Aberdare Community School

Mathematics Department

WJEC GCSE

Higher – Non Calculator

Data

Histograms

Name: .....

Set: .....

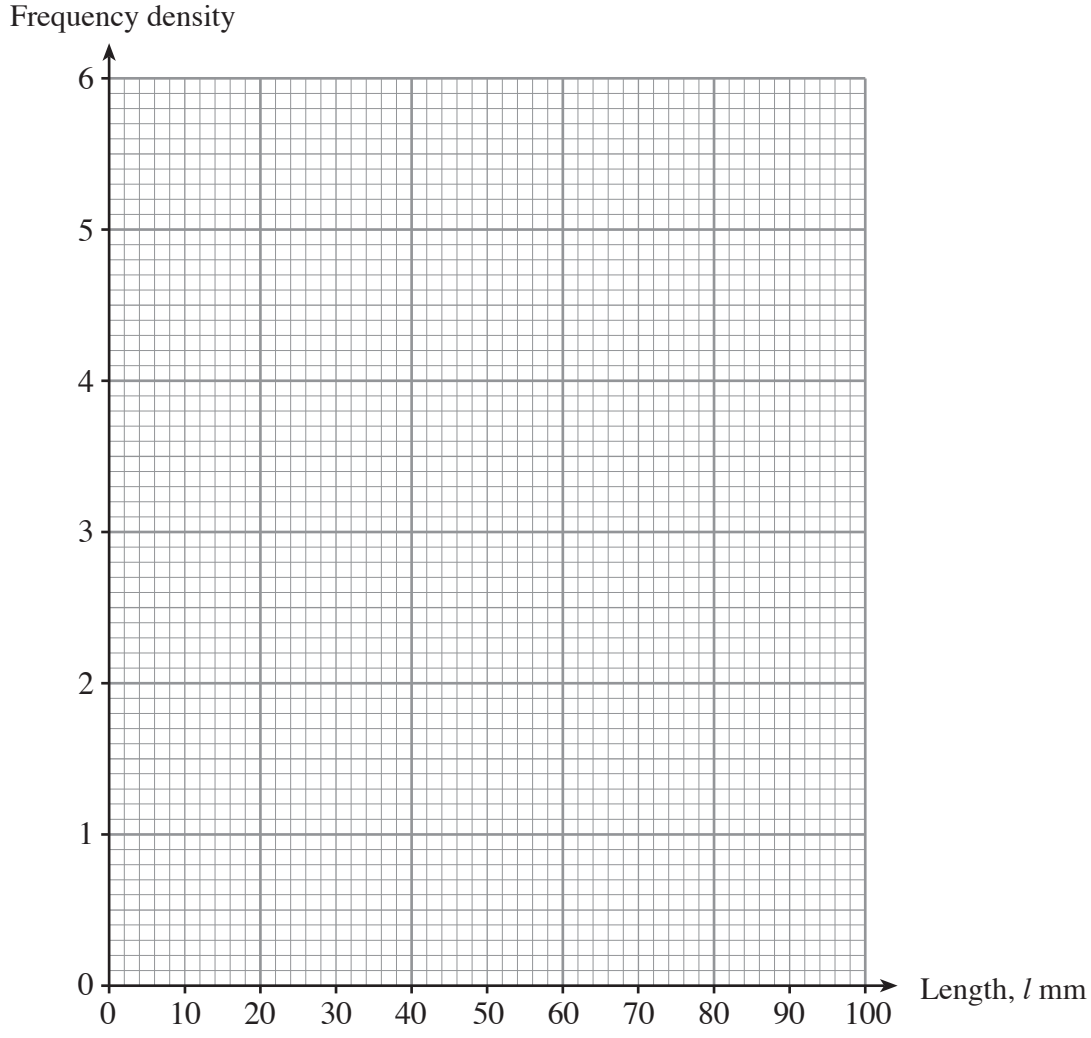
Date: .....

Teacher: .....

20. A survey was carried out to find the distribution of the lengths of index fingers. The data was recorded in a grouped frequency table.

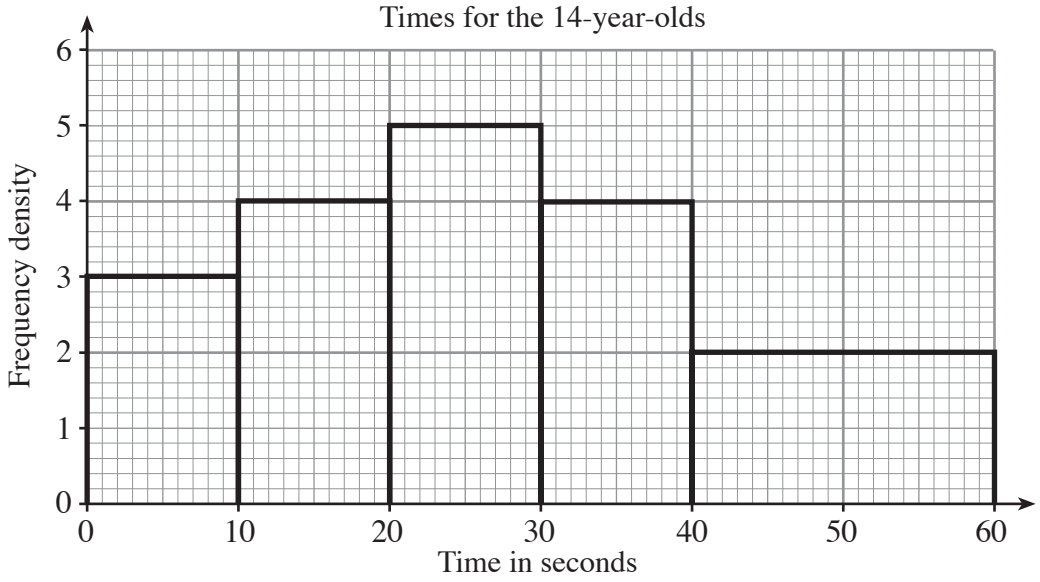
Length of index finger, l mm	Frequency	Frequency density
$0 \leqslant l < 40$	0	
$40 \leqslant l < 50$	3	
$50 \leqslant l < 55$	5	
$55 \leqslant l < 60$	15	
$60 \leqslant l < 65$	25	
$65 \leqslant l < 70$	10	
$70 \leqslant l < 90$	2	

