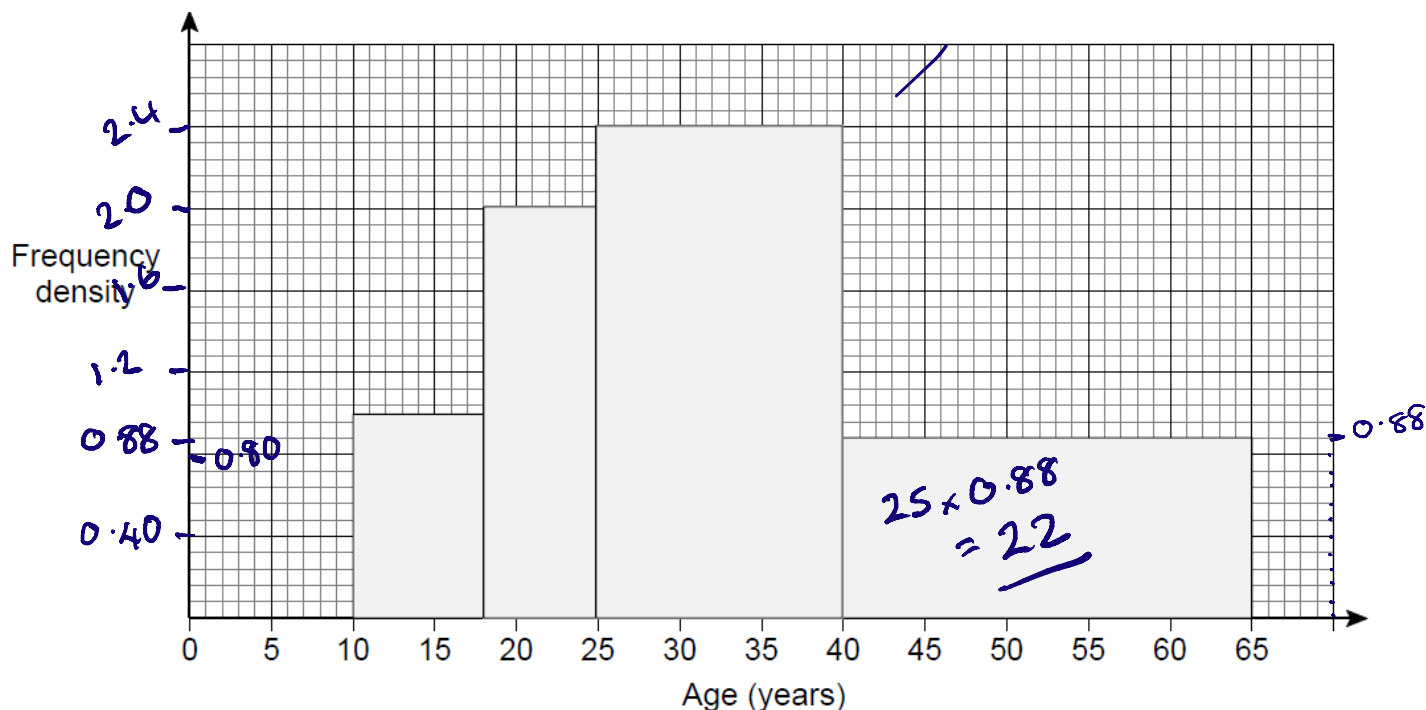
Bhavna made some mistakes when she drew a histogram for this information.



Write down two mistakes Bhavna made.

Bhavna has plotted frequency not frequency density  
 (2) the final category is  $20 \leq t < 40$  and not  $20 \leq t < 50$

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



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

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

$$2.4 \times 15 = 36 \text{ members.}$$

[4]

