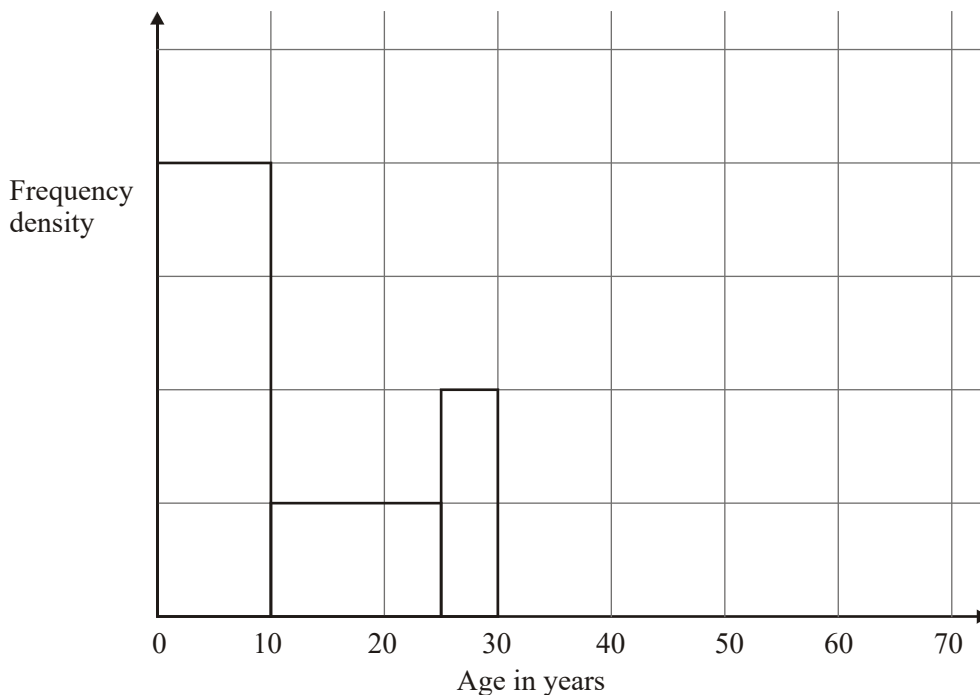


1. The incomplete table and histogram give some information about the ages of the people who live in a village.



- (a) Use the information in the histogram to complete the frequency table below.

Age (x) in years	Frequency
$0 < x \leq 10$	160
$10 < x \leq 25$	
$25 < x \leq 30$	
$30 < x \leq 40$	100
$40 < x \leq 70$	120

(2)

- (b) Complete the histogram.

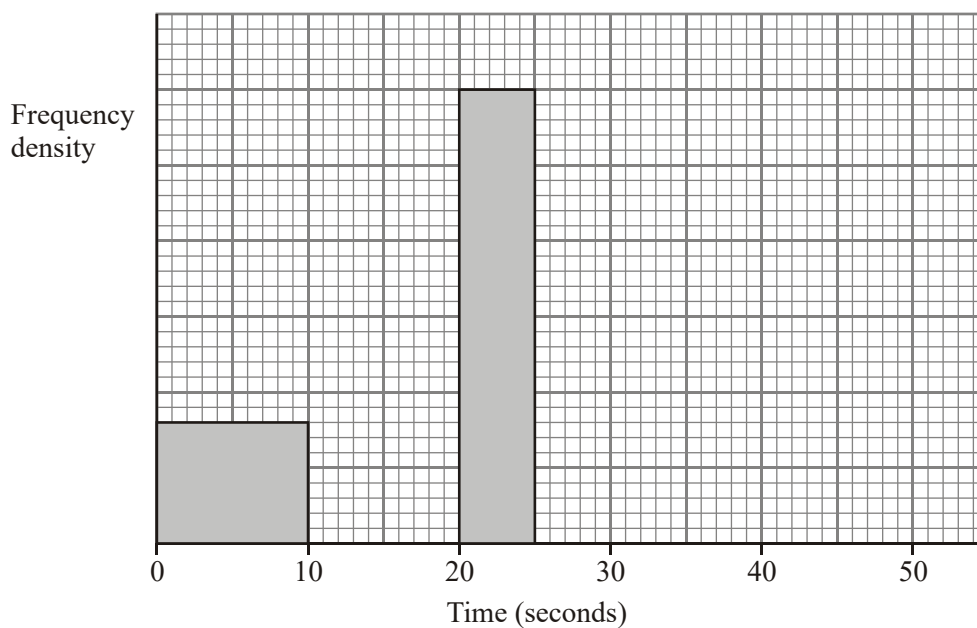
(2)
(Total 4 marks)

2. One Monday, Victoria measured the time, in seconds, that individual birds spent on her bird table.

She used this information to complete the frequency table.

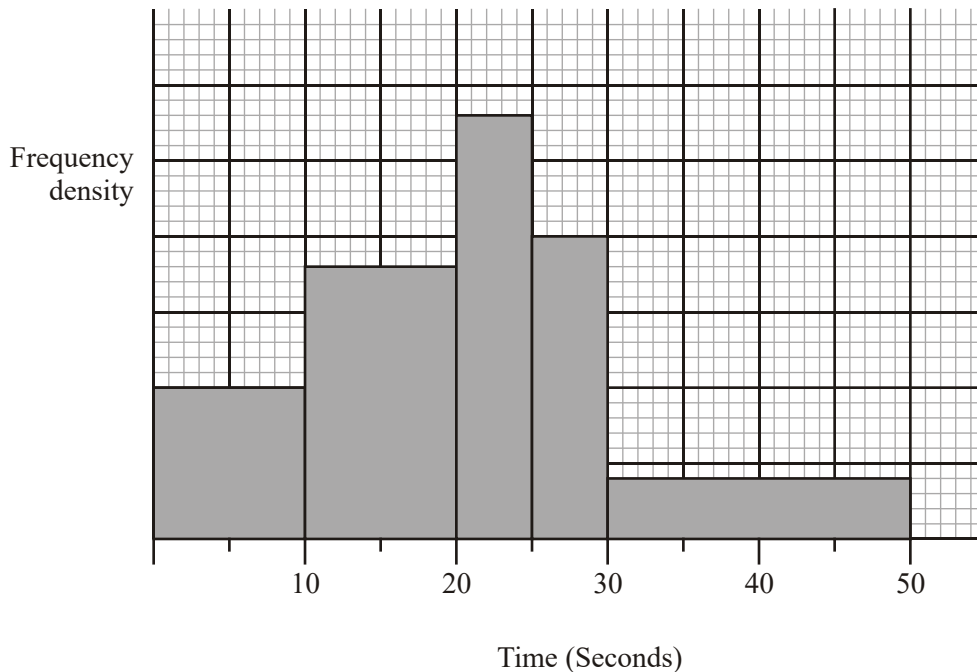
Time (t seconds)	Frequency
$0 < t \leq 10$	8
$10 < t \leq 20$	16
$20 < t \leq 25$	15
$25 < t \leq 30$	12
$30 < t \leq 50$	6

- (a) Use the table to complete the histogram.



(3)

On Tuesday she conducted a similar survey and drew the following histogram from her results.

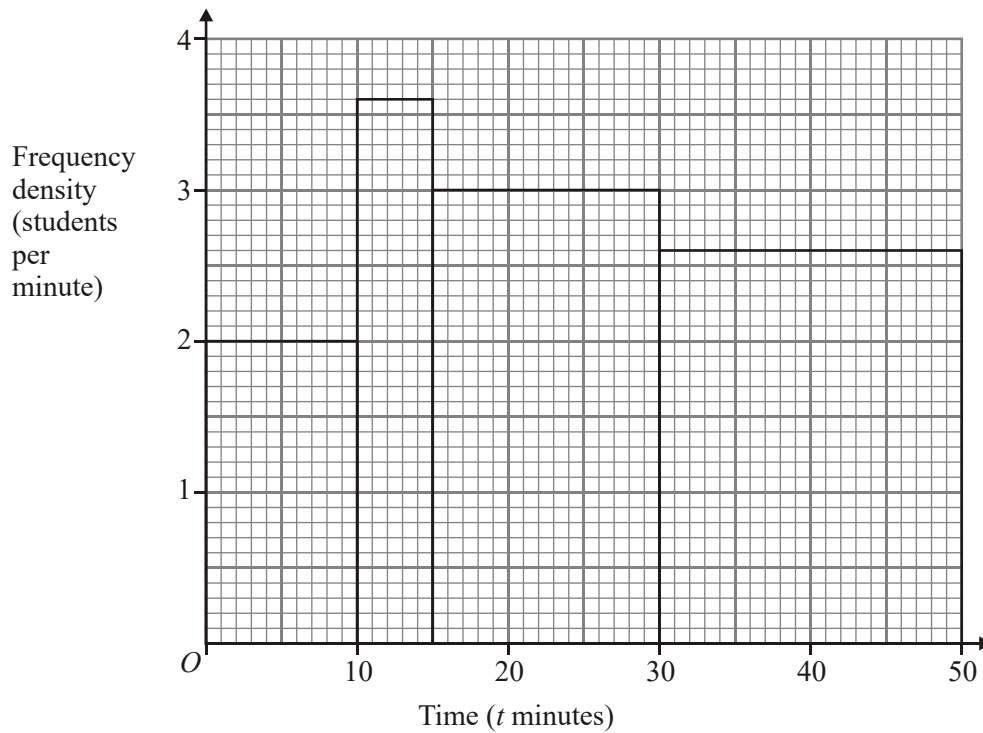


(b) Use the histogram for Tuesday to complete the table.

Time (t seconds)	Frequency
$0 < t \leq 10$	10
$10 < t \leq 20$	
$20 < t \leq 25$	
$25 < t \leq 30$	
$30 < t \leq 50$	

(2)
(Total 5 marks)

3. The histogram gives information about the times, in minutes, 135 students spent on the Internet last night.



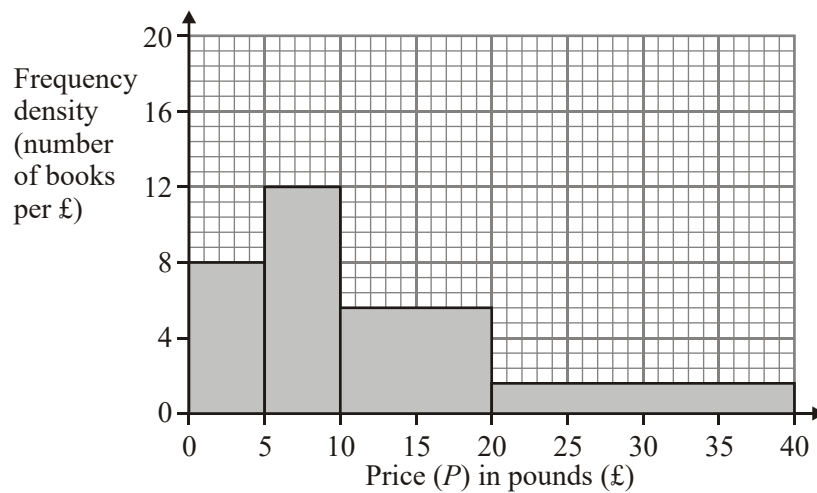
Use the histogram to complete the table.

Time (t minutes)	Frequency
$0 < t \leq 10$	
$10 < t \leq 15$	
$15 < t \leq 30$	
$30 < t \leq 50$	

TOTAL 135

(Total 2 marks)

4. This histogram gives information about the books sold in a bookshop one Saturday.



- (a) Use the histogram to complete the table.

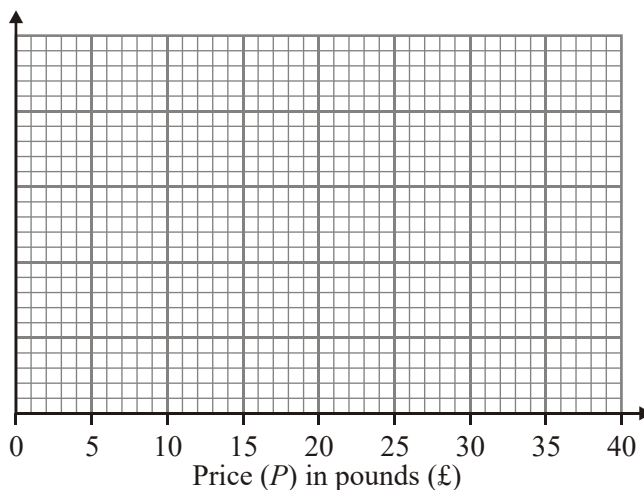
Price (P) in pounds (£)	Frequency
$0 < P \leq 5$	
$5 < P \leq 10$	
$10 < P \leq 20$	
$20 < P \leq 40$	

(2)

The frequency table below gives information about the books sold in a second bookshop on the same Saturday.

Price (P) in pounds (£)	Frequency
$0 < P \leq 5$	80
$5 < P \leq 10$	20
$10 < P \leq 20$	24
$20 < P \leq 40$	96

- (b) On the grid below, draw a histogram to represent the information about the books sold in the second bookshop.



(3)
(Total 5 marks)

5. Fred did a survey on the areas of pictures in a newspaper. The table gives information about the areas.

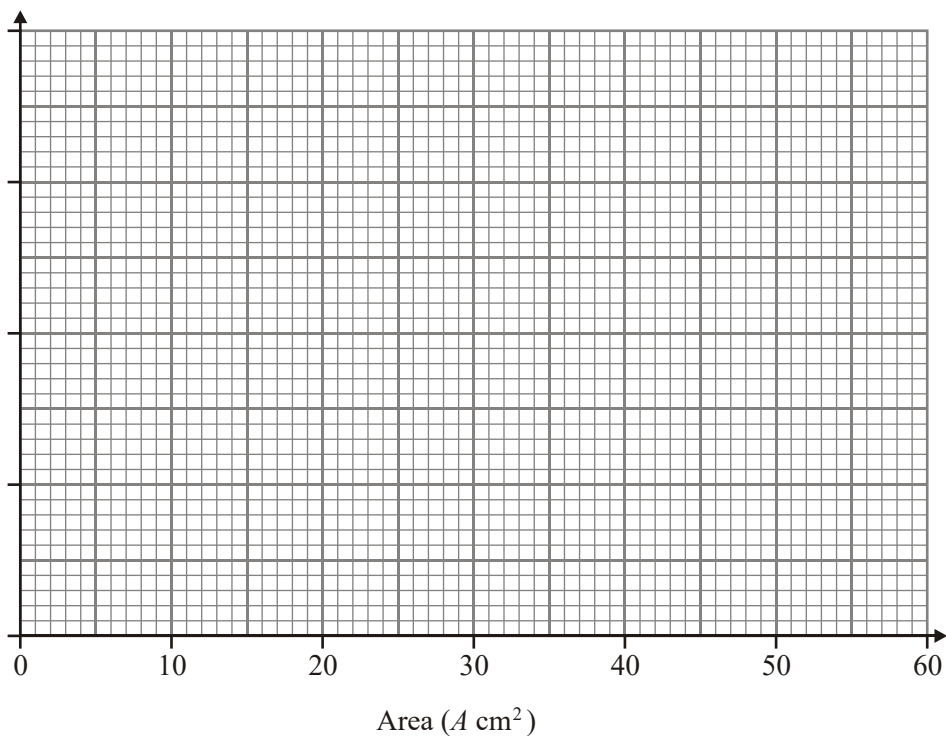
Area (A cm ²)	Frequency
$0 < A \leq 10$	38
$10 < A \leq 25$	36
$25 < A \leq 40$	30
$40 < A \leq 60$	46

- (a) Work out an estimate for the mean area of a picture.