Complete the frequency density column in the table above and hence draw the histogram for the data using the axes below. [3]



Examiner only

21. As part of an investigation, the time taken to complete an obstacle course was measured for each pupil in a group of fourteen-year-olds.
The results are summarised in the histogram below.



(a) Use the histogram to calculate the number of fourteen-year-olds in this group.

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[3]

(b) The time taken to complete the same obstacle course was measured for each student in a group of 200 eighteen-year-olds.
The following grouped frequency distribution was obtained.

Time, t seconds	$0 < t \leqslant 10$	$10 < t \leqslant 20$	$20 < t \leqslant 30$	$30 < t \leqslant 40$	$40 < t \leqslant 60$
Numbers of students	10	20	30	40	100

Find an estimate for the median of this distribution.

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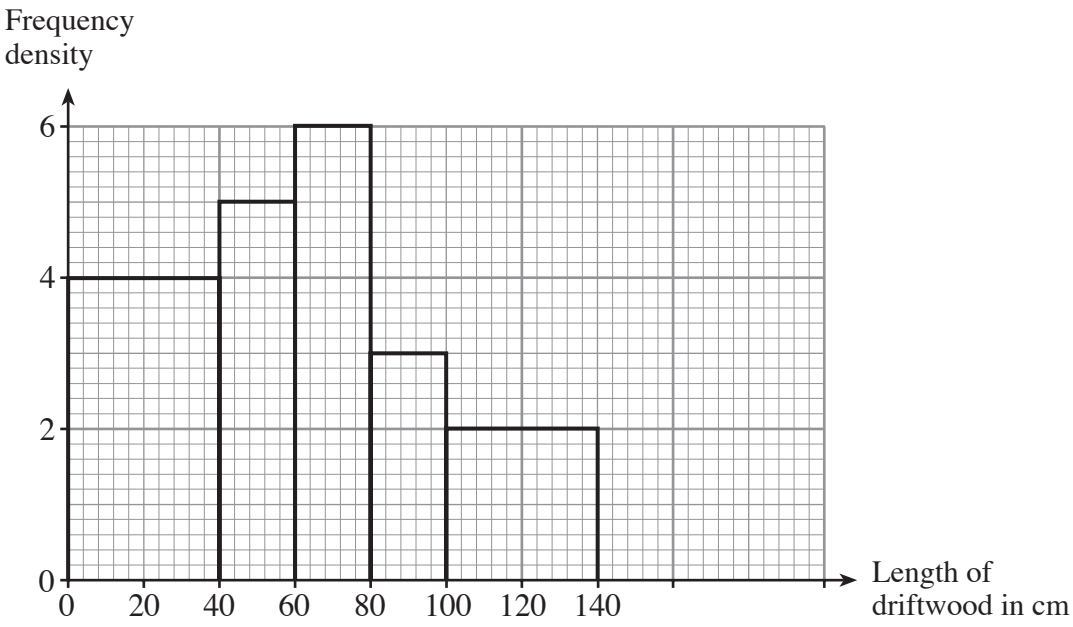
[1]

13. The histogram below represents the results of gathering and measuring the lengths of pieces of driftwood.



(a) Use the histogram to find the total number of pieces of driftwood gathered and measured.

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[3]

(b) Use the histogram to find an estimate for the median.

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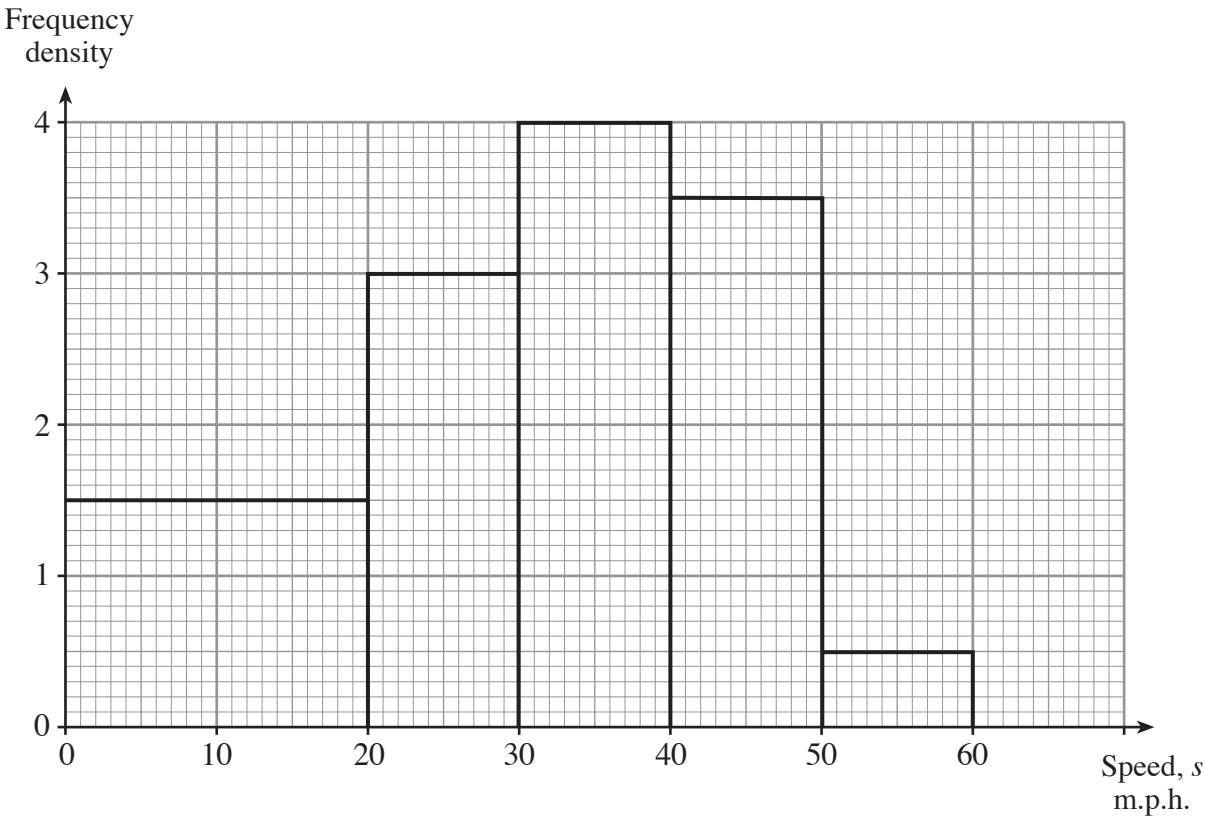
[1]