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

F.D

1.3

3.2

3.6

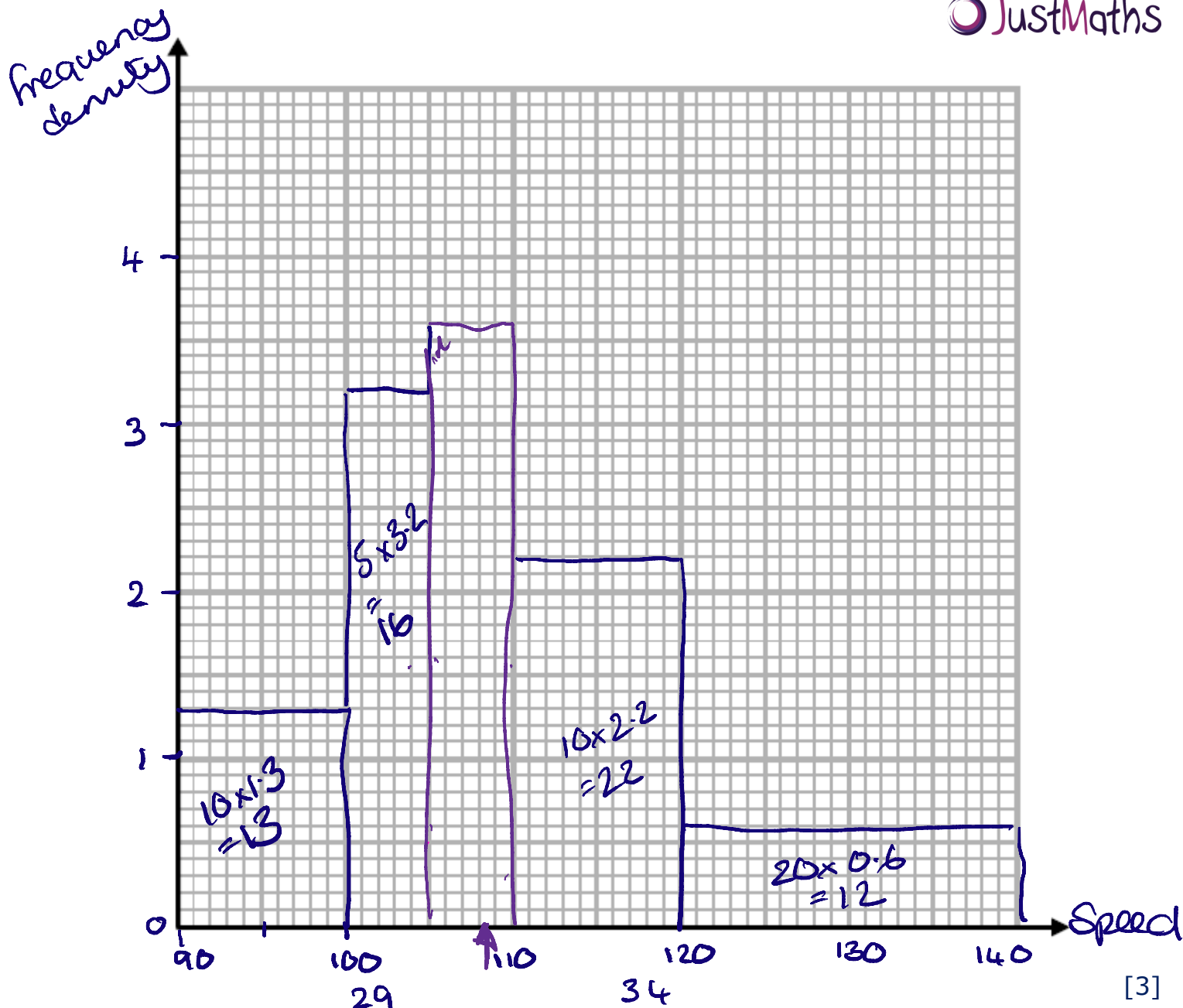
2.2

0.6

	Speed ( $s$ km/h)	Frequency
10	$90 < s \leq 100$	13
5	$100 < s \leq 105$	16
5	$105 < s \leq 110$	18
10	$110 < s \leq 120$	22
20	$120 < s \leq 140$	12