.....cm²

(4)

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



(3)

(Total 7 marks)

6. The table and histogram show information about the length of time it took 165 adults to connect to the internet.

Time (t seconds)	Frequency
$0 < t \leq 10$	20
$10 < t \leq 15$	
$15 < t \leq 17.5$	30
$17.5 < t \leq 20$	40
$20 < t \leq 25$	
$25 < t \leq 40$	

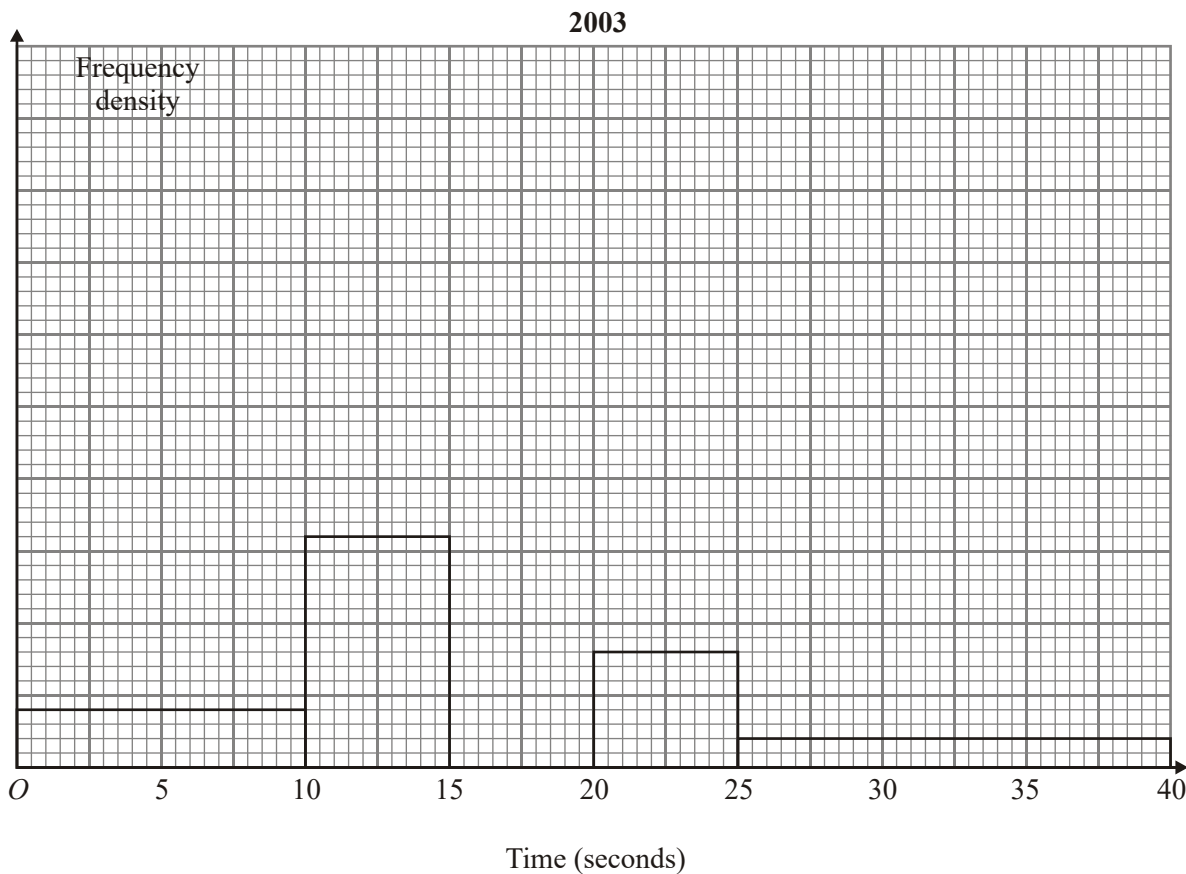
None of the adults took more than 40 seconds to connect to the internet.

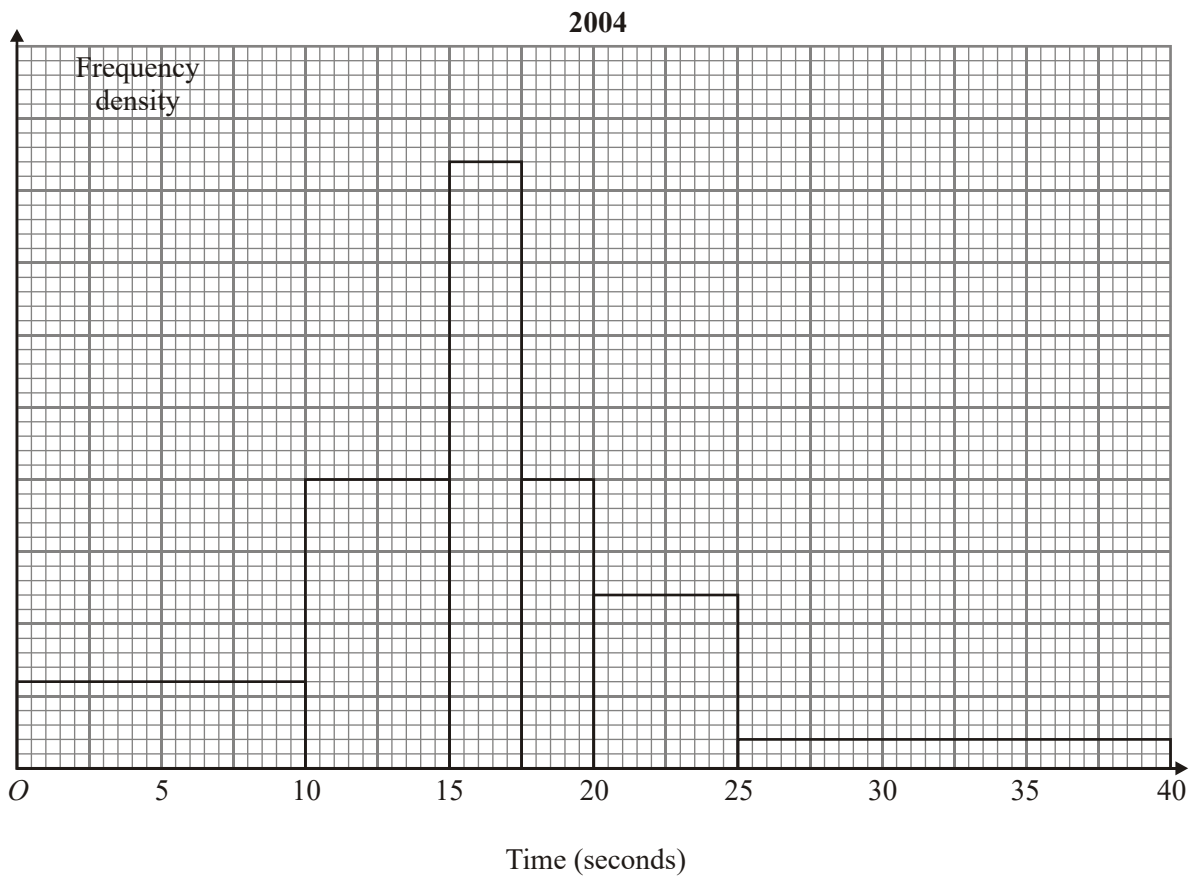
- (a) Use the table to complete the histogram.

(2)

- (b) Use the histogram to complete the table.

(2)





The histogram shows information about the time it took some children to connect to the internet.

None of the children took more than 40 seconds to connect to the internet.

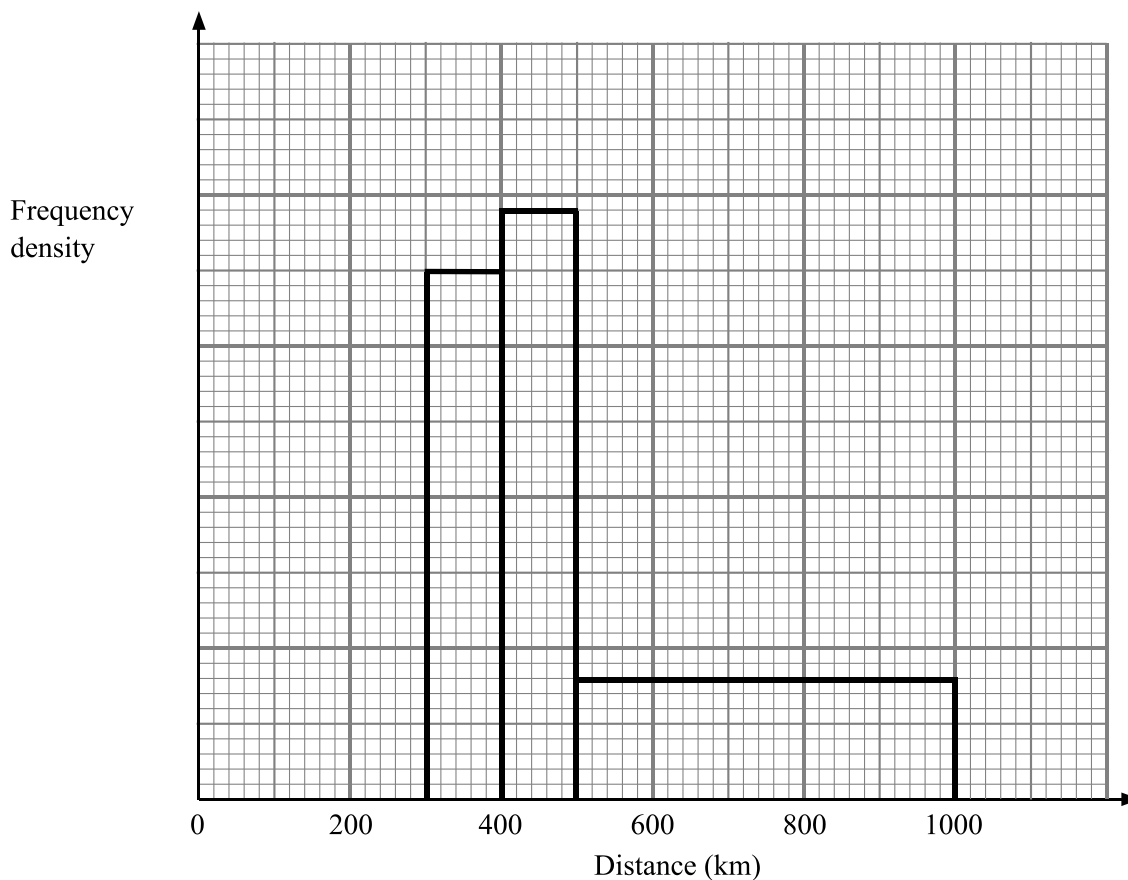
110 children took up to 12.5 seconds to connect to the internet.

- (c) work out an estimate for the number of children who took 21 seconds or more to connect to the internet.

.....

(3)
(Total 7 marks)

7. The incomplete table and histogram give some information about the distances walked by some students in a school in one year.



- (a) Use the information in the histogram to complete the frequency table.

Distance (d) in km	Frequency
$0 < d \leq 300$	210
$300 < d \leq 400$	350
$400 < d \leq 500$	
$500 < d \leq 1000$	

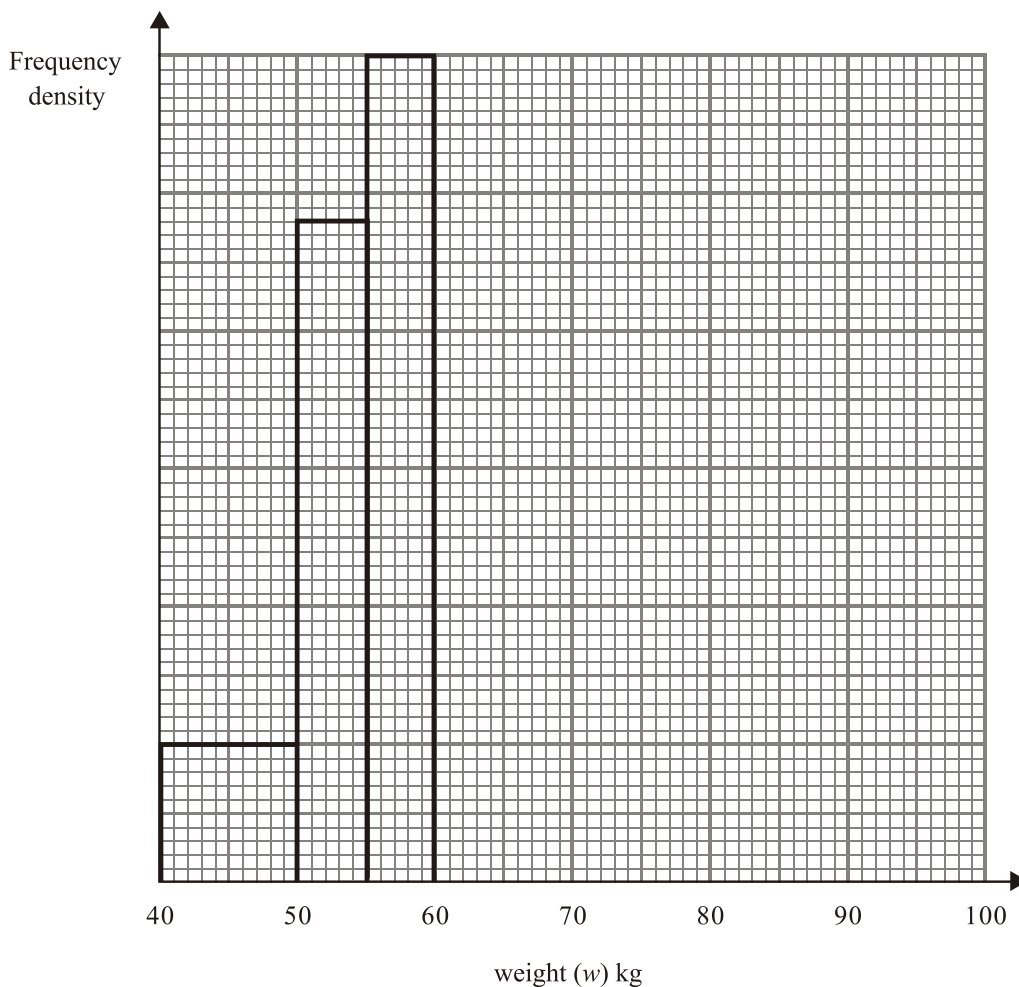
(2)

- (b) Use the information in the table to complete the histogram.

(1)

(Total 3 marks)

8. The incomplete table and histogram give some information about the weights of people at a keep-fit session.



- (a) Use the information in the histogram to complete the frequency table.

Weight (w) kg	Frequency
$40 \leq w < 50$	10
$50 \leq w < 55$	
$55 \leq w < 60$	
$60 \leq w < 75$	15
$75 \leq w < 95$	8

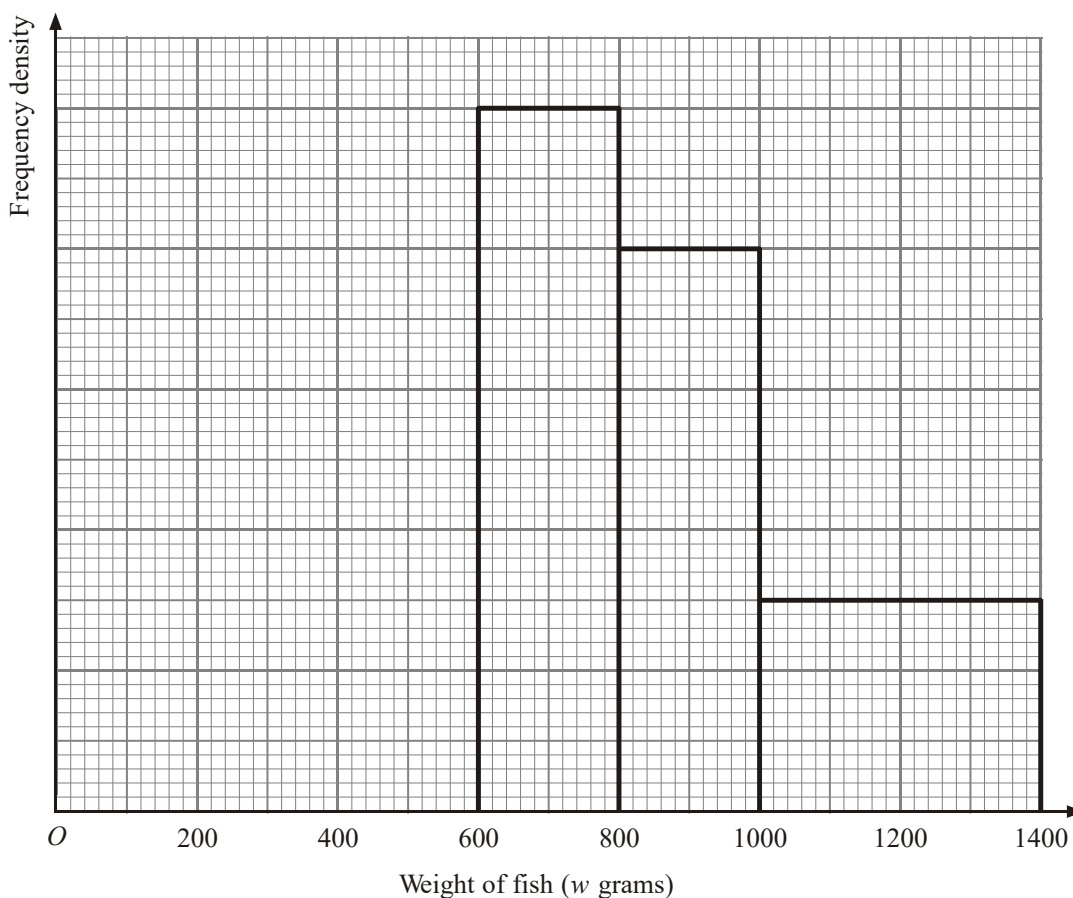
(2)

(b) Complete the histogram.