13. 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 m.p.h.	$0 < s \leqslant 20$	$20 < s \leqslant 30$	$30 < s \leqslant 40$	$40 < s \leqslant 50$	$50 < s \leqslant 60$
Frequency					

[2]

(b) Calculate an estimate of the number of cars with speeds exceeding 32 m.p.h.

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[3]

(c) A further survey was carried out after the placement of a speed camera warning sign. The results are summarised in the grouped frequency distribution below.

Speed, s m.p.h.	$0 < s \leqslant 20$	$20 < s \leqslant 30$	$30 < s \leqslant 40$	$40 < s \leqslant 50$	$50 < s \leqslant 60$
Frequency	60	40	20	15	5
Frequency density					

Draw a histogram to illustrate the results of this survey.

[3]

(d) Compare the two histograms. Do you consider the speed camera warning sign to have been effective? Give a reason for your answer.

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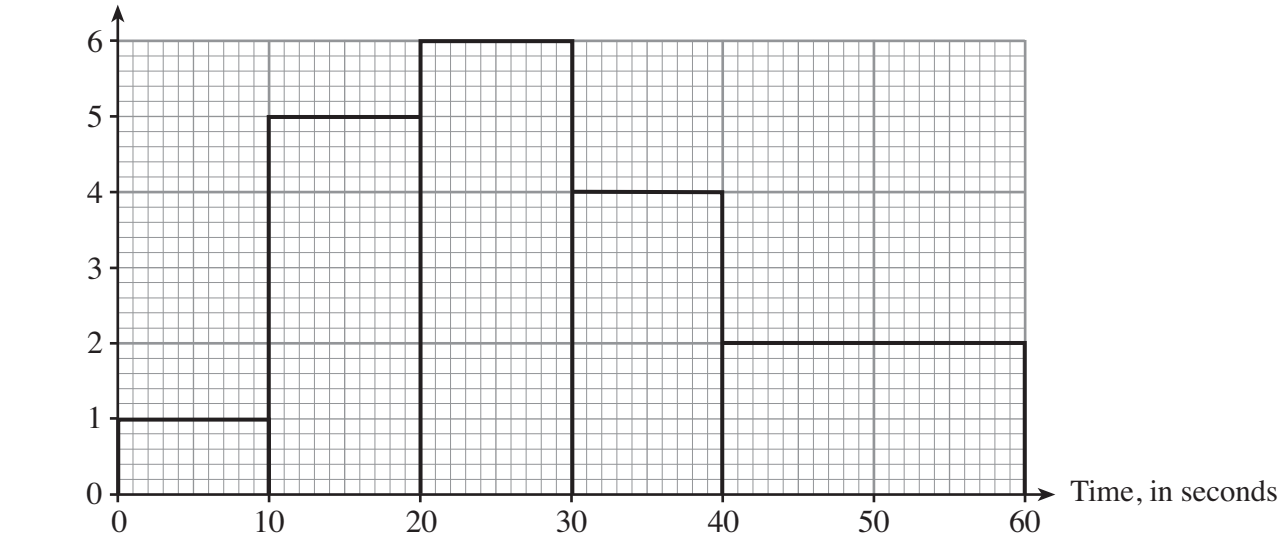
[1]

Examiner only

17. As part of an investigation, the time taken to complete a physical challenge in a gym was measured for each pupil in a group of thirteen-year-olds.
The histogram below illustrates the results obtained.

Times for the 13-year-olds



(a) Use the histogram to calculate the number of thirteen-year-olds in this group.

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[3]

Examiner only

(b) The time taken to complete the same challenge was measured for each pupil in a group of 200 sixteen-year-olds. The following grouped frequency distribution was obtained.

Time, t seconds	$0 < t \leqslant 10$	$10 < t \leqslant 20$	$20 < t \leqslant 30$	$30 < t \leqslant 40$	$40 < t \leqslant 60$
Number of pupils	30	70	50	40	10

(i) Find an estimate for the median of this distribution.

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(ii) Draw a histogram to illustrate the distribution on the graph paper below.