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

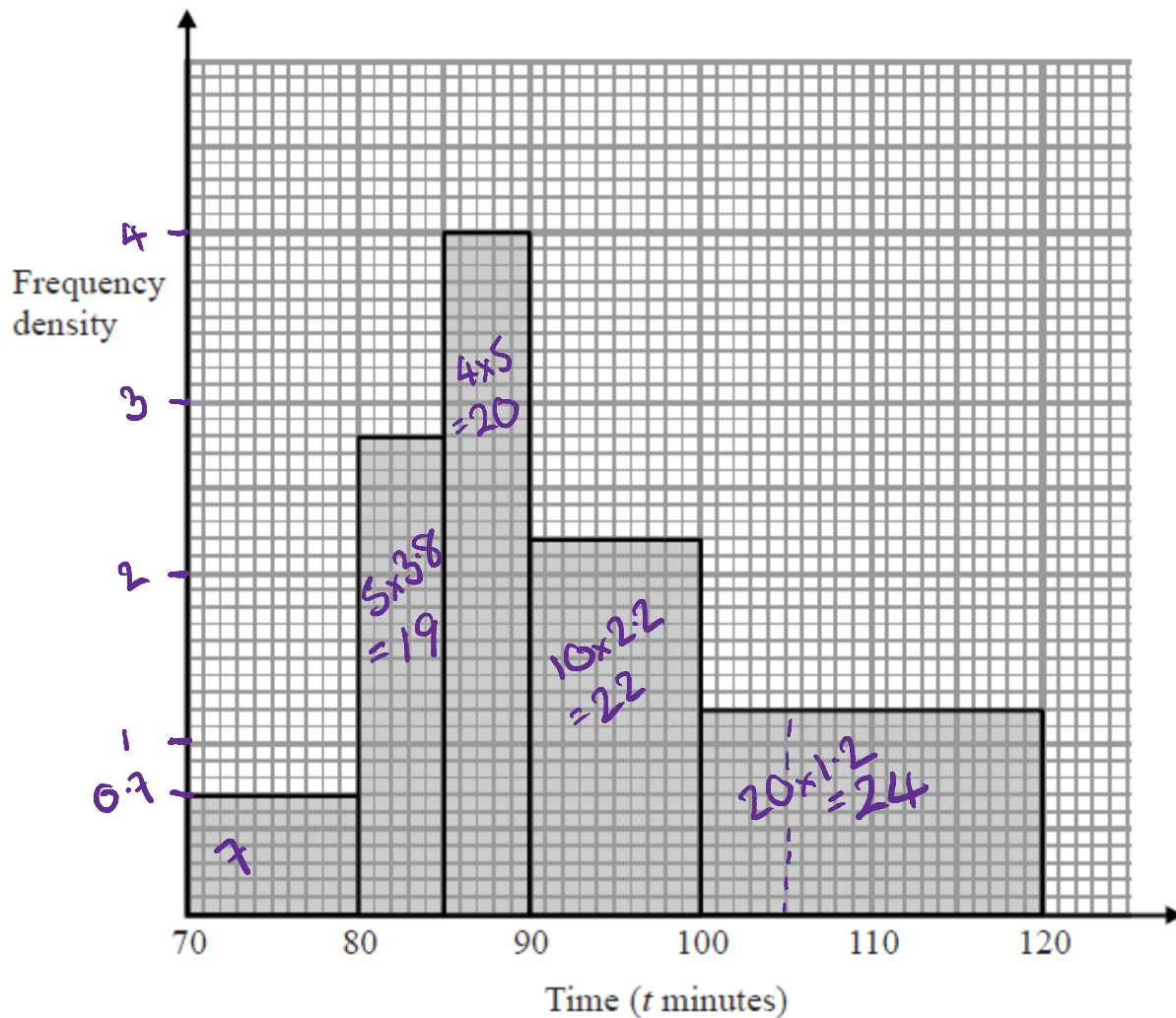




b) Find an estimate for the median.

108 .....km/h [2]

5. 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.