(2)
(Total 4 marks)

9. The unfinished table and histogram show information about the weight, w grams, of fish that Alan caught each day.

Weight (w grams)	Frequency
$0 < w \leq 400$	8
$400 < w \leq 600$	5
$600 < w \leq 800$	10
$800 < w \leq 1000$	
$1000 < w \leq 1400$	



(a) Use the information in the histogram to complete the table.

(2)

(b) Use the information in the table to complete the histogram.

(2)

(Total 4 marks)

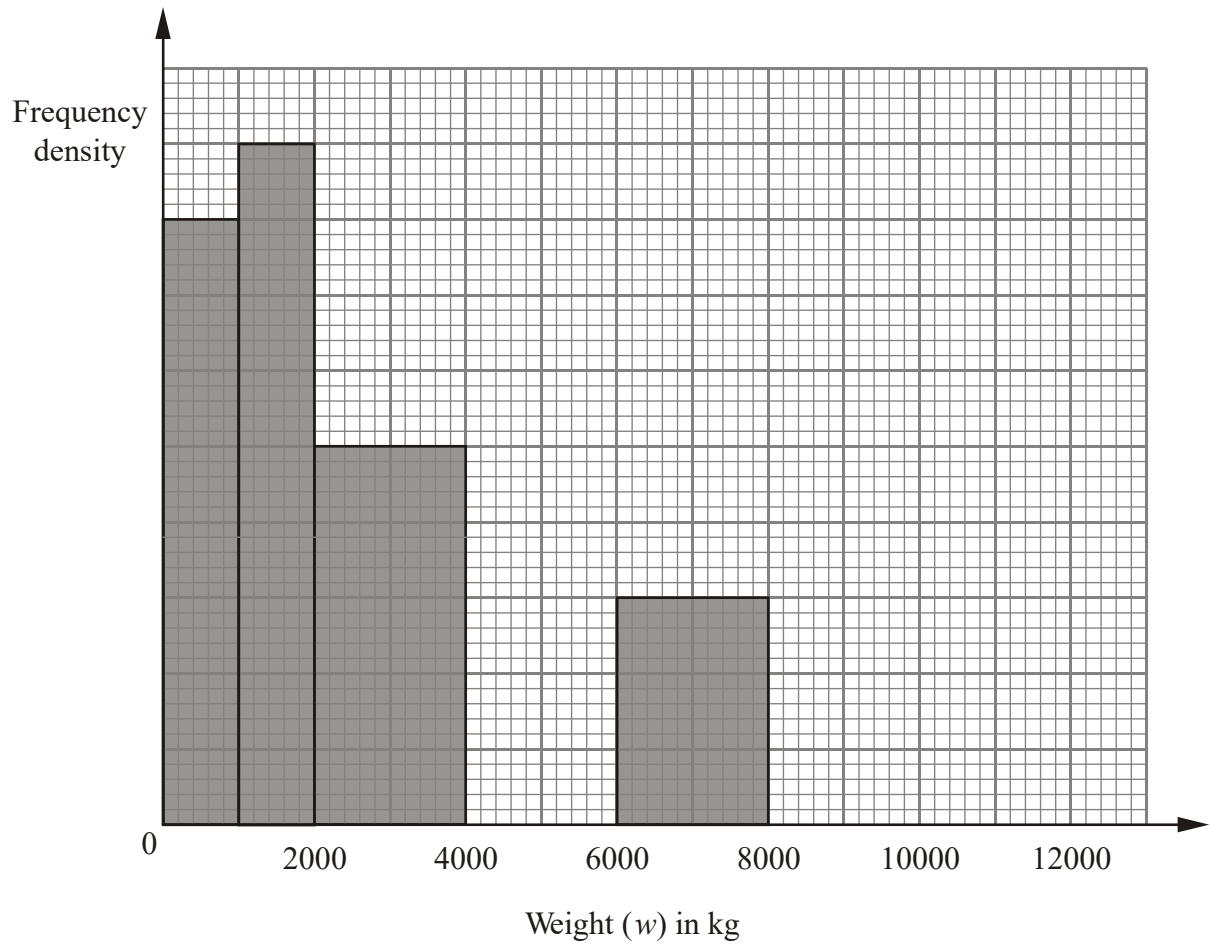
10. The incomplete histogram and table show information about the weights of some containers.

Weight (w) in kg	Frequency
$0 < w \leq 1000$	16
$1000 < w \leq 2000$	
$2000 < w \leq 4000$	
$4000 < w \leq 6000$	16
$6000 < w \leq 8000$	
$8000 < w \leq 12000$	8

(a) Use the information in the histogram to complete the table.

(2)

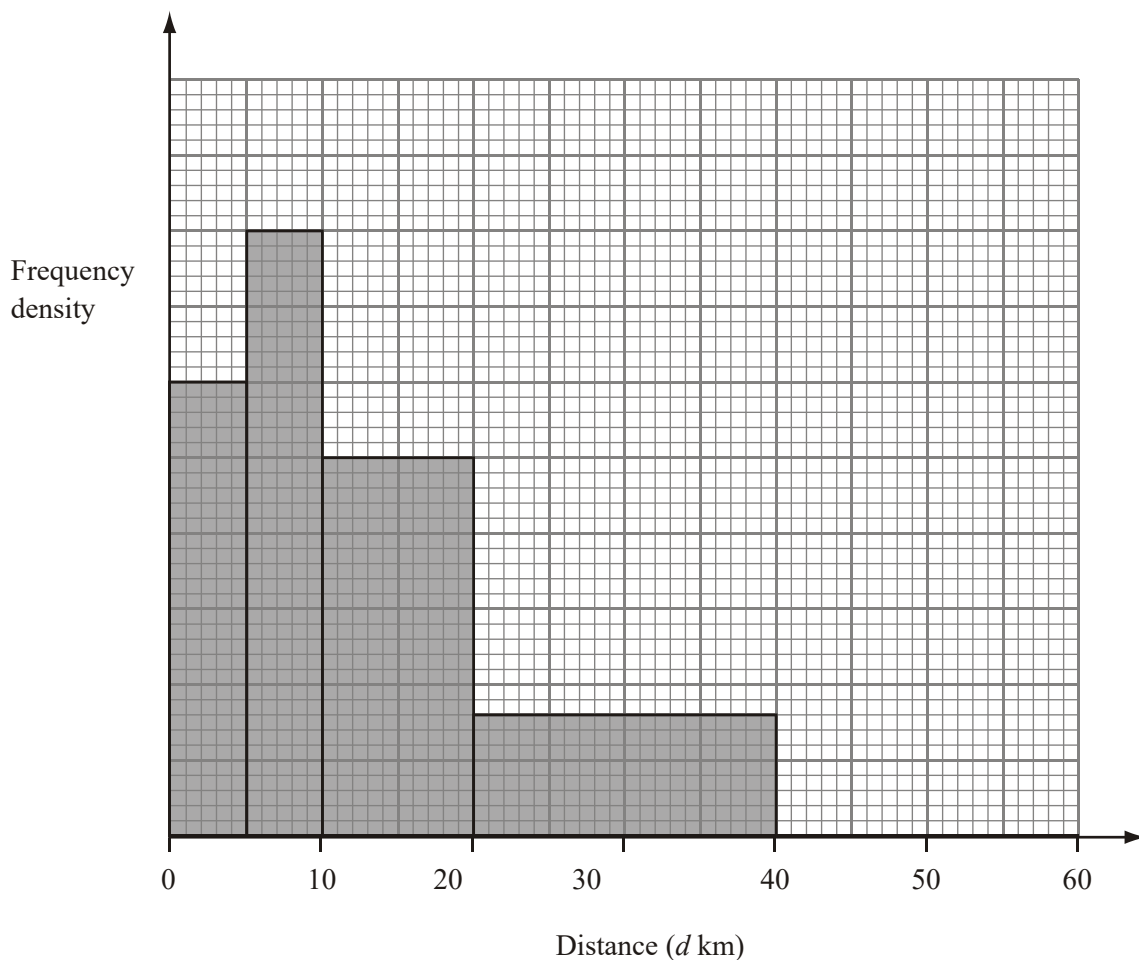
(b) Use the information in the table to complete the histogram.



(2)

(Total 4 marks)

11. The incomplete histogram and table give some information about the distances some teachers travel to school.



- (a) Use the information in the histogram to complete the frequency table.

Distance (d km)	Frequency
$0 < d \leq 5$	15
$5 < d \leq 10$	20
$10 < d \leq 20$	
$20 < d \leq 40$	
$40 < d \leq 60$	10

(2)

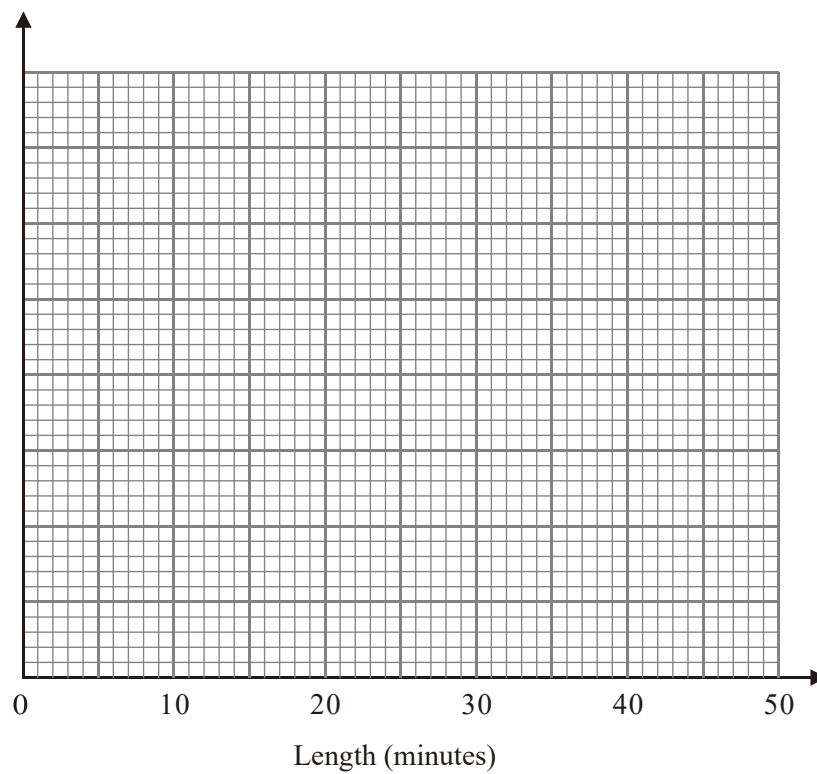
- (b) Use the information in the table to complete the histogram.

(1)
(Total 3 marks)

12. A call centre receives 64 telephone calls one morning.
The table gives information about the lengths, in minutes, of these telephone calls.

Length (x) minutes	Frequency
$0 < x \leq 5$	4
$5 < x \leq 15$	10
$15 < x \leq 30$	24
$30 < x \leq 40$	20
$40 < x \leq 45$	6

Draw a histogram for this information.

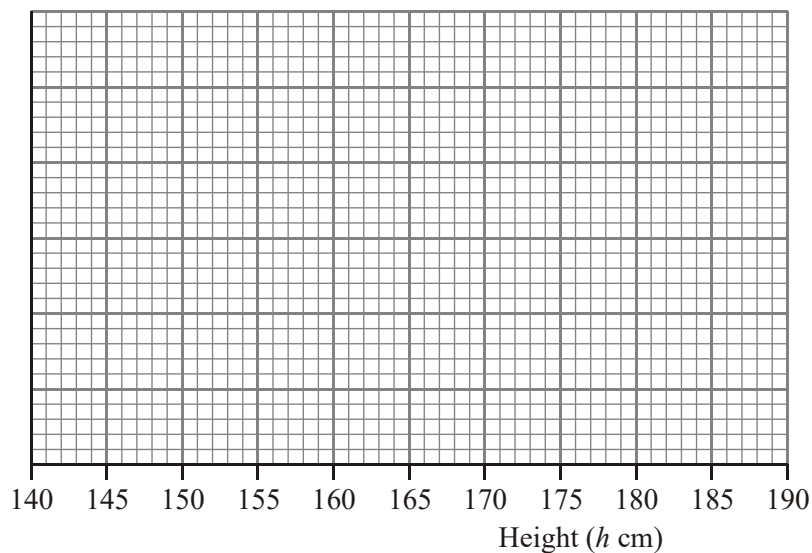


(Total 4 marks)

13. The table gives information about the heights, in centimetres, of some 15 year old students.

Height (h cm)	$145 < h \leq 155$	$155 < h \leq 175$	$175 < h \leq 190$
Frequency	10	80	24

Use the table to draw a histogram.

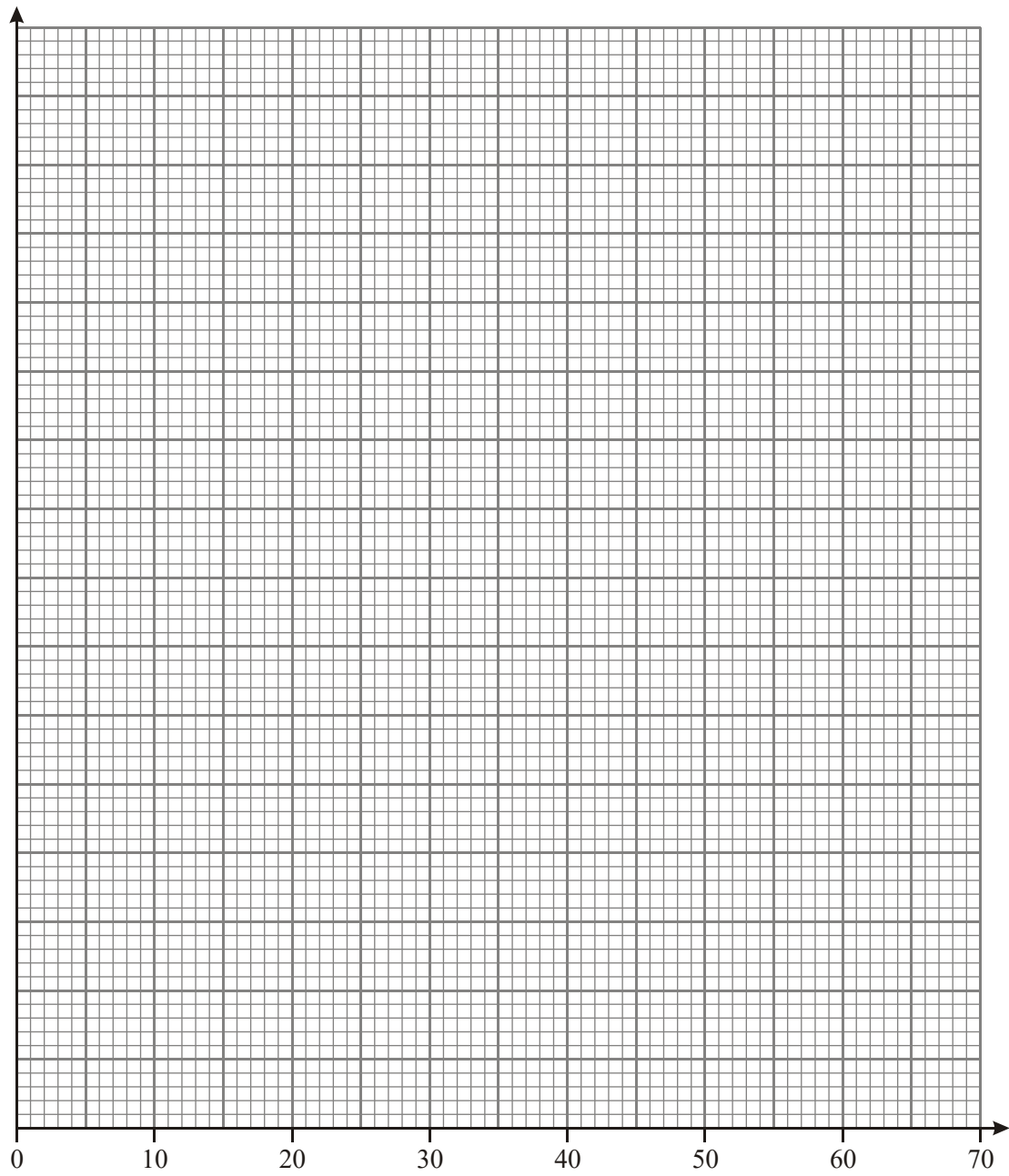


(Total 3 marks)