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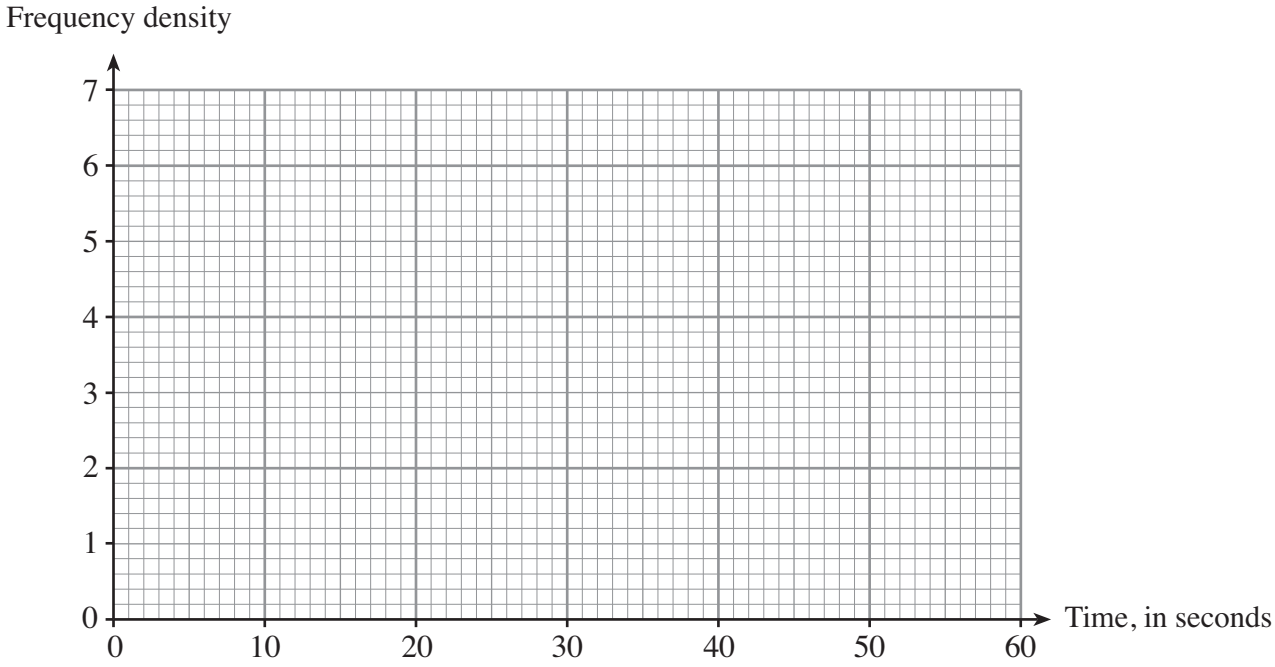
[3]

Times for the 16-year-olds



(c) State, with a reason, which of the two groups is the quicker, on average, to complete the challenge.

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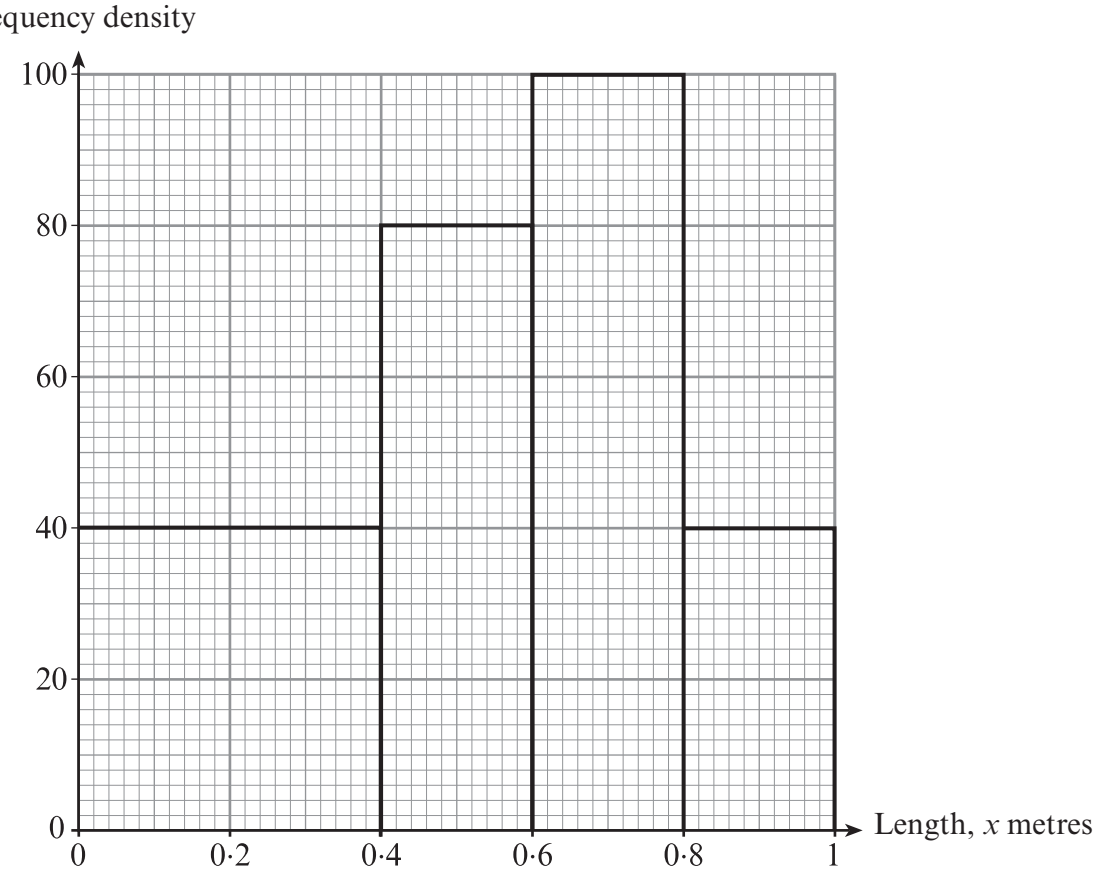
[1]

Examiner only

13. *(a)* The lengths of logs in a pile were recorded.
The histogram below illustrates the results.