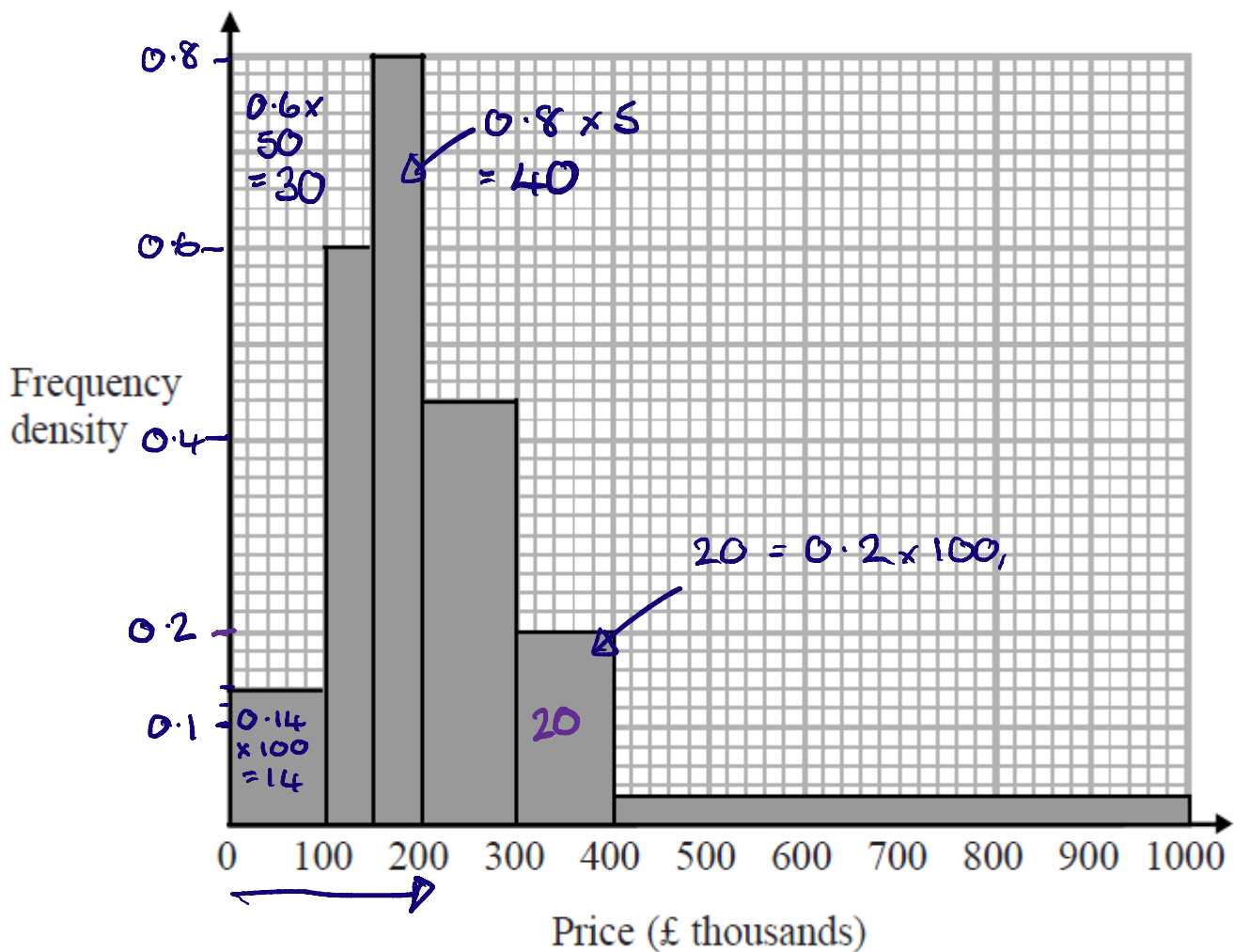
$$15 \times 1.2 = \dots\dots\dots 18$$

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

I have calculated the number in the 100 to 120 class interval to be 24 but we don't know the distribution of cyclists within this interval.

[4]

6. 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

$$14 + 30 + 40 = \underline{84}$$

[3]