14. The table shows the distribution of the ages of passengers travelling on a plane from London to Belfast.

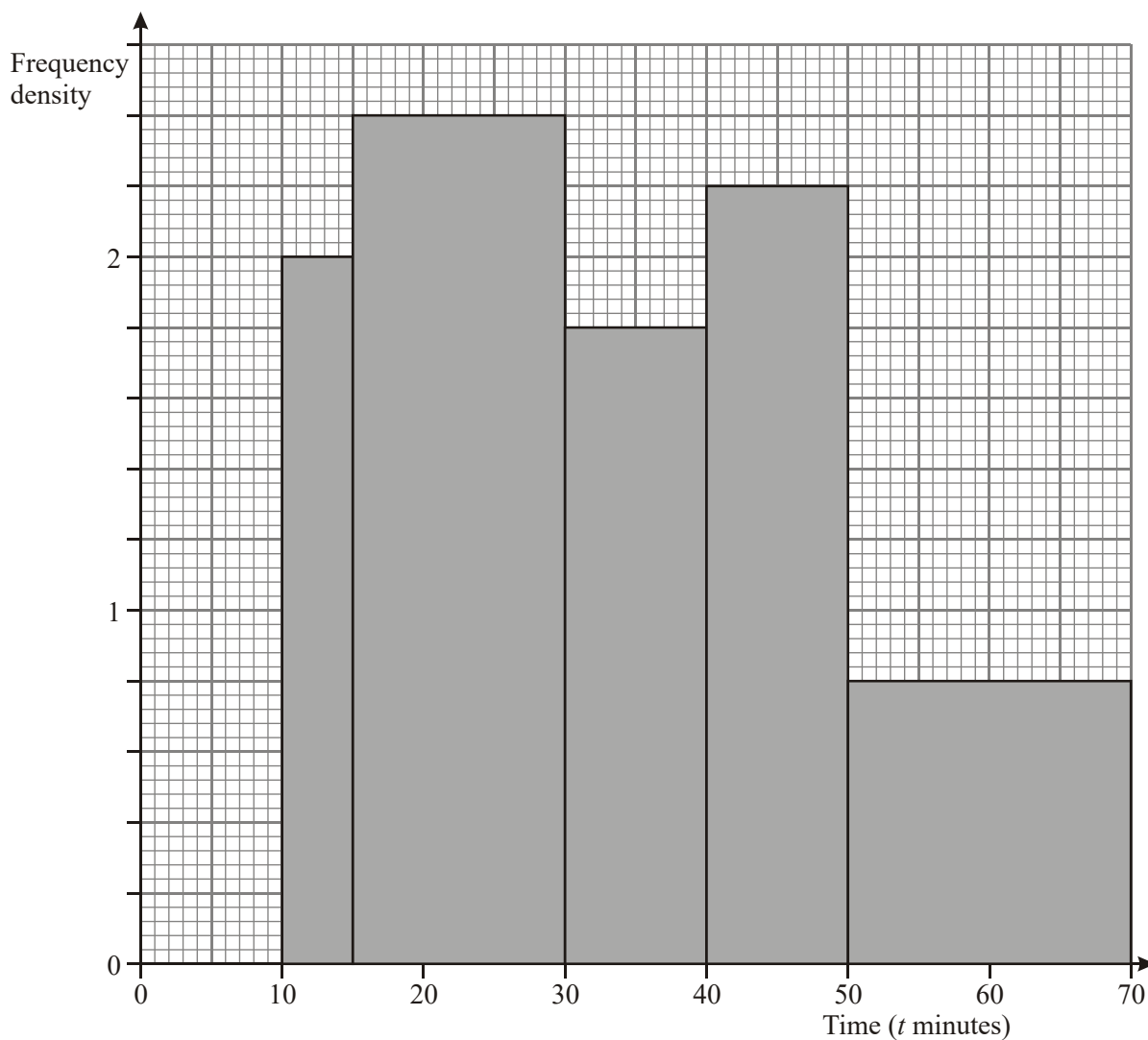
Age (x years)	Frequency
$0 < x \leq 20$	28
$20 < x \leq 35$	36
$35 < x \leq 45$	20
$45 < x \leq 65$	30

On the grid below, draw a histogram to show this distribution.



Age (x years)
(Total 3 marks)

15. A teacher asked some year 10 students how long they spent doing homework each night. The histogram was drawn from this information.



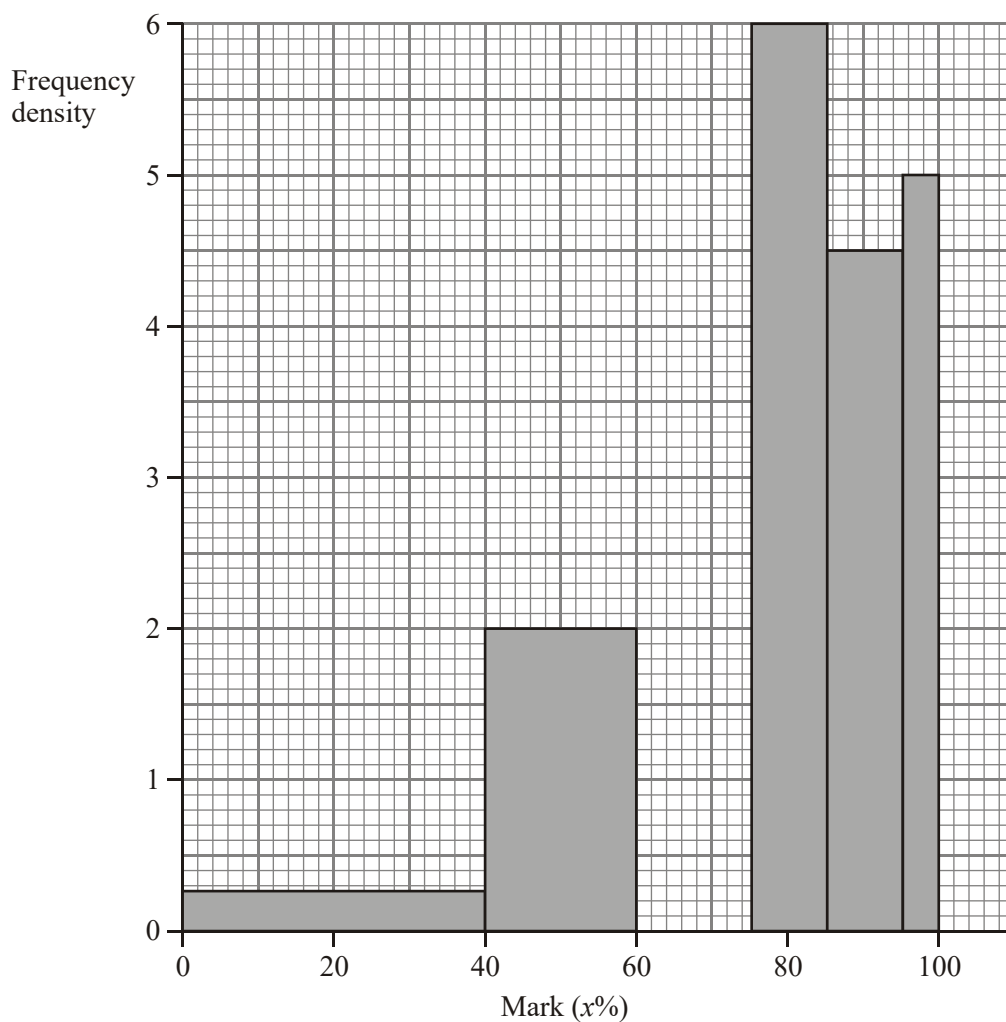
Use the histogram to complete the table.

Time (t minutes)	Frequency
$10 \leq t < 15$	10
$15 \leq t < 30$	
$30 \leq t < 40$	
$40 \leq t < 50$	
$50 \leq t < 70$	

(Total 2 marks)

16. Some students at Highfliers School took a mathematics examination. The unfinished table and histogram show some information about their marks.

Mark ($x\%$)	Frequency
$0 < x \leq 40$	10
$40 < x \leq 60$	40
$60 < x \leq 75$	45
$75 < x \leq 85$	60
$85 < x \leq 95$	
$95 < x \leq 100$	25



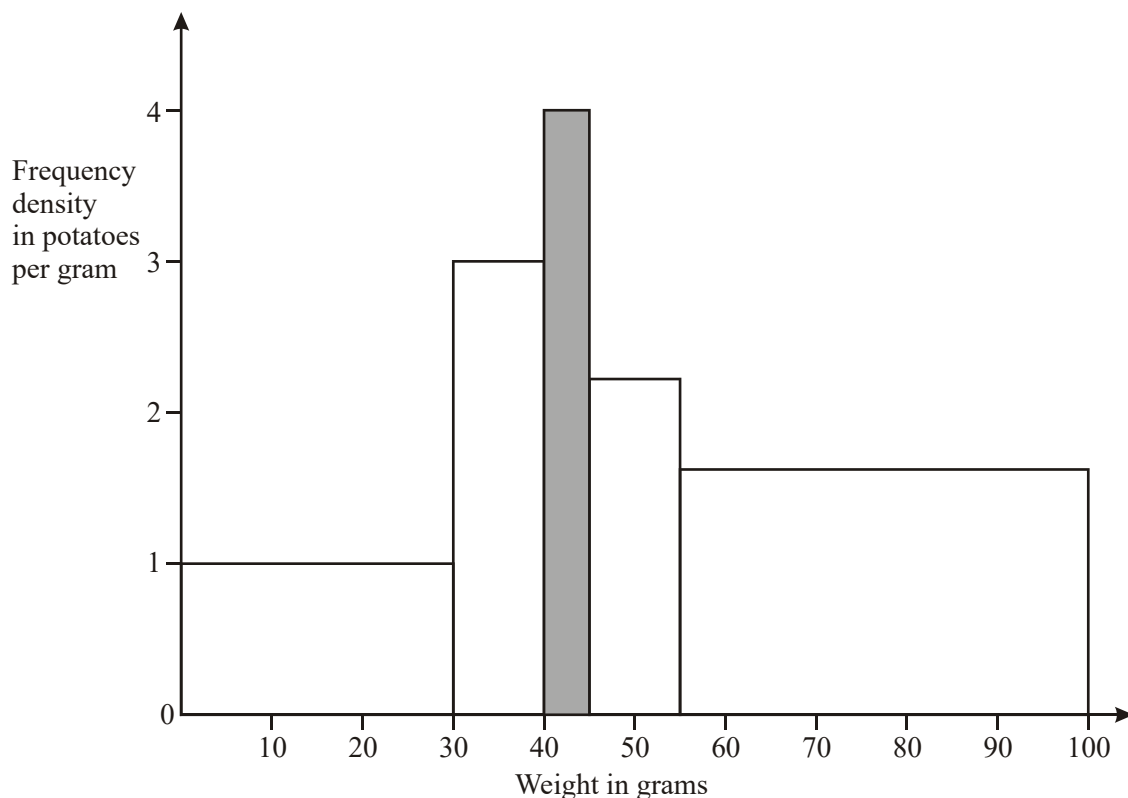
- (a) Use the information in the table to complete the histogram.

(1)

(b) Use the information in the histogram to complete the table.

(1)
(Total 2 marks)

17.



The histogram gives information about the weights of some potatoes.
The shaded bar represents 20 potatoes.

(a) Work out how many of the potatoes weigh 30 grams or less.

.....

(1)

- (b) Work out how many of the potatoes weigh more than 45 grams.

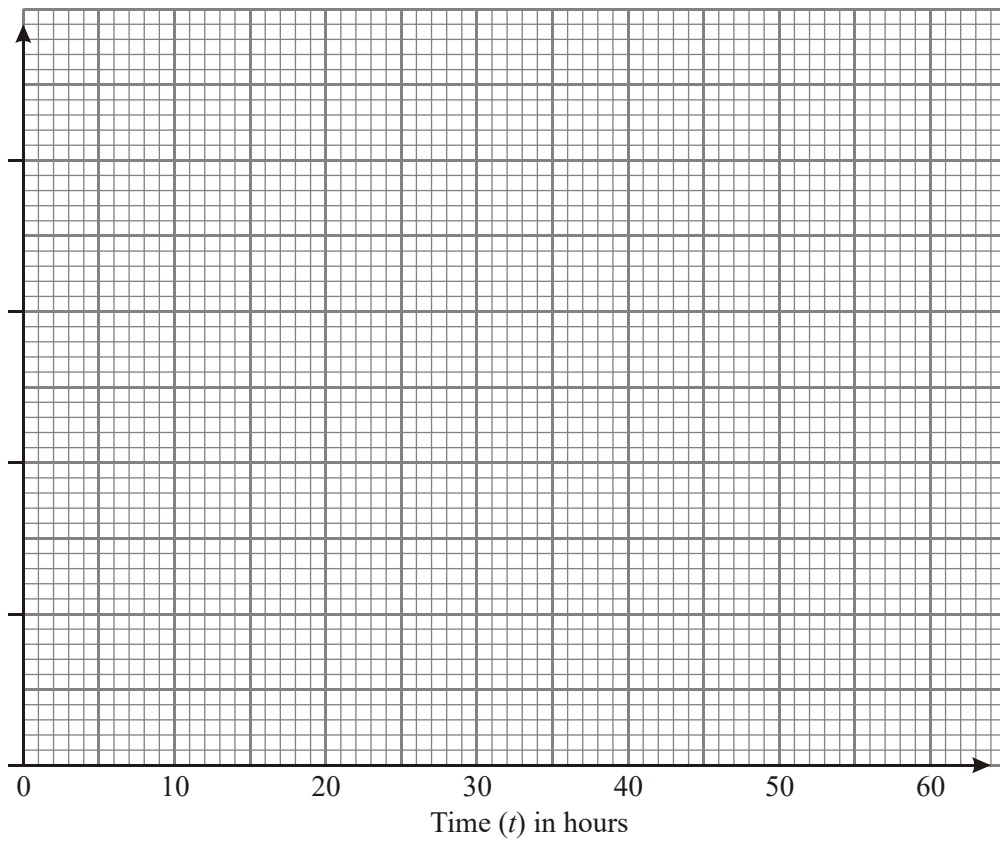
.....