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

Length, x metres	$0 < x \leqslant 0{\cdot}4$	$0{\cdot}4 < x \leqslant 0{\cdot}6$	$0{\cdot}6 < x \leqslant 0{\cdot}8$	$0{\cdot}8 < x \leqslant 1$
Frequency				8

(ii) Calculate an estimate of the number of logs with lengths greater than 0·3 m.

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[4]

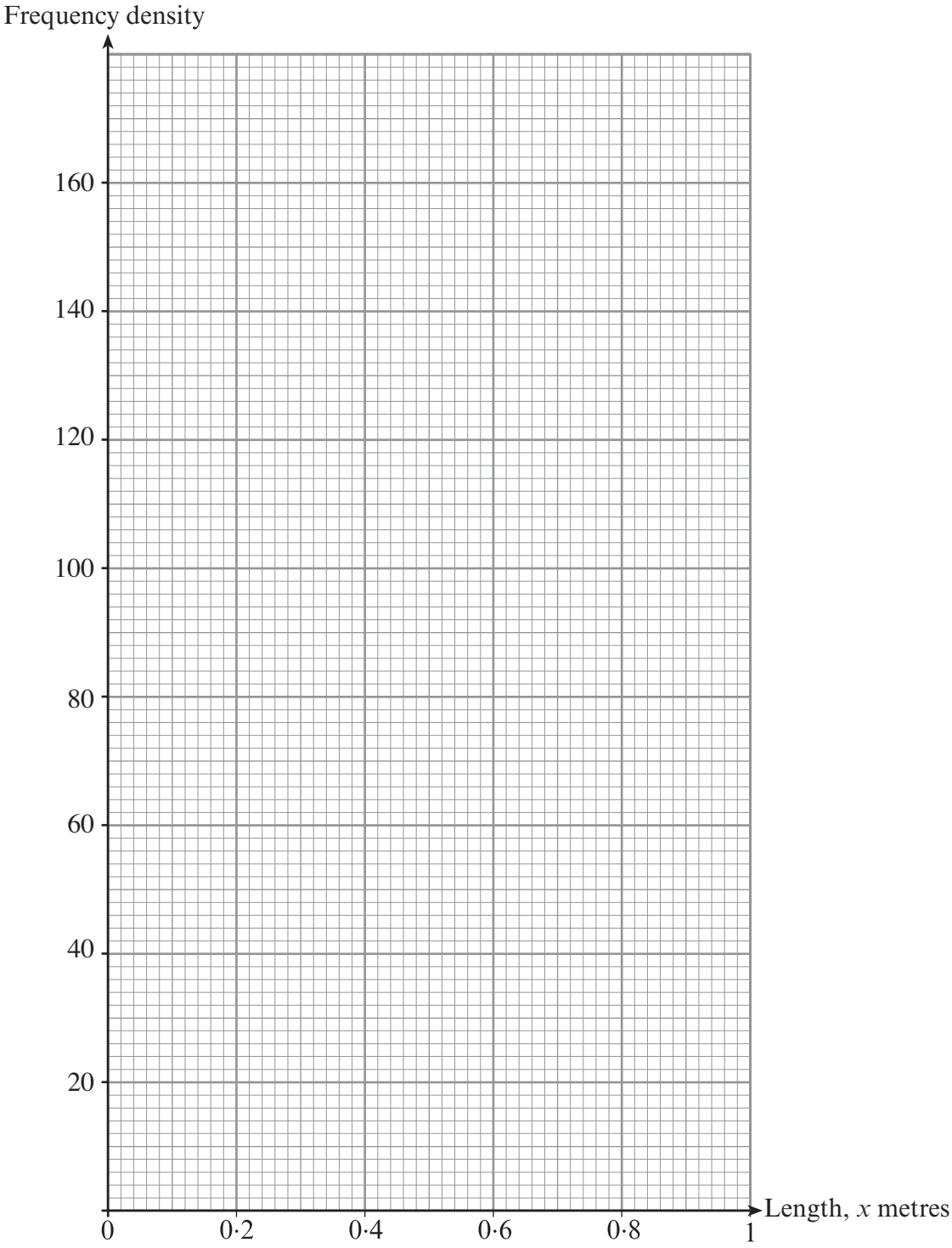
(b) The lengths of logs in a different pile were recorded.
The results are summarised in the grouped frequency distribution below.

Length, x metres	$0 < x \leqslant 0{\cdot}4$	$0{\cdot}4 < x \leqslant 0{\cdot}6$	$0{\cdot}6 < x \leqslant 0{\cdot}8$	$0{\cdot}8 < x \leqslant 1$
Frequency	16	30	8	6
Frequency density				

Complete the frequency density row in the table and draw a histogram.

[3]

Examiner only



(c) Thomas compares the two histograms.
He states that the mean length of the logs in the first pile is greater than the mean length of the logs in the second pile.
Is Thomas correct? You must give a reason for your answer.