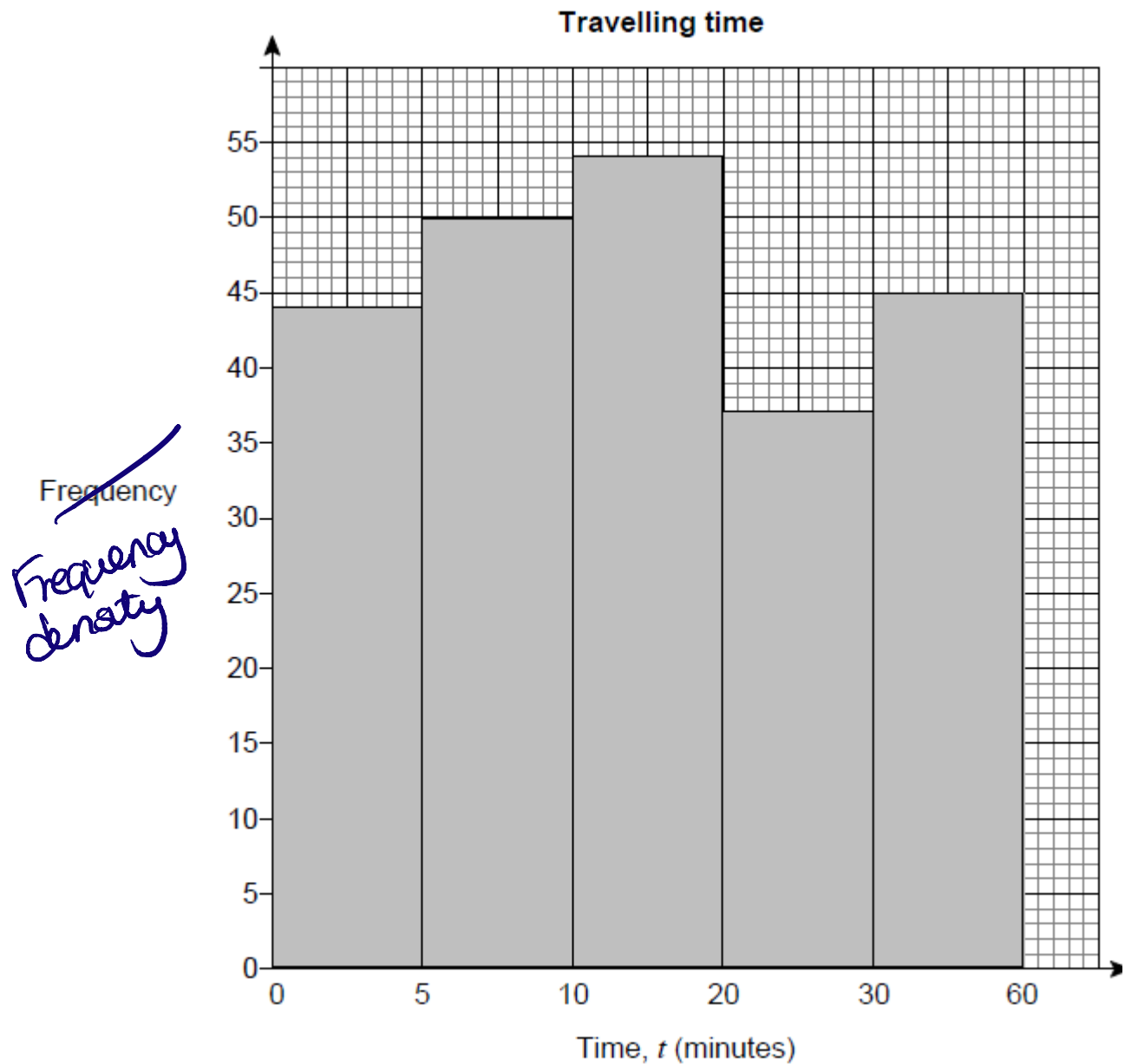
7. Joe asked 230 students how long it took them to travel to school.

The results are shown in the table.

8.8

Travelling time, $t$ (minutes)		Number of students
5	$0 < t \leq 5$	44
5	$5 < t \leq 10$	50
10	$10 < t \leq 20$	54
10	$20 < t \leq 30$	37
30	$30 < t \leq 60$	45

This is Joe's attempt to draw a histogram to show the data.



Make two criticisms of his histogram.