(2)
(Total 3 marks)

18. The table gives information about the times, in hours, some students took to complete a piece of coursework.

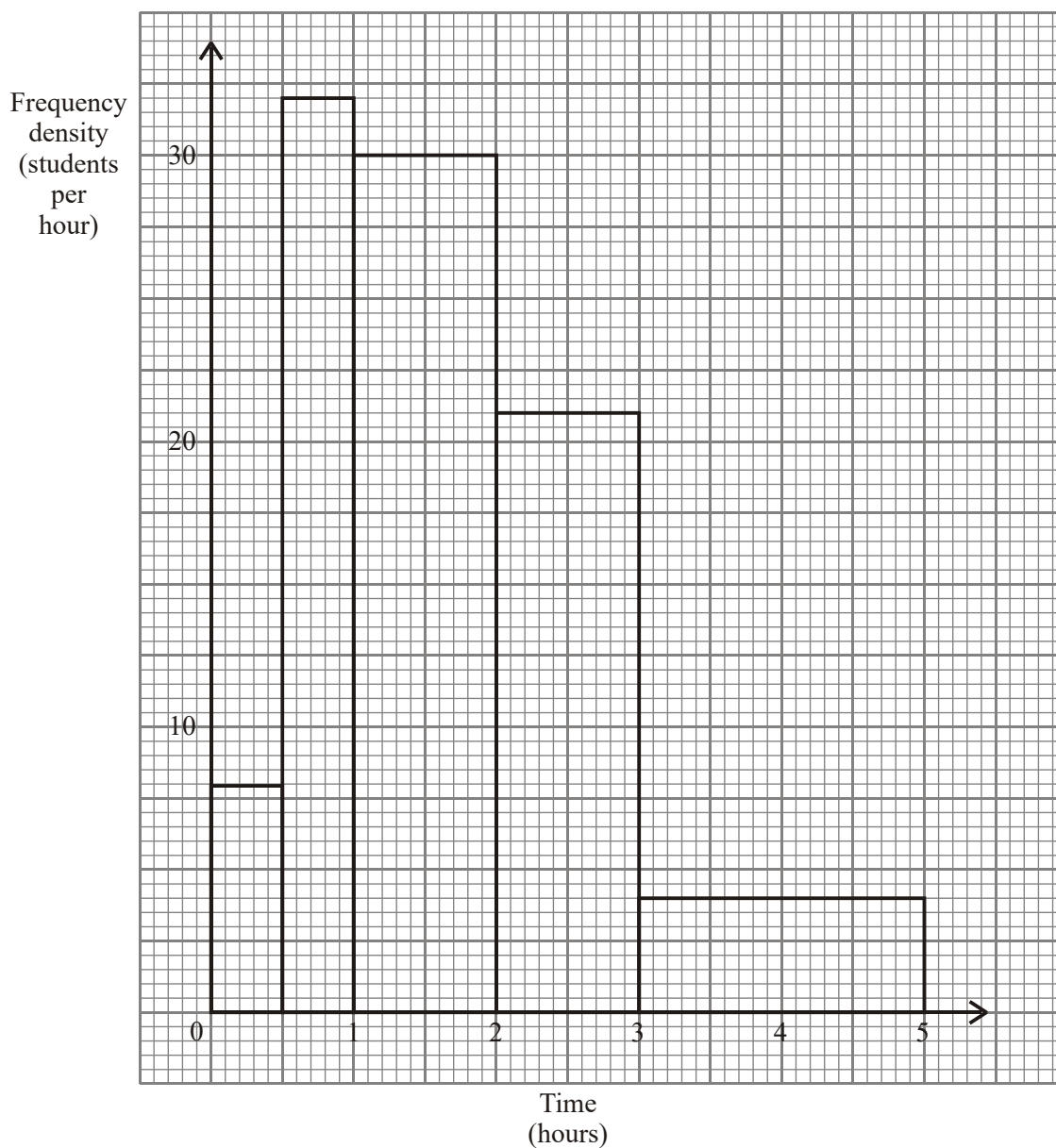
Time (t) in hours	Frequency
$0 < t \leq 20$	30
$20 < t \leq 30$	40
$30 < t \leq 55$	25

Use this information to draw a histogram.



(Total 3 marks)

19. A teacher asked some students how much time they spent using a mobile phone one week. The histogram was drawn from this information.



Use the histogram to complete the table.

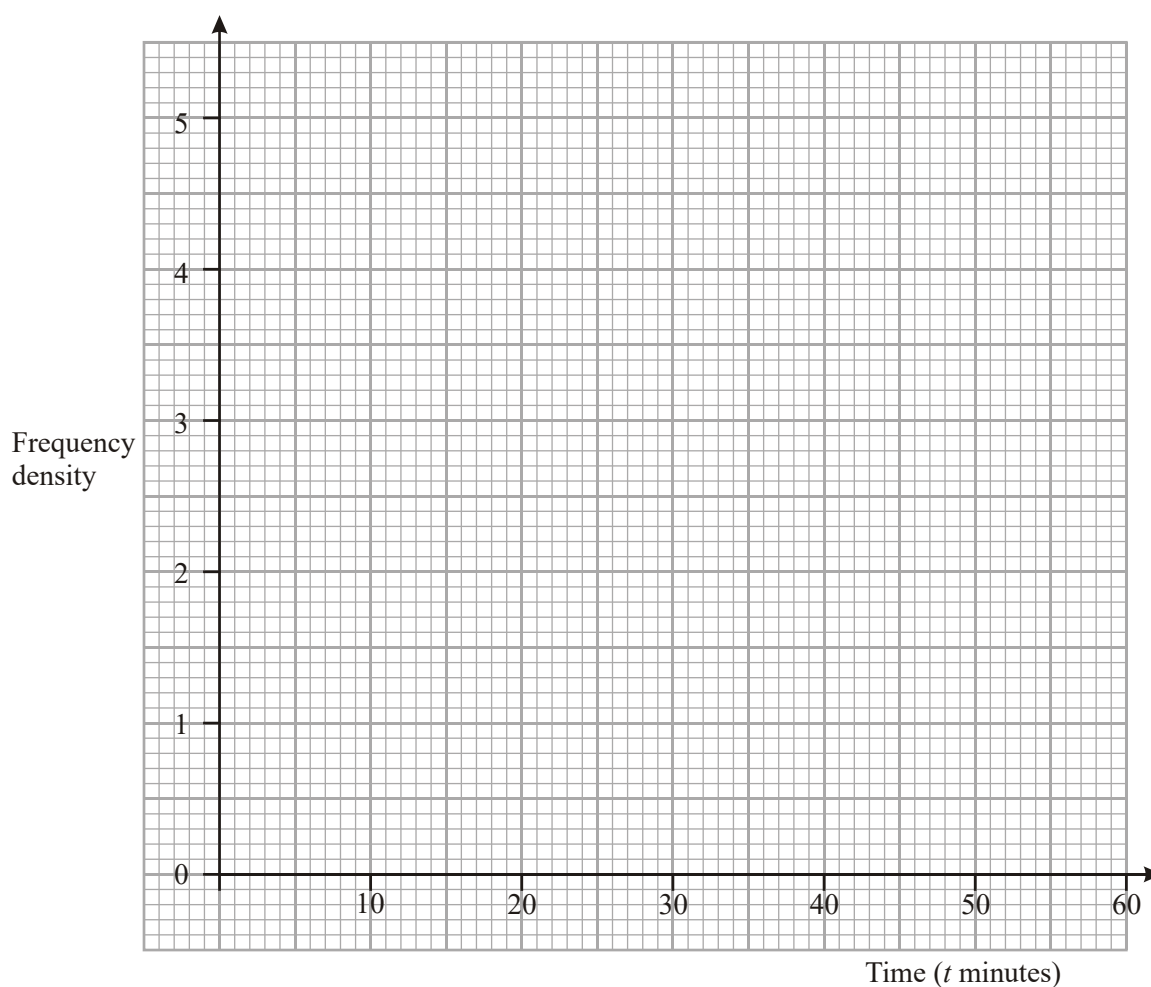
Time (t) hours	Frequency
$0 \leq t < \frac{1}{2}$	
$\frac{1}{2} \leq t < 1$	
$1 \leq t < 2$	30
$2 \leq t < 3$	
$3 \leq t < 5$	

(Total 2 marks)

20. Kath recorded the times, in minutes, taken by 170 students to travel to school. The table gives information about her results.

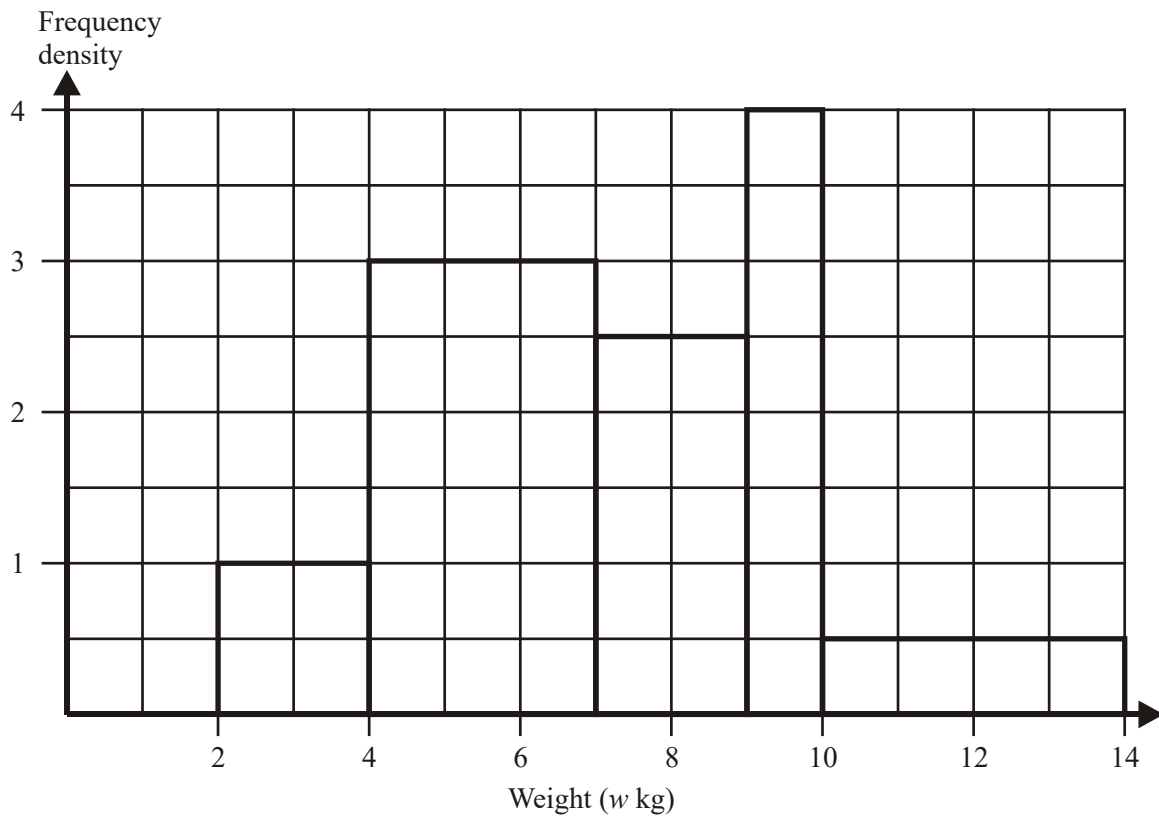
Time (t minutes)	Frequency
$0 \leq t < 20$	70
$20 \leq t < 35$	45
$35 \leq t < 45$	44
$45 \leq t < 50$	11

Use the information in the table to draw a histogram.



(Total 3 marks)

21. The histogram gives information about the weights, in kilograms, of some boxes.



Use the histogram to complete the table.

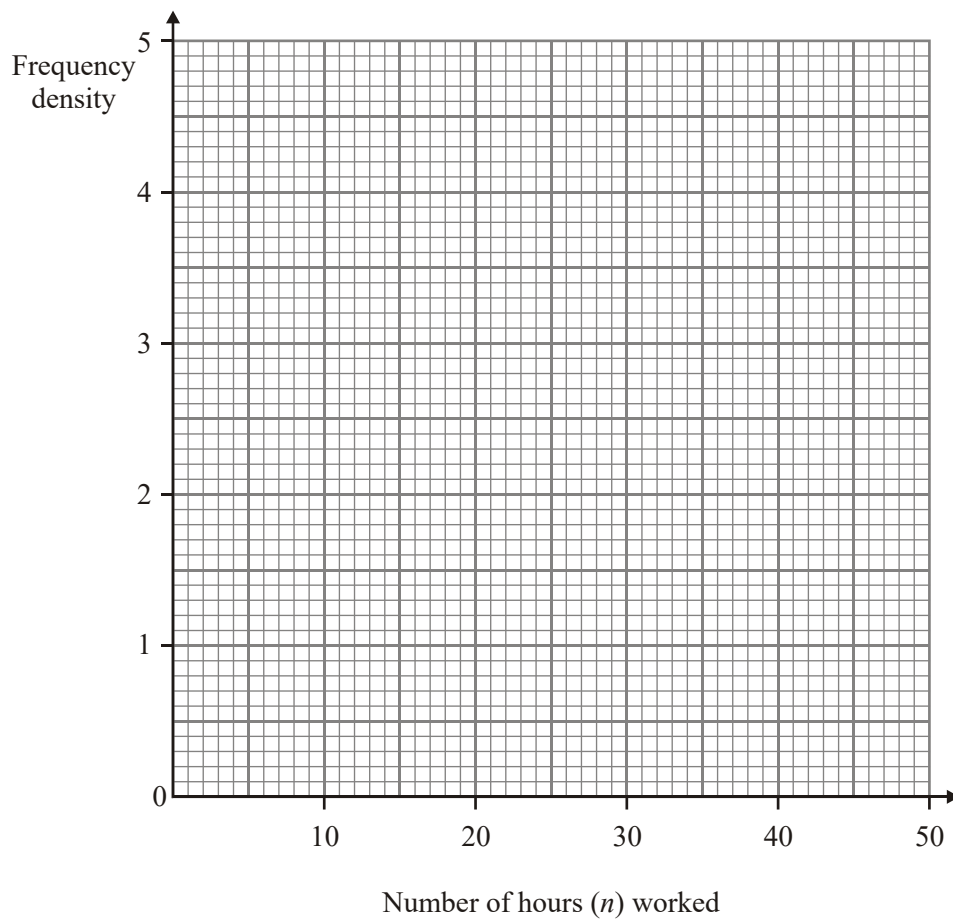
Weight (w kg)	Frequency
$2 \leq w < 4$	20
$4 \leq w < 7$	
$7 \leq w < 9$	
$9 \leq w < 10$	
$10 \leq w < 14$	

(Total 2 marks)

22. The table gives information about the number of hours worked by some factory workers.

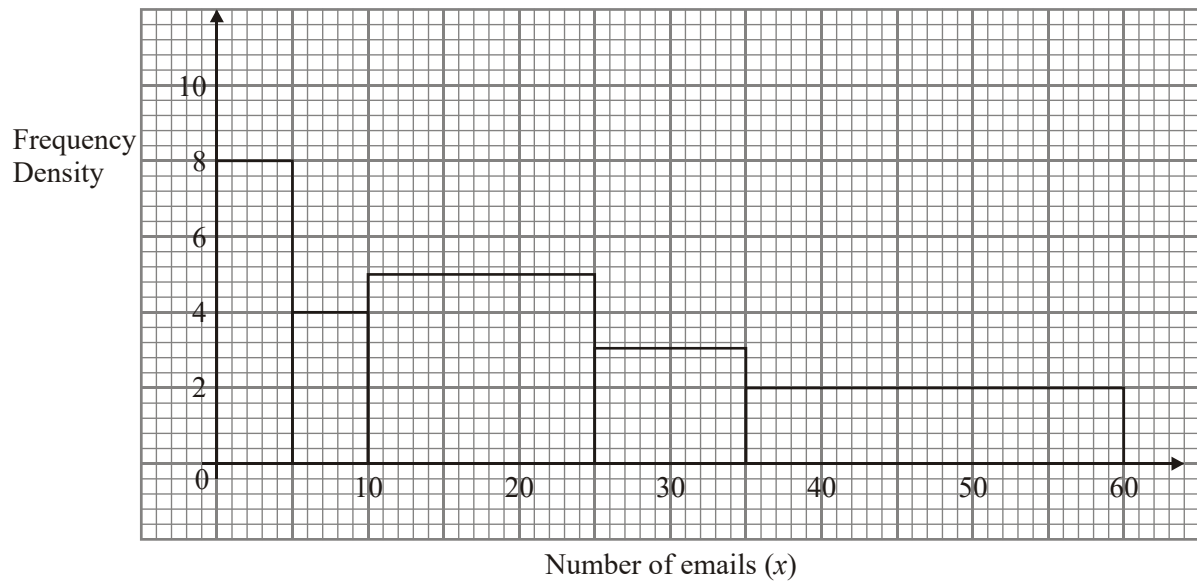
Number of hours (n) worked	Frequency
$0 < n \leq 5$	15
$5 < n \leq 15$	42
$15 < n \leq 35$	40
$35 < n \leq 50$	6

Use the table to draw a histogram.



(Total 3 marks)

23. The histogram and table show information about the number of emails received by each of the students in a school.



Number of emails (x)	Frequency
$0 < x \leq 5$	
$5 < x \leq 10$	20
$10 < x \leq 25$	
$25 < x \leq 35$	
$35 < x \leq 60$	

Use the information in the histogram to complete the table.