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[2]

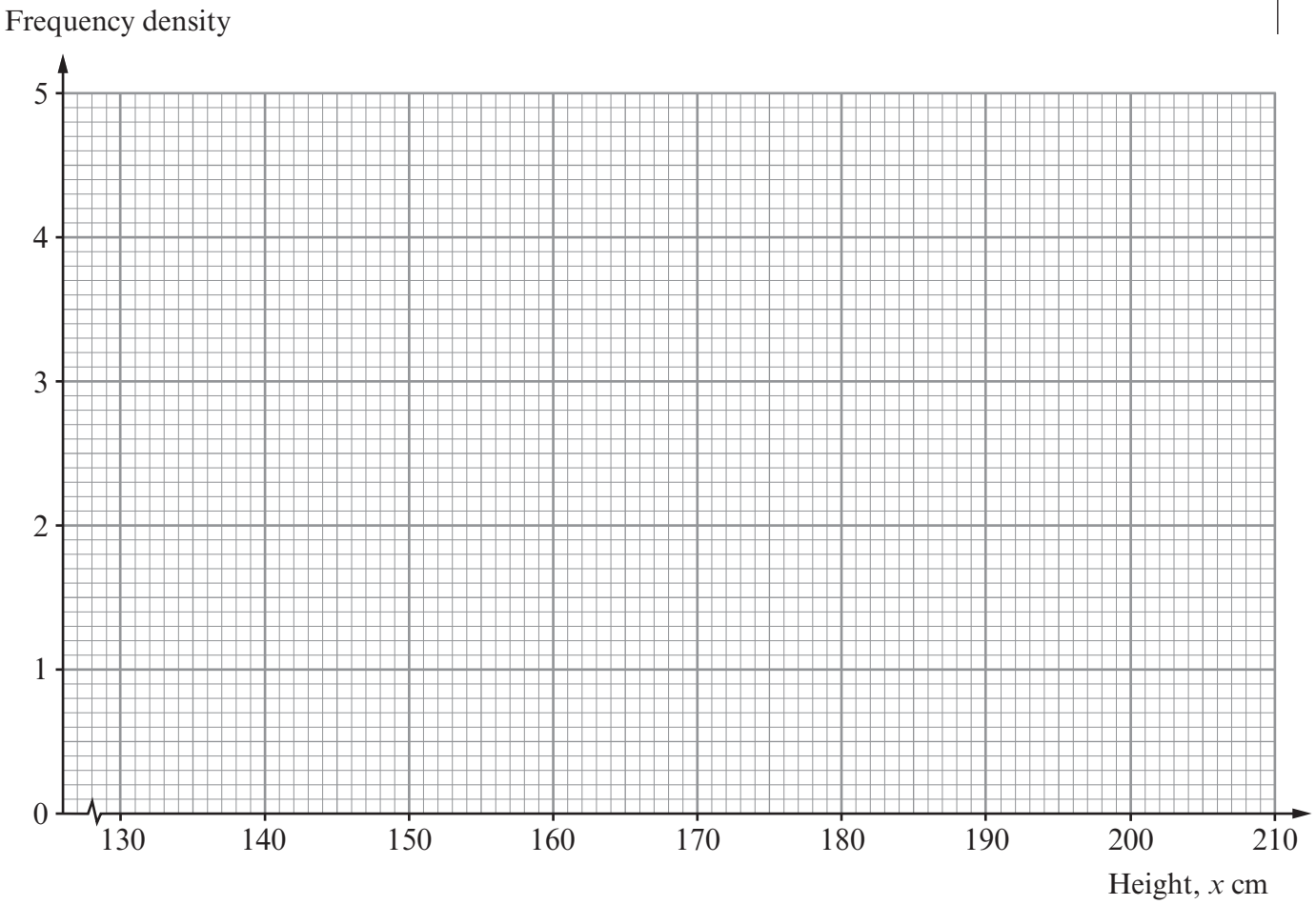
Examiner only

12. The heights of a group of people are summarised in the grouped frequency distribution below.

Height, x cm	Number of people	Frequency density
$130 \leqslant x < 150$	8	0·4
$150 \leqslant x < 160$	16	1·6
$160 \leqslant x < 170$	20	
$170 \leqslant x < 180$	42	
$180 \leqslant x < 190$	24	
$190 \leqslant x < 210$	4	

(a) Complete the frequency density column in the table and draw a histogram.

[3]



Examiner only

(b) Calculate an estimate for the number of people in the group whose heights are at least 162 cm.

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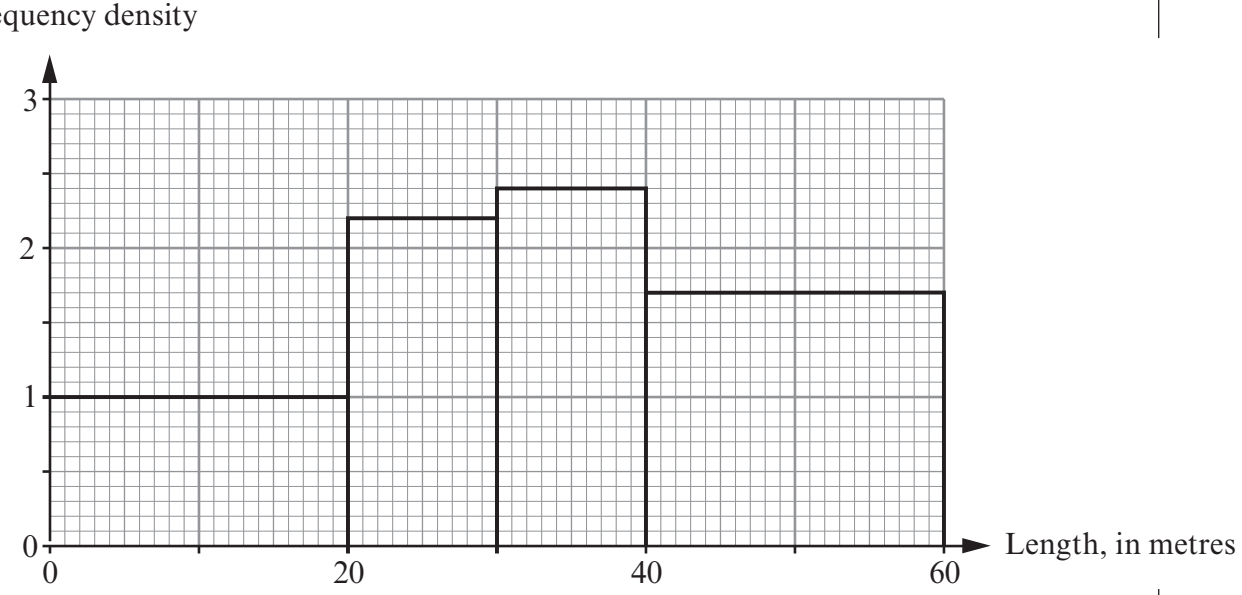
[3]