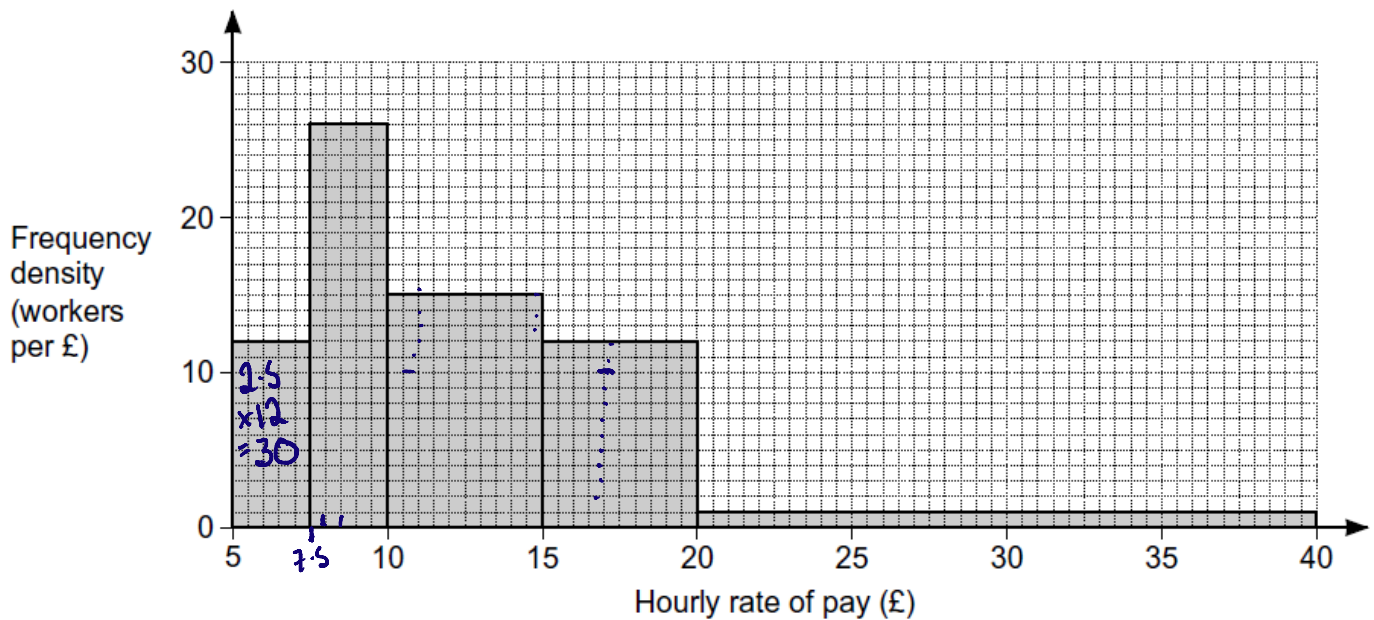
Criticism 1 Joe has plotted frequency, not frequency density on the y axis.

Criticism 2

The scale for 'time' on the y axis is not linear [2]

8. Omar surveyed a group of workers to find their hourly rate of pay.

His results are summarised in the histogram.



a) Show that Omar surveyed 250 workers.

$$\begin{aligned}
 & 2.5 \times 12 \quad 2.5 \times 26 \quad 1.5 \times 15 \quad 1.5 \times 12 + 2.5 \times 1 \\
 & = 30 + 65 + 22.5 + 17.5 + 2.5 \\
 & = 250 \text{ workers}
 \end{aligned}$$

[3]

b) The UK living wage is £7.85 per hour.

A newspaper states that one fifth of workers earn less than the living wage.

i) Does Omar's survey support the statement in the newspaper?

Show how you decide.

$$\begin{aligned}
 & \frac{1}{5} \text{ of } 250 = 50 \quad 50\text{th will be between } 7.50 \text{ and } 10 \\
 & 20 \div 26 = £7.69 \quad \text{which is less than } £7.85
 \end{aligned}$$

[4]

ii) Explain why your calculations in part (b)(i) may not give the exact number of workers earning less than the living wage.

the distribution within each interval may not be equal.

[1]

c) Omar used this table to record the ages of the people in his survey.