(Total 2 marks)

24. The table and histogram show information about the length of time it took 165 adults to connect to the internet.

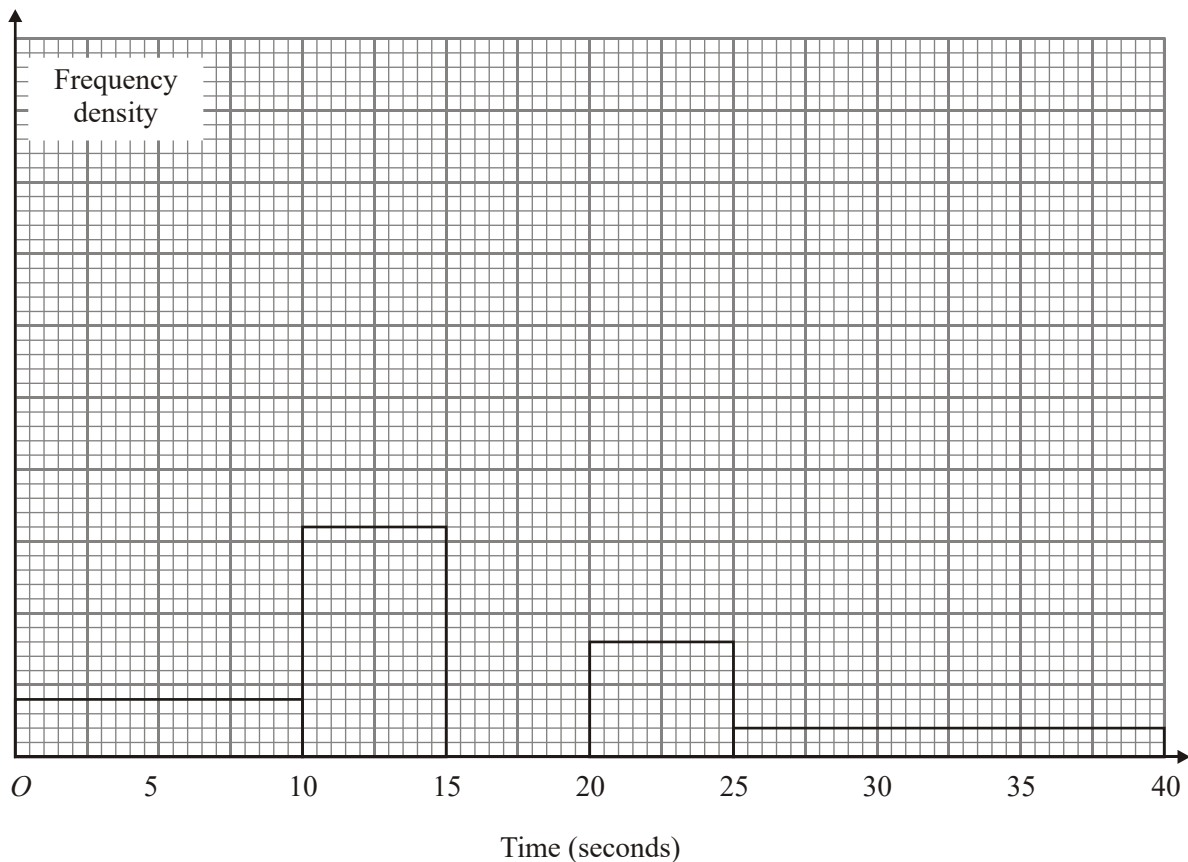
Time (t seconds)	Frequency
$0 < t \leq 10$	20
$10 < t \leq 15$	
$15 < t \leq 17.5$	30
$17.5 < t \leq 20$	40
$20 < t \leq 25$	
$25 < z \leq 40$	

None of the adults took more than 40 seconds to connect to the internet.

- (a) Use the table to complete the histogram.

(2)

- (b) Use the histogram to complete the table.

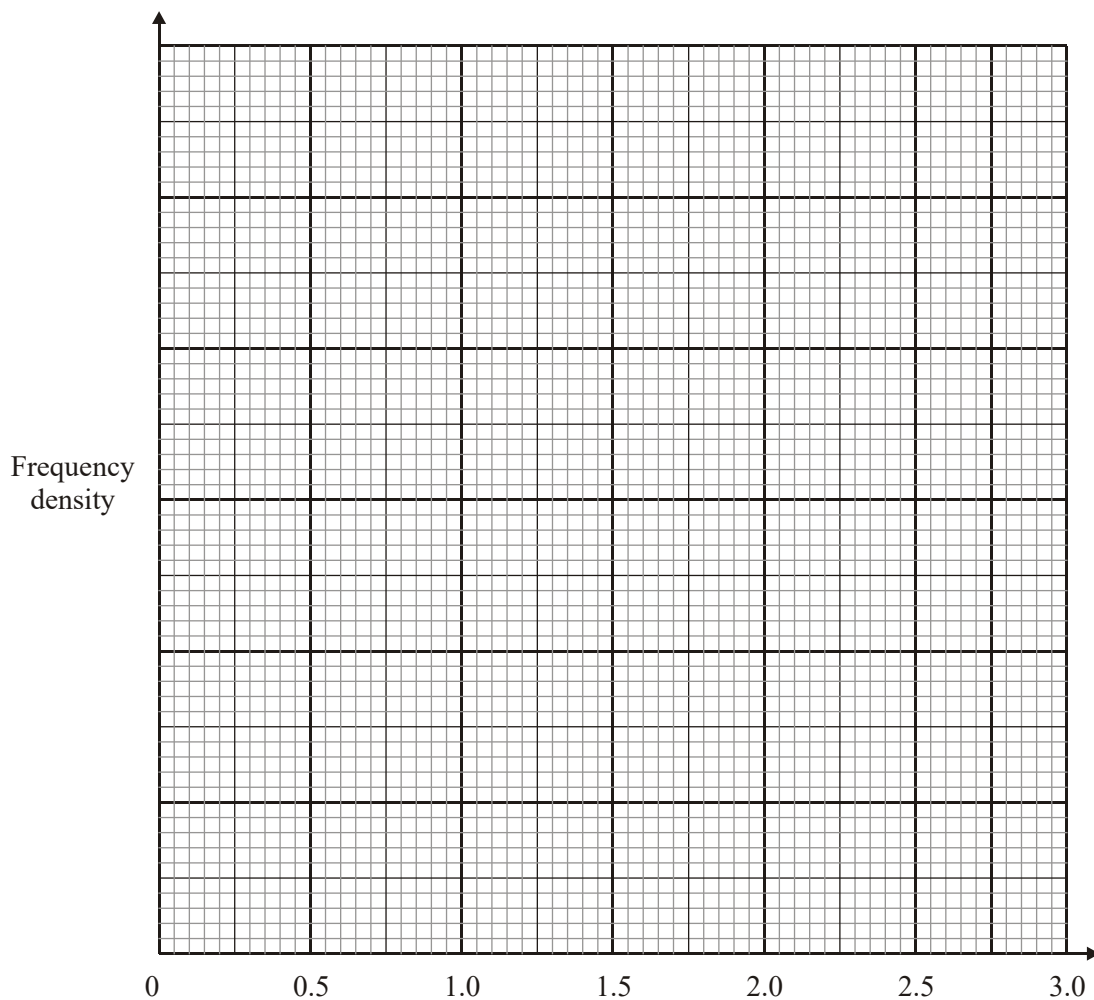


(2)
(Total 4 marks)

25. Munir measured the heights of some walls.

The table and histogram show information about these heights.

Height (h metres)	Frequency
$0 < h \leq 1.0$	9
$1.0 < h \leq 1.5$	10
$1.5 < h \leq 2.5$	12
$2.5 < h \leq 3.0$	



(a) Use the histogram to complete the table.

(1)

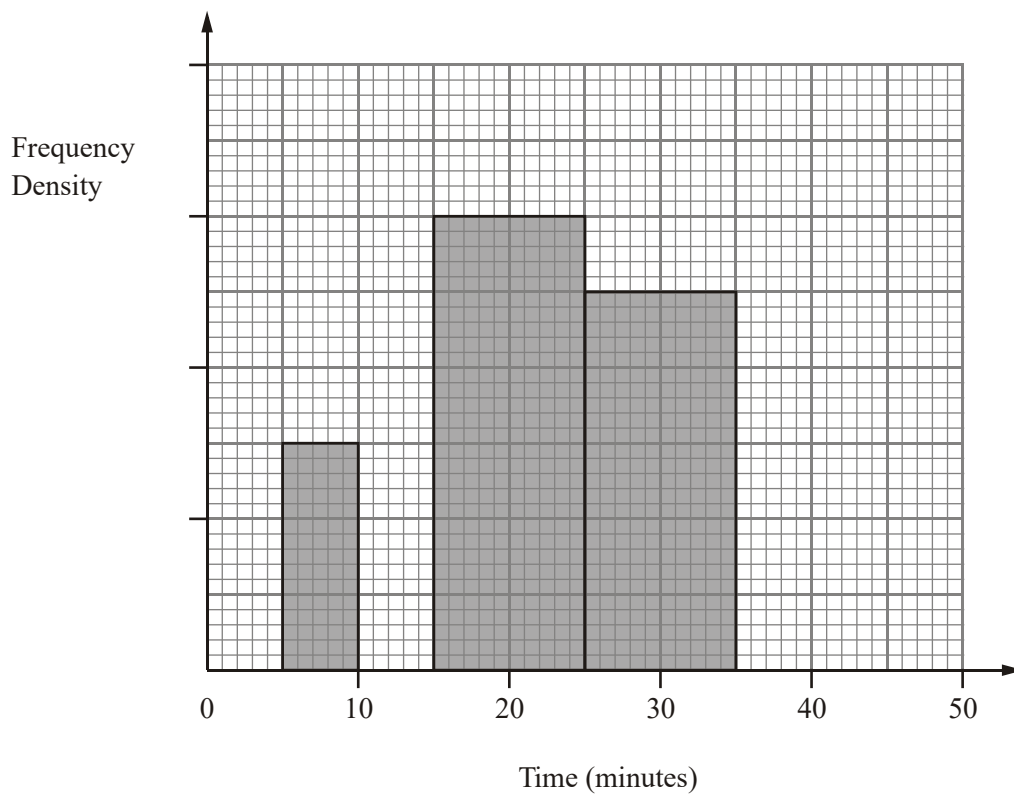
(b) Use the table to complete the histogram.

(1)

(Total 2 marks)

26. Sam asks some students how long they took to finish their science homework. The table and histogram show some of this information.

Time (minutes)	Frequency
$5 < x \leq 10$	
$10 < x \leq 15$	20
$15 < x \leq 25$	
$25 < x \leq 35$	50
$35 < x \leq 50$	15



(a) Use the information in the histogram to complete the table.

(2)

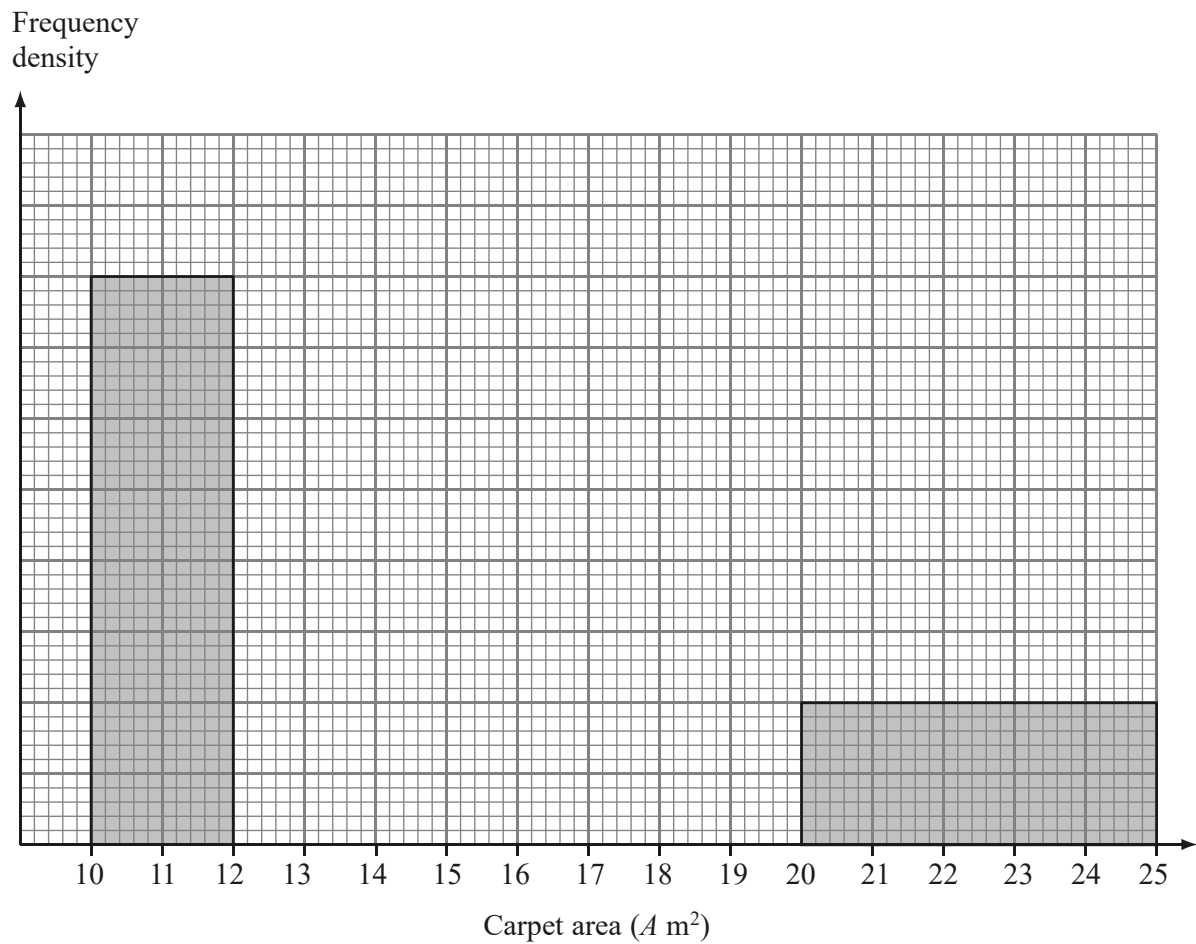
(b) Use the information in the table to complete the histogram.

(2)

(Total 4 marks)

27. The table and histogram show some information about the area of some carpets.

Carpet area ($A \text{ m}^2$)	Frequency
$10 < A \leq 12$	
$12 < A \leq 15$	15
$15 < A \leq 20$	12
$20 < A \leq 25$	10



(a) Use the histogram to complete the table.

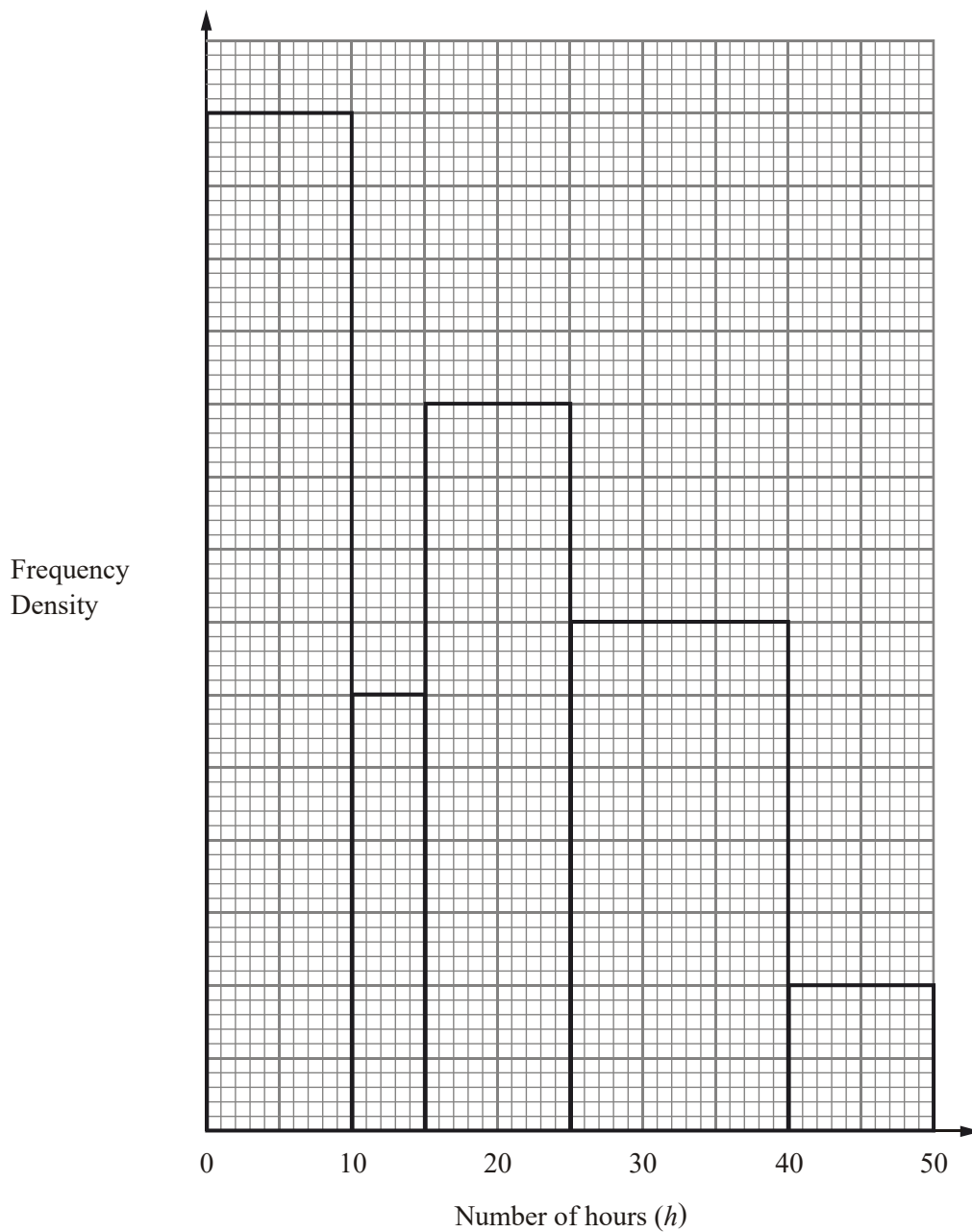
(1)

(b) Use the table to complete the histogram.