Examiner only

17. A survey was carried out to measure the lengths of the gardens of a number of houses. The histogram shows the results of the survey.



(a) Use the histogram to calculate the number of gardens measured.

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[3]

(b) Find the length exceeded by 58% of the gardens measured.

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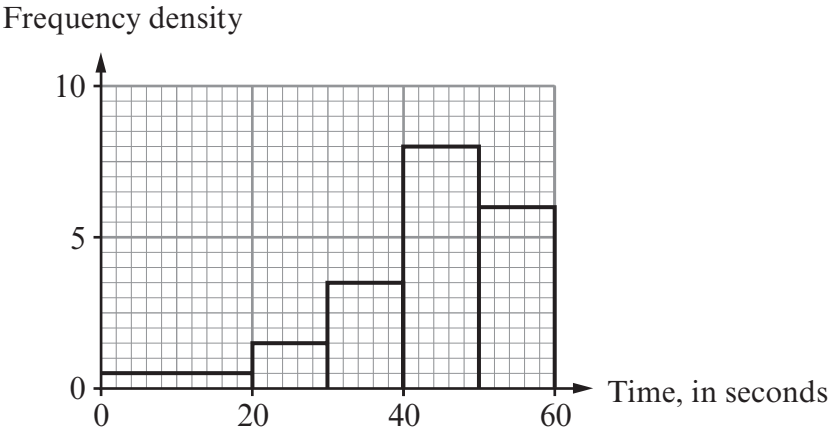
[1]

Examiner only

16. *(a)* The time taken to sew a button on a shirt was measured for each child in a group of 200 children.
The histogram below illustrates the results obtained.



Use the histogram to calculate how many of the children took less than 50 seconds to sew a button on a shirt.

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[3]

Examiner only

(b) The time taken to sew a button on a shirt was measured for each adult in a group of 200 adults.
The following grouped frequency distribution was obtained.

Time, t seconds	$0 < t \leqslant 20$	$20 < t \leqslant 30$	$30 < t \leqslant 40$	$40 < t \leqslant 50$	$50 < t \leqslant 60$
Number of adults	20	20	25	35	100

(i) Find an estimate of the median of this distribution.

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[1]

(ii) Draw the histogram to illustrate the distribution on the graph paper below.

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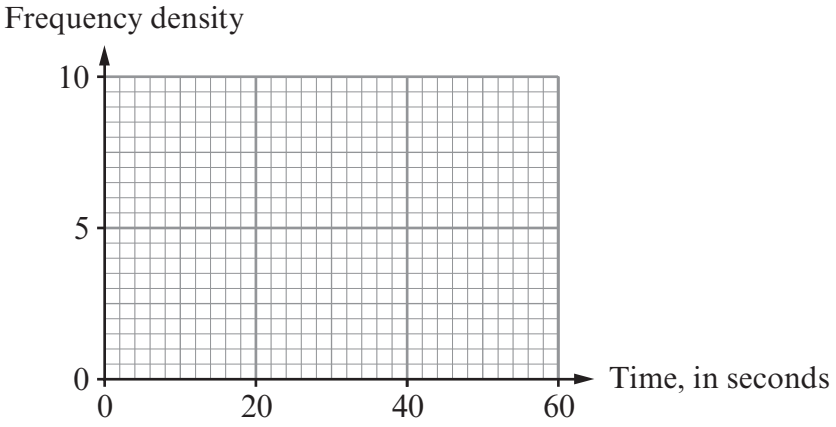
[3]



(c) Using the information from parts *(a)* and *(b)*, do you think the adults are faster than the children at sewing buttons on shirts? You must give a reason for your answer.

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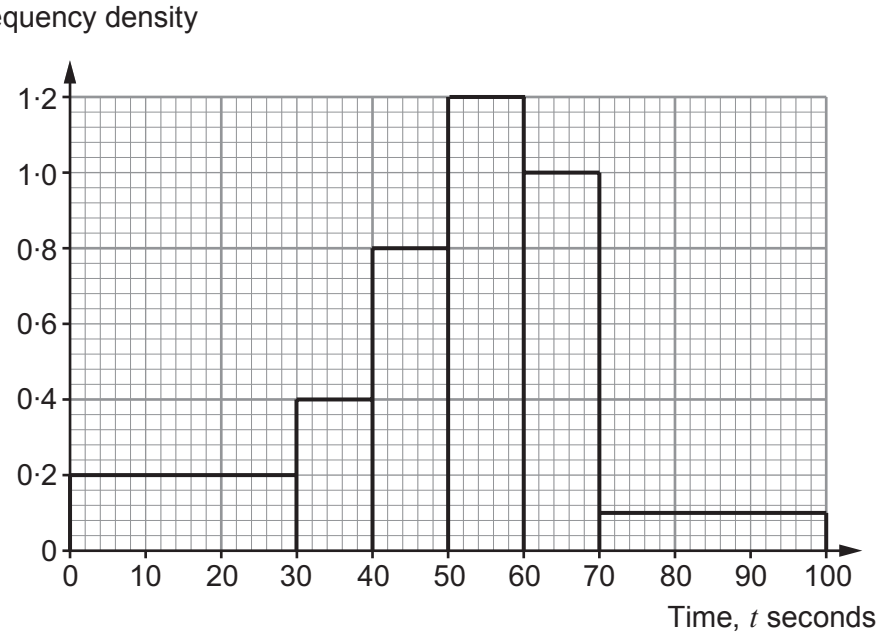
[1]