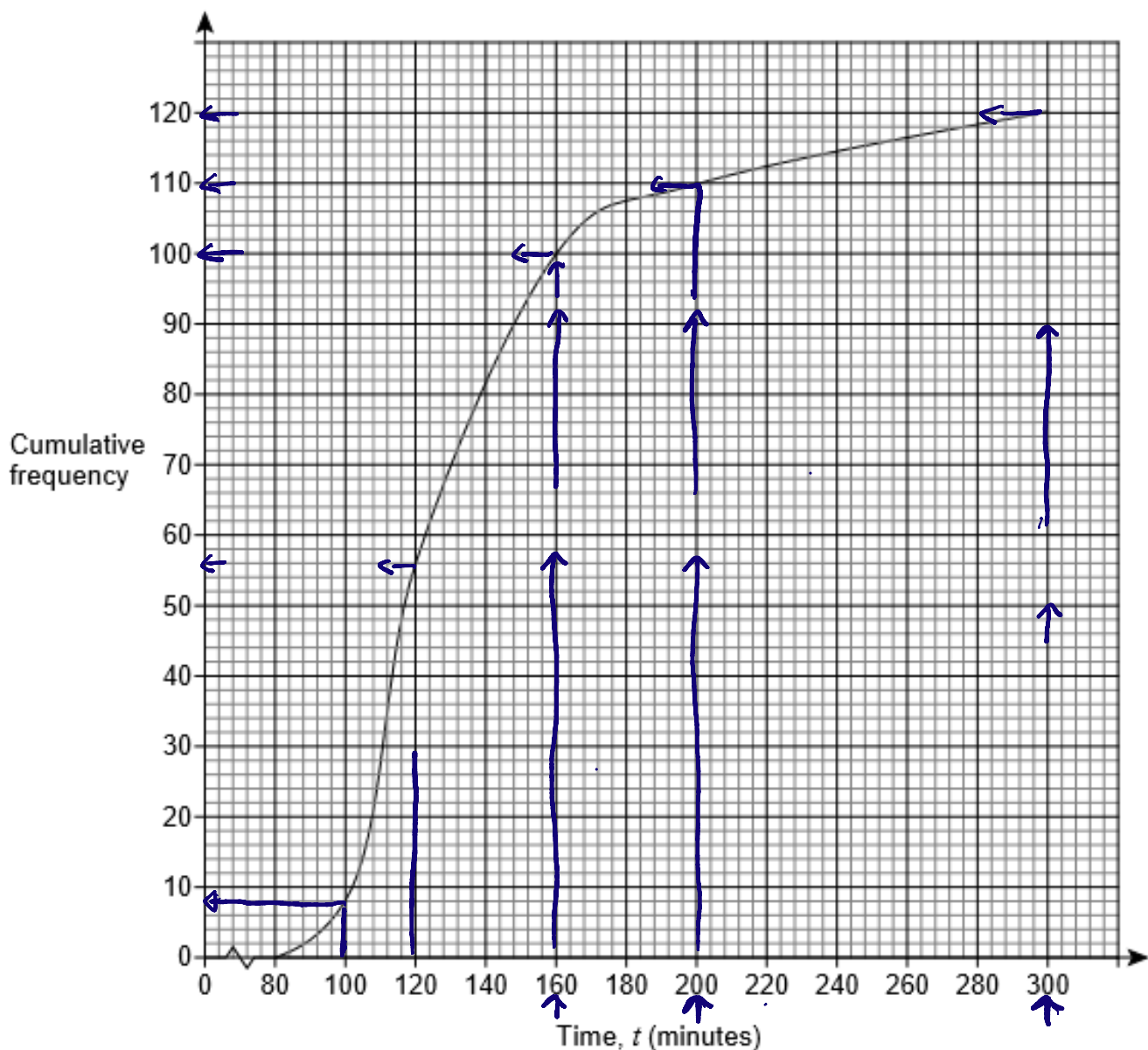
Age ( $a$ years)	$18 \leq a \leq 20$	$20 \leq a \leq 30$	$30 \leq a \leq 40$	$40 \leq a \leq 50$	$50 \leq a \leq 70$

Comment on one problem with his table.

*the intervals overlap*

[1]