(2)

(Total 3 marks)

28. The histogram and table show information about the number of hours some adults used their mobile phones last month.

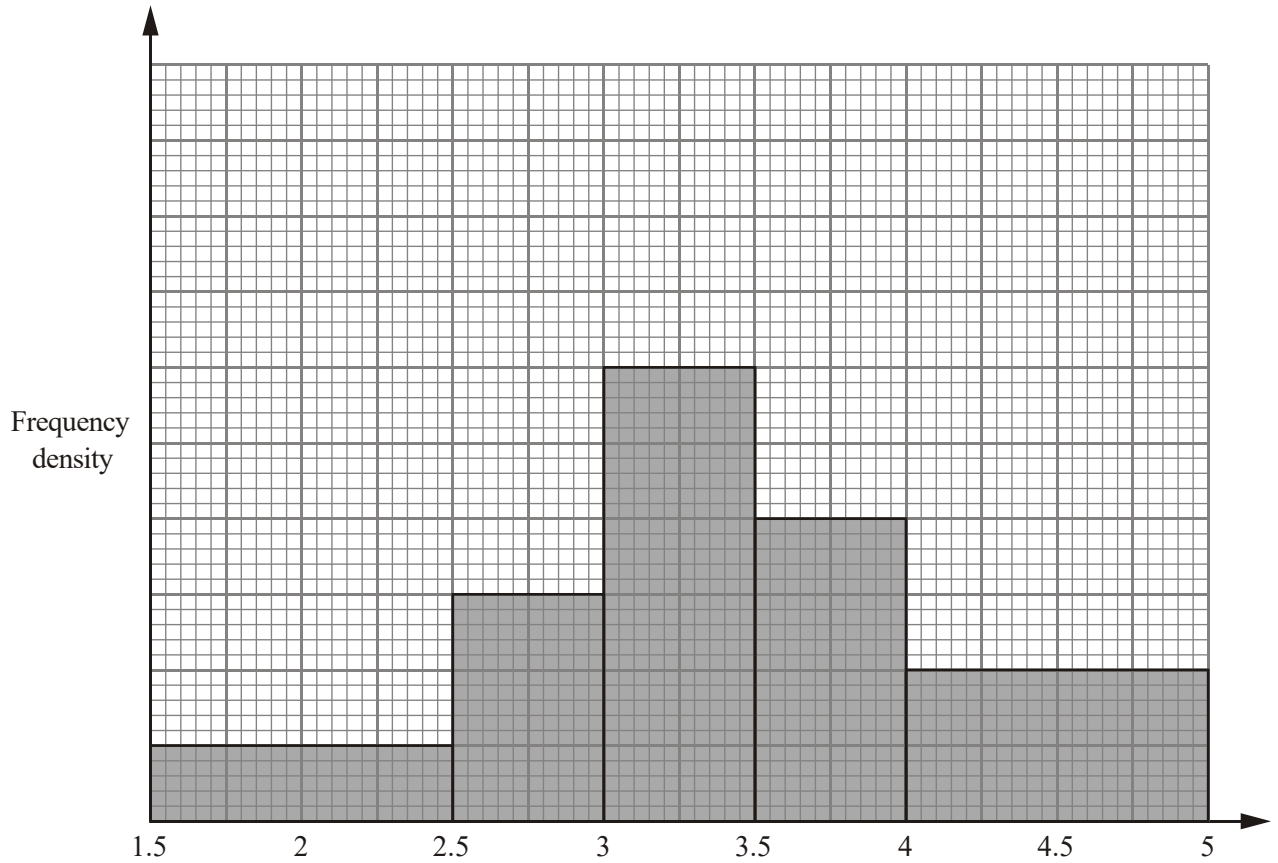


Number of hours (h)	Frequency
$0 \leq h < 10$	
$10 \leq h < 15$	30
$15 \leq h < 25$	
$25 \leq h < 40$	
$40 \leq h < 50$	

Use the information in the histogram to complete the table.

(Total 2 marks)

29. The histogram shows information about the lifetime of some batteries.



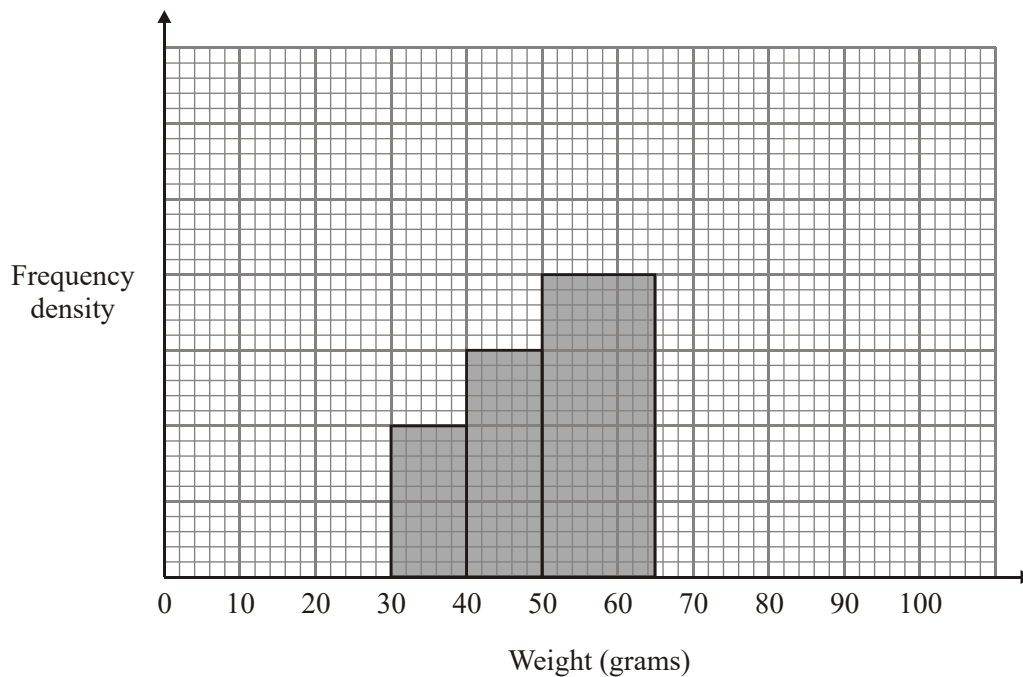
Two of the batteries had a lifetime of between 1.5 and 2.5 years.

Find the total number of batteries.

.....
(Total 2 marks)

30. The table and histogram show some information about the weights, in grams, of some tomatoes.

Weight (w grams)	Frequency
$30 < w \leq 40$	4
$40 < w \leq 50$	6
$50 < w \leq 65$	15
$65 < w \leq 80$	9
$80 < w \leq 100$	4



Use the table to complete the histogram.

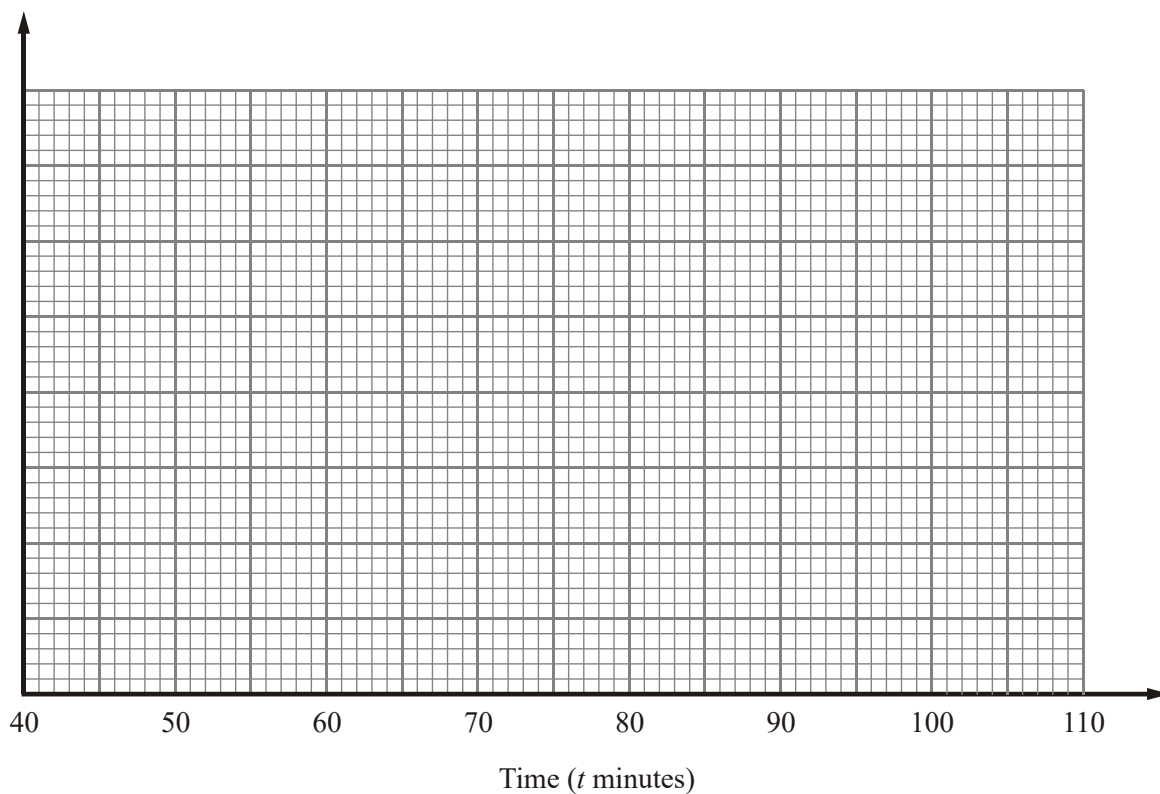
(Total 2 marks)

31. The table gives some information about the lengths of time some boys took to run a race.

Time (t minutes)	Frequency
$40 \leq t < 50$	16
$50 \leq t < 55$	18
$55 \leq t < 65$	32
$65 \leq t < 80$	30
$80 \leq t < 100$	24

Draw a histogram for the information in the table.

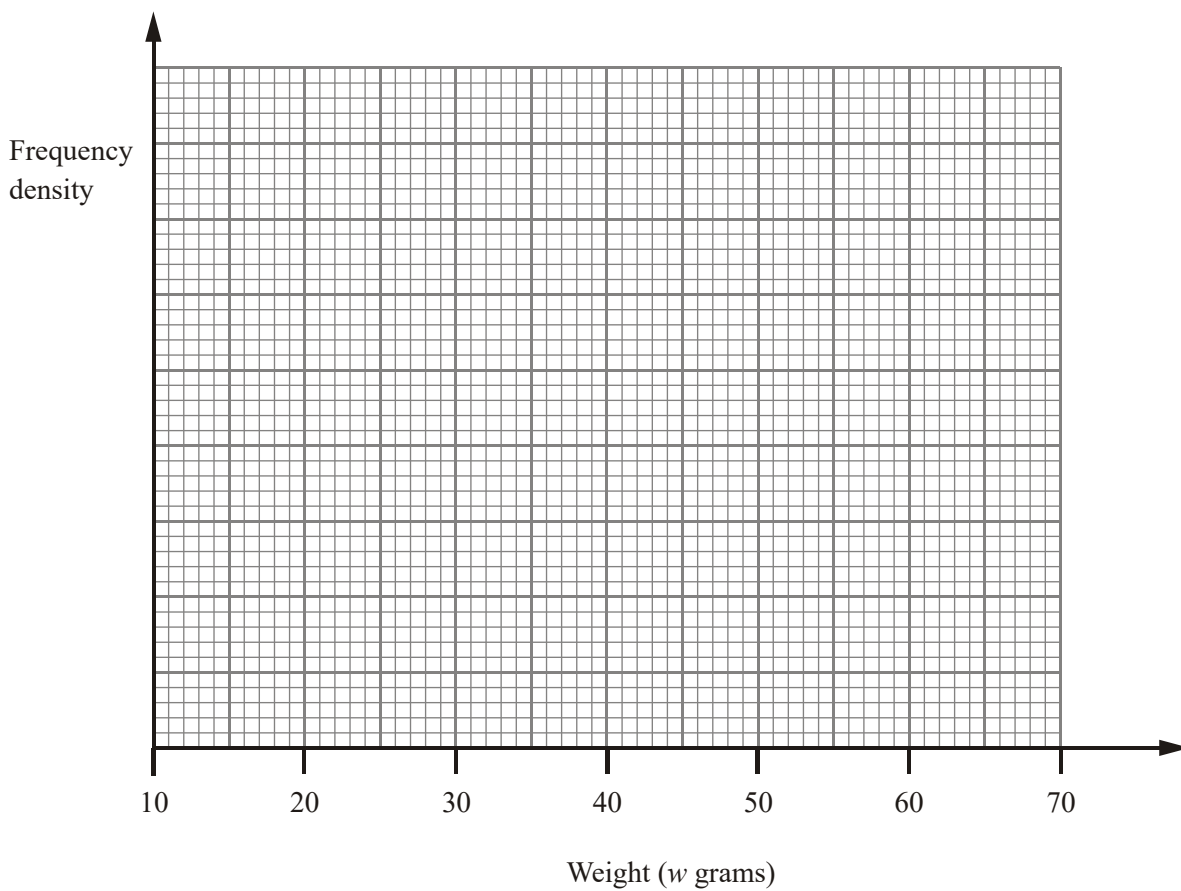
Frequency
density



(Total 3 marks)

32. The table shows some information about the weights of some packets of crisps.

Weight (w grams)	Frequency
$20 < w \leq 25$	4
$25 < w \leq 35$	12
$35 < w \leq 45$	14
$45 < w \leq 50$	8
$50 < w \leq 70$	6



Use the information in the table to draw a histogram.

(Total 3 marks)

01. (a) 60
40

2

Bl cao
Bl cao

- (b) correct bars 2
- B1 for $30 < x \leq 40$ with an area of $2\frac{1}{2}$ squares*
B1 for $40 < x \leq 70$ with an area of 3 squares
 SC: $\frac{0}{4}$ give M1 if clearly using area or frequency density

[4]

02. (a) Frequency densities of $8 \div 10 = 0.8$
 $16 \div 10 = 1.6$, $15 \div 5 = 3$, $12 \div 5 = 2.4$
 $6 \div 20 = 0.3$ 3
- B1 + B1 + B1 for each correct column shown on histogram*
If B0, then M1 for clear attempt to use frequency density or area

- (b) 18, 14, 10, 8 2
- $1.8 \times 10 = 18$, $2.8 \times 5 = 14$, $2 \times 5 = 10$, $0.4 \times 20 = 8$
- B2 all correct
 B1 2 or 3 correct
 5
 $\square 5 =$
 $\frac{25}{80} = 2.5$ birds

[5]

03. Reading top to bottom frequencies are 20; 18; 45; 52 2
- B2 all correct*
(B1 for one frequency correct)

[2]

04. (a) 40, 60, 56, 32 2
- B2 for all frequencies correct*
(B1 for any 1 frequency correct)
- (b) 3
- B1 for Frequency density label or appropriate units*
B2 for 4 correct histogram bars $\pm \frac{1}{2}$ sq
(B1 for 2 bars correct)

[5]

05. (a) $38 \times 5, 36 \times 17.5, 30 \times 32.5, 46 \times 50$
 (= 190, 630, 975, 2300)
 $\Sigma fx = 190 + 630 + 975 + 2300 = 4095$
 Mean $\Sigma fx / \Sigma f = 4095/150$
 27.3 4
- M1 for fx with x within intervals (including ends) at least two consistently*
M1 (dep) for fx consistently using midpoints
M1 (dep on 1st M) for use of $\Sigma fx / \Sigma f$
A1 for 27.3 cao
- (b) Frequency density (number of pictures per cm^2)
 e.g.
 Width 0 to 10 height of rectangle 3.8(k)
 Width 10 to 25 height of rectangle 2.4(k)
 Width 25 to 40 height of rectangle 2(k)
 Width 40 to 60 height of rectangle 2.3(k)
 Bars with correct heights, widths, label and scaling 3
- B2 for 4 rectangles with correct widths and heights*
(B1 for 3 rectangles with correct widths and heights)
B1 for correct label or key and consistent scaling
(SC if 0/3 award M1 if clearly using area or freq. density)
- [7]
06. (a) Heights 24, 32 2
B1 cao for bar from 15 – 17.5, height 24 \times 2mm squares
B1 cao for bar from 17.5 – 20, height 32 \times 2mm square
- (b) Freqs 40, 20, 15 2
B2 cao for all 3 correct
(B1 for any 1 or 2 correct)

(c) Area up to 12.5 = $220x$
 Area above 21 = $156x$
 Frequency = $\frac{156x}{220x} \times 110$

78

3

*M1 for attempt to find area up to 12.5 **and** area above 21 consistently*

M1 for $\frac{156}{220} \times 110$ or $\frac{6.24}{8.8} \times 110$ or $156 \times \frac{110}{220}$ oe

A1 78 cao

SC: If no marks earned B1 for $2mm^2 = 1$ person oe

[7]

07. (a) 390

2

B1 cao

400

B1 cao

(b) Correct bar

1

B1 for correct bar

[3]

08. (a) 24
= 30

2

B1 24 cao

B1 30 cao

(b) Column $60 \leq w < 75$ at 10

Column $75 \leq w < 95$ at 4

10

= 4

2

B1 10 and correct width (tol $\pm \frac{1}{2}$ small square)

B1 4 and correct width (tol $\frac{1}{2}$ small square)

[4]

09. (a) 8, 6 2
Bl cao
Bl cao
- (b) Bars of ht 4cm, 5cm 2
Bl for height = 4 ± 1 mm
Bl for height = 5 ± 1 mm

[4]

10. (a) Freq = FD × int width = 0.018 × 1000 = 18
 Or = 18 × 1 = 18
 = 0.010 × 2000 = 20 or 10 × 2 = 20
 = 0.006 × 2000 = 12 or 6 × 2 = 12
 OR
 No of small squares = 200 Total freq = 16
 So 1 small square = 16 ÷ 200 = 0.08
 9 × 25 × 0.08 = 18
 10 × 25 × 0.08 = 20
 6 × 25 × 0.08 = 12
 OR 8 cm² = 16 so 1 cm² = 2 etc
 18, 20, 12 2
M1 use of Freq = FD × int width or attempt to find freq of 1 standard square
(or one answer correct)
Al cao: all three
- (b) FD = Freq ÷ int width = 16 ÷ 2000 = 0.008 so 4 sqs up
 4000-6000
 4 cm high
 = 8 ÷ 4000 = 0.002 so 1 sq up
 OR
 16 ÷ 0.08 = 200 200 ÷ 25 = 8 so 4 sqs up
 8 ÷ 0.08 = 100 100 ÷ 25 = 4 so 1 square up
 OR 16 ÷ 2 = 8 so 4 sqs up etc
 8000-12000
 1 cm high 2
Bl 4000-6000; 4 cm high
Bl 8000-12000; 1 cm high
or
if B0, M1 use of Freq = FD × int width or attempt to find freq of 1 standard square

[4]

11. (a) 25
16

2

M1 for correct use of frequency density to find a unit of area (for example $1\text{cm}^2 = 2.5$ or 1 small square = 0.1) or the area of one block.

A1 cao

- (b) Correct black (1 cm high between 40 and 60)
B1 for correct black

1

[3]

12.

F	4	10	24	20	6
Fd	0.8	1	1.6	2	1.2

or

F	4	10	24	20	6
Fd	4	5	8	10	6

Correct histogram

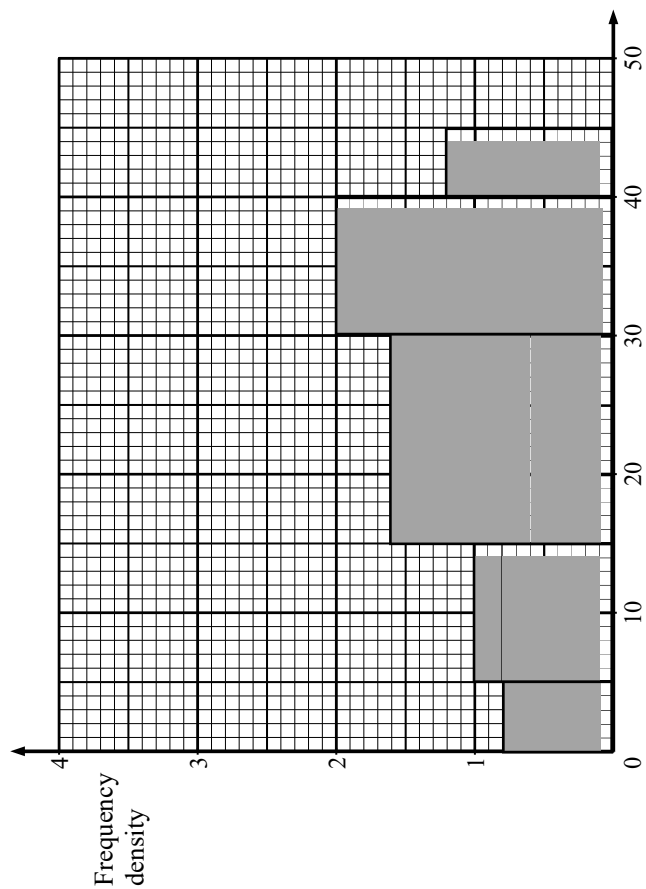
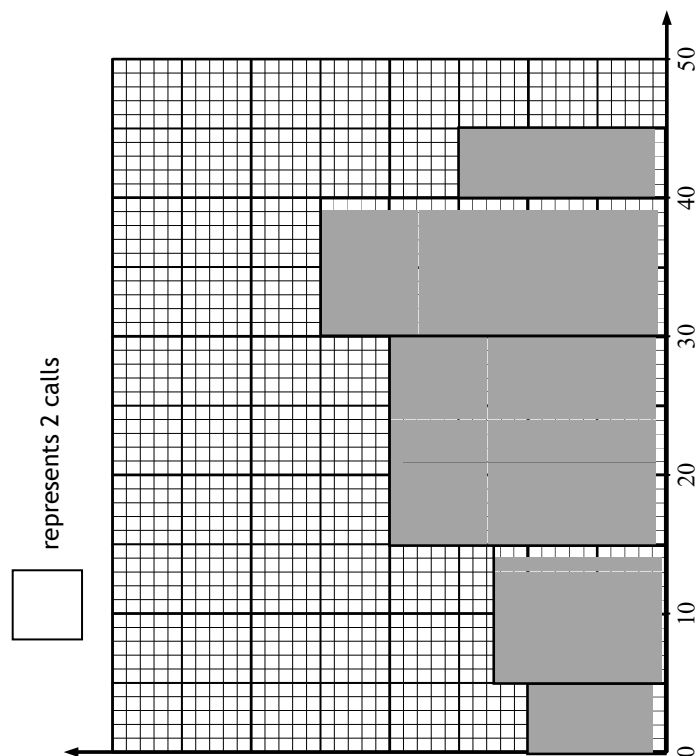
4

M1 use of frequency density as frequency \div width (can be implied by two correct frequency densities or two correct bars with different widths) or area (can be implied by one correct bar) to represent frequency

A2 for all 5 histogram bars correct $\pm 1/2$ square (A1 at least 3 correct histogram bars $\pm 1/2$ square)

A1 for correct label and scale numbered appropriately or for key and consistent scaling

Examples



[4]

13. Correct histogram 3
 Heights in proportion 5 : 20 : 8
B3 for fully correct histogram with axes scaled
OR labelled
(B2: fully correct but one error)
(B1: fully correct but two errors) [3]
14. Heights 1.4, 2.4, 2, 1.5 3
B1 for correct labelling (frequency density)
B1 for at least 2 columns of at least 2 different widths correct
B1 for all columns correct
[SC: If no marks earned then M1 for clear attempt to use frequency density or area] [3]
15. (10), 36, 18, 22, 16 2
B2 for all 4 answers correct
(B1 for any 2 correct answers) [2]
16. (a) bar to 3 1
 Bar 6cm high ... (to 3) in correct place
B1 cao
- (b) 45 1
B1 cao [2]
17. (a) 30 1
 30×1
B1 cao
- (b) 94 2
 $10 \times 2.2 + 45 \times 1.6 = 22 + 72$
M1 for 10×2.2 or 45×1.6
A1 cao [3]

18. bars 1.5, 4, 1 high 3
 $\frac{30}{20}$, $\frac{40}{10}$, $\frac{25}{25}$
B1 for correct labelling (frequency density)
B1 for at least 2 columns correct
B1 for correct all columns correct
SC: If no marks earned then B1 for clear attempt to use frequency density or area
[3]
19. 4, 16, 21, 8 2
B2 for 4 correct
(B1 for 2 or 3 correct)
[2]
20. Column heights of:
 3.5 3 4.4 2.2
 Histogram 3
M1 for use of frequency density
A1 correct width of 3 or 4 bars
A1 fully correct histogram
[3]
21. (20), 90, 50, 40, 20 2
B2 for all 4 correct
(B1 for 2 or 3 correct)
Alternative Scheme
B2 for 9, 5, 4, 2
(B1 for 2 or 3 of 9, 5, 4, 2)
[2]
22. Bars of heights
 3, 4.2, 2, 0.4 3
B3 for all 4 bars fully correct $\pm \frac{1}{2}$ square
(B2 for 3 bars fully correct)
(B1 for 2 bars fully correct)
SC: If no marks scored then B1 for use of frequency density: at least one correct result must be seen
[3]

23. 40, 20, 75, 30, 50 2
B2 for all values correct
(B1 for 2 or 3 correct values) **[2]**
24. (a) Heights 24, 32 2
B1 cao for bar from 15 – 17.5, height 24×2 mm squares
B1 cao for bar from 17.5 – 20, height 32×2 mm square
- (b) Freqs 40, 20, 15 2
B2 cao for all 3 correct
(B1 for any 1 or 2 correct) **[4]**
25. (a) 3 1
B1 cao
- (b) Frequency density of 9 1
B1 cao (4.25 cm high column; allow any line from 4.2 to 4.3 cm high, inclusive). **[2]**
26. (a) 15, 60 2
B2 (B1 for 1 correct)
- (b) $10 - 15 = 4$ high, 2
 $35 - 50 = 1$ high
B2 (B1 for 1 correct) **[4]**

27. (a) 16 1
B1 cao
- (b) Frequency density of 5 2
 (for $12 < A \leq 15$)
 and 2.4 (for $15 < A \leq 20$)
*B2 for a correctly completed histogram
 $\pm \frac{1}{2}$ sq in height
 (numbers are not needed on f.d. axis)
 (B1 for one correct block.
 NOTE: If only $15 < A \leq 20$ block correct, the correct scale must
 be shown on the fd axis.)
 B1 for 5 and 2.4 calculated but not drawn correctly*
 [3]
28. 140, (30), 100, 105, 20 2
*M1 for Frequency = frequency density \times column width, implied
 by one frequency correct or frequency density correctly marked
 on the vertical axis 1 cm = 1 unit
 A1 for all frequencies correct
For area method
 M1 for identifying 1 cm² as a frequency of 5
 A1 for all frequencies correct*
 [2]
29. $2\text{cm}^2 = 1$ battery 2
 20
*M1 for use of frequency density or area
 Sight of $2 \times 1, 6 \times 0.5, 14 \times 0.5, 8 \times 0.5, 4 \times 1$
OR $4 \div 2, 6 \div 2, 14 \div 2, 8 \div 2, 8 \div 2$
OR 2, 3, 7, 4, 4
 (condone 1 error or omission)
 A1 cao*
 [2]
30. frequency densities 2
 0.4, 0.6, 1.0, 0.6, 0.2
 bars 3cm, 1cm high respectively
*M1 for consistent correct use of fd or $1\text{cm}^2 = 2$ (may be implied
 by one correct bar)
 A1 for 2 correct bars*
 [2]

31. $40 \leq t < 50$ fd 1.6
 $50 \leq t < 55$ fd 3.6
 $55 \leq t < 65$ fd 3.2
 $65 \leq t < 80$ fd 2
 $80 \leq t < 100$ fd 1.2

3

B3 for 5 correct histogram bars $\pm \frac{1}{2}$ square AND frequency density numbered appropriately or key and consistent scaling

(B2 for 5 correct histogram bars $\pm \frac{1}{2}$ square

or all heights correct with frequency density numbered appropriately with one error in numbering

or 3 or 4 histogram bars correct AND frequency density numbered appropriately or key and consistent scaling)

(B1 for 4 histogram bars in correct proportion, no numbering

or 2 or more frequency densities correctly

or 2 or more histogram bars in correct proportion with appropriate numbering on the f.d. axis)

[3]

32. Bars at 4cm, 6cm, 7cm, 8 cm and 1.5 cm in height oe with fd axis labeled correctly 3

M1 for dividing frequency by group size or sight of 0.8, 1.2, 1.4, 1.6, 0.3 (minimum 2 seen)

A1 for bars of consistent areas for all given frequencies

B1 for fd axis labeled correctly and consistently

Alternative scheme

B3 for bars at 4cm, 6cm, 7cm, 8 cm and 1.5 cm in height oe with fd axis labeled correctly and consistently (e.g. 1 cm fd 0.2)

[B2 for bars at 4cm, 6cm, 7cm, 8cm and 1.5cm in height oe with no labeling or incorrect labeling on the fd axis OR fully and correctly labeled fd axis with one bar error]

[B1 for 4th bar twice as high as 1st bar]

[B0 for bar chart with unequal bars]

NB apply the same mark-scheme if a different frequency density is used e.g. bars at 1.6 cm, 2.4 cm, 2.8 cm, 3.2 cm, 0.6 cm

[3]

01. Many candidates gained full marks for this question. All but the very weakest generally drew the first bar correctly. The common wrong values in the table were 40 and 80.

02. The improvement in the success with which candidates answer questions such as this has been maintained. Many candidates had a clear idea of the concept of frequency density and were able to relate the diagram to the table in both parts.

- 03.** This histogram question was answered well with even many below grade A gaining at least one of the two marks. Candidates whose only error was to make an arithmetical slip in calculating “ 3.6×5 ” displayed poor examination technique as they failed to make use of the total “135” given in the table.
- 04.** The performance in this very straightforward histogram question was very disappointing. Only 25% of candidates could correctly calculate the area of the bars and so the frequencies in part (a) and in part (b) only 20% of candidates gained all the marks. Frequently the vertical axis was left with no label even though an example was given in part (a).
- 05.** Many candidates were able to use a value from within each class interval to calculate $\sum fx$, but multiplications and additions were often careless. Some were confused about the midpoints 17.5 and 32.5 and these were often rounded to an integer. Having calculated $\sum fx$ correctly, some went on to divide by 4, whilst others divided by the sum of the midpoints. In part (b), a significant proportion of candidates did not know how to draw a histogram. This was usually given as a bar chart or frequency polygon. A large number of candidates did not gain the mark for labelling the vertical axis or giving a key.
- 06.** Candidates were much more successful at completing the table in part (b) than they were at completing the histogram in part (a).
Common errors in part (a) were to have the bars the wrong way round, or just to have a single bar across the width.
About half the candidates were able to get full marks in part (b). Some common errors in the table were 40, 20, 30 or 80, 40, 10 or 32, 16, 12.
Only the best candidates were able to do part (c). The majority did not attempt to compare the two areas, typically working only with area up to 12.5. Some candidates were able to gain credit for identifying One person = One 2 mm square
- 07.** An increasing number of candidates are showing that they are able to work with frequency density. In part (a), many were able to complete the table correctly, but a common incorrect answer for the interval $500 < d \mid 1000$ was 4000. Part (b) was generally less successful than part (a), as some candidates reverted to a bar chart approach for the height of the bar.
- 08.** There were many good answers to this question. It was straightforward for those candidates that had an understanding of frequency density or of the fact that it is the area under the bars that determines the