Examiner only

17. The histogram shows the times taken by people in a group to climb a set of stairs.



(a) Calculate the number of people in the group. [3]

(b) Calculate an estimate for the number of people who climbed the stairs in less than 65 seconds. [2]

Examiner only

18. The time taken to answer a short questionnaire was measured for each person in a group of 200 ten-year-olds.
The following grouped frequency distribution was obtained.

Time, t seconds	$0 < t \leqslant 20$	$20 < t \leqslant 40$	$40 < t \leqslant 60$	$60 < t \leqslant 80$	$80 < t \leqslant 120$
Number of ten-year-olds	36	44	100	12	8

(a) Draw a histogram to illustrate the distribution on the graph paper below. [4]

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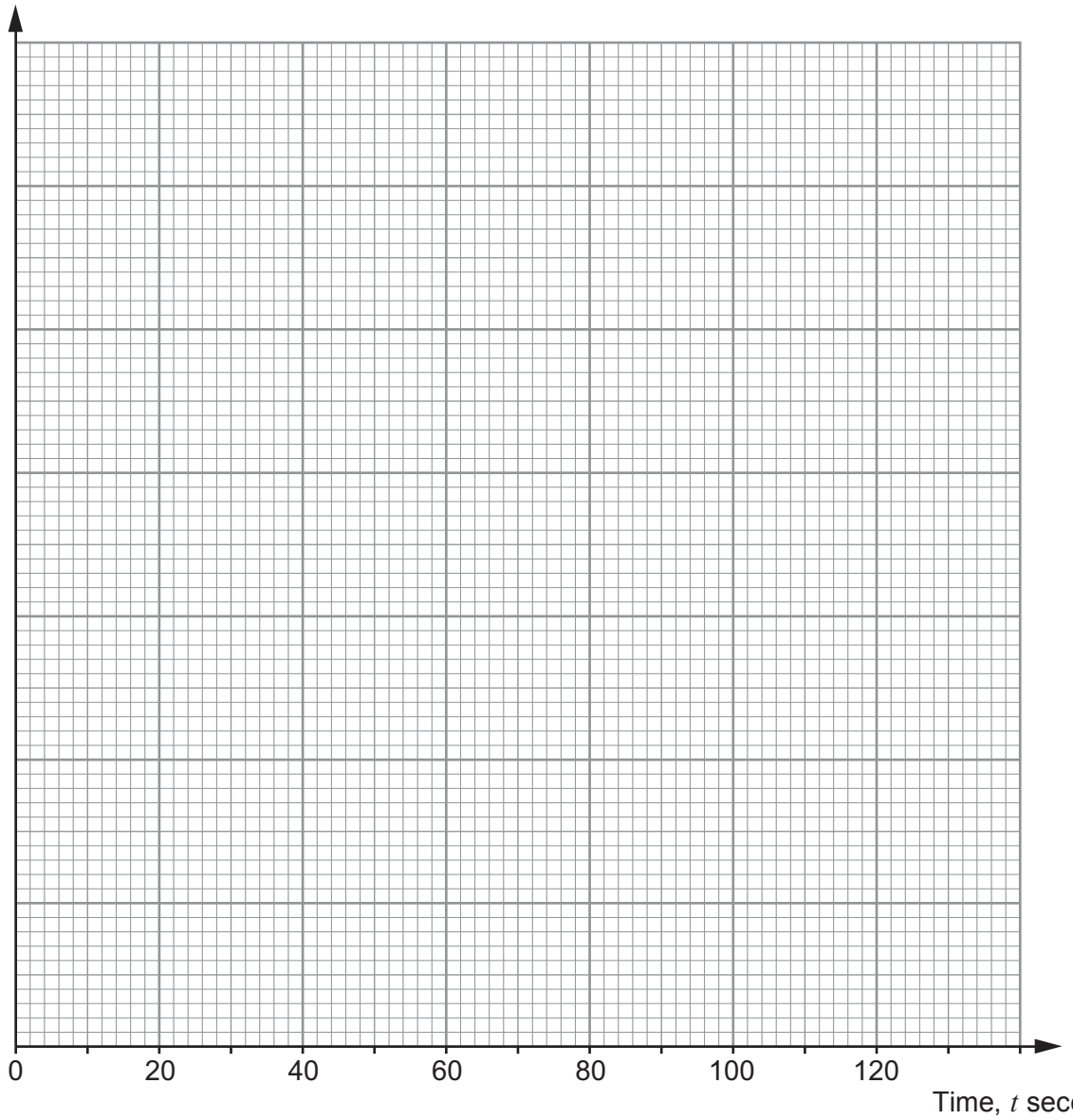

Examiner only

(b) 200 twenty-year-olds were set an identical task.
The times taken to answer the short questionnaire were also recorded using the same time intervals as were used for the ten-year-olds.
The median time taken by the twenty-year-olds to answer the short questionnaire was 58 seconds.

Gemma says,

'The median for the 10-year-olds is the same as the median for the 20-year-olds.'

Fred disagrees. He says,

'The median for the 10-year-olds could be less than the median for the 20-year-olds.'

Explain why either Gemma or Fred could be correct. [2]

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