9. The cumulative frequency diagram shows the times taken by runners to complete a half-marathon.

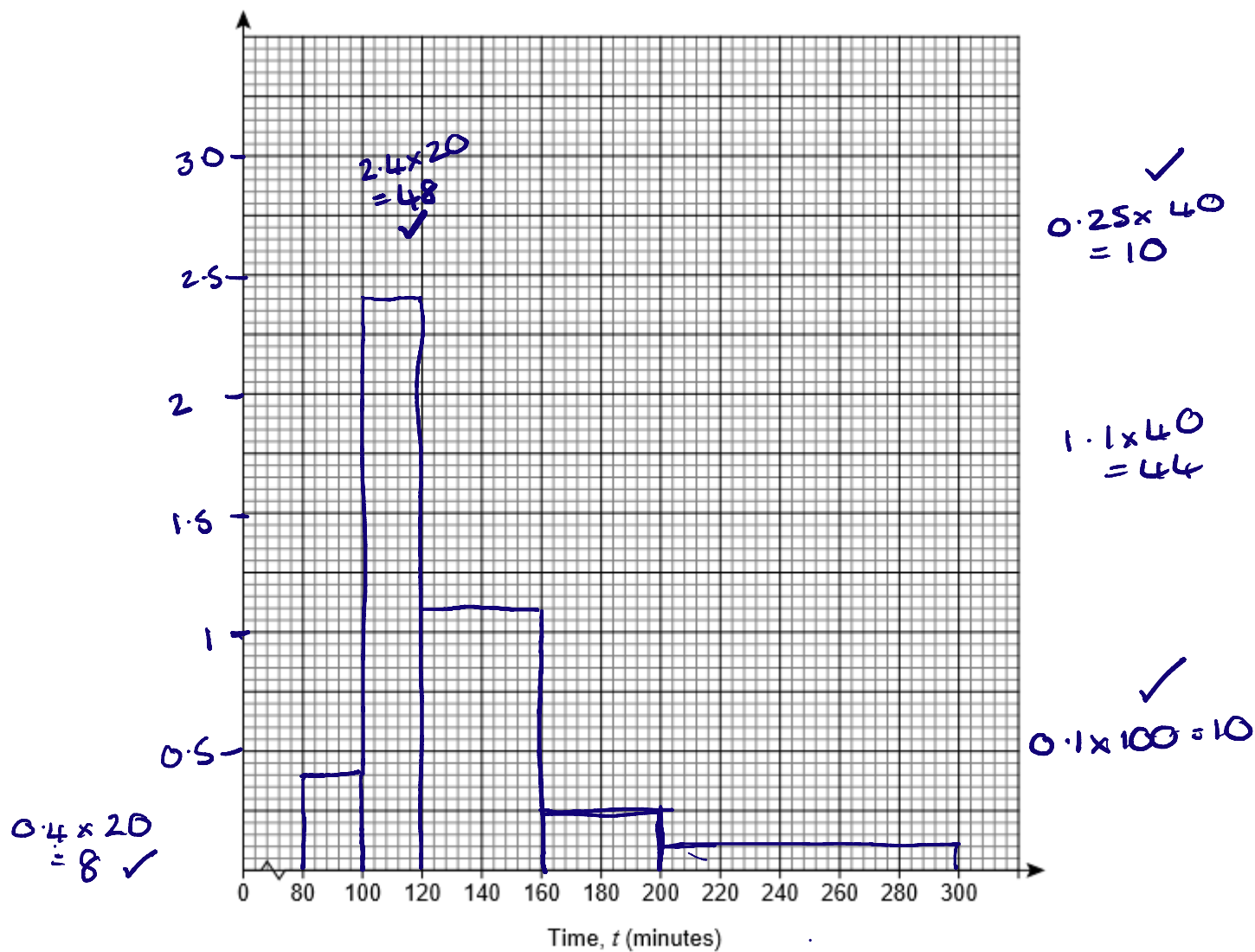


On the grid opposite, draw a histogram to represent the data.

Use this table to help you.

Time, $t$ (minutes)	Cumulative frequency
$t < 100$	8
$t < 120$	56
$t < 160$	100
$t < 200$	110
$t < 300$	120

Time, $t$ (minutes)	Frequency	Class width	Frequency density
$80 \leq t < 100$	8	20	0.4
$100 \leq t < 120$	48	20	2.4
$120 \leq t < 160$	44	40	1.1
$160 \leq t < 200$	10	40	0.25
$200 \leq t < 300$	10	100	0.1



[6]

## CREDITS AND NOTES

Question	Awarding Body
1	WJEC Eduqas
2	Pearson Edexcel
3	AQA
4	Pearson Edexcel
5	Pearson Edexcel
6	Pearson Edexcel
7	AQA
8	OCR
9	AQA

### Notes:

These questions have been retyped from the original sample/specimen assessment materials and whilst every effort has been made to ensure there are no errors, any that do appear are mine and not the exam board s (similarly any errors I have corrected from the originals are also my corrections and not theirs!).

Please also note that the layout in terms of fonts, answer lines and space given to each question does not reflect the actual papers to save space.

These questions have been collated by me as the basis for a GCSE working party set up by the GLOW maths hub - if you want to get involved please get in touch. The objective is to provide support to fellow teachers and to give you a flavour of how different topics "could" be examined. They should not be used to form a decision as to which board to use. There is no guarantee that a topic will or won't appear in the "live" papers from a specific exam board or that examination of a topic will be as shown in these questions.



### Links:

AQA <http://www.aqa.org.uk/subjects/mathematics/gcse/mathematics-8300>

OCR <http://ocr.org.uk/gcsemaths>

Pearson Edexcel <http://qualifications.pearson.com/en/qualifications/edexcel-gcses/mathematics-2015.html>

WJEC Eduqas <http://www.eduqas.co.uk/qualifications/mathematics/gcse/>

### Contents:

This version contains questions from:

AQA – Sample Assessment Material, Practice set 1 and Practice set 2

OCR – Sample Assessment Material and Practice set 1

Pearson Edexcel – Sample Assessment Material, Specimen set 1 and Specimen set 2

WJEC Eduqas – Sample Assessment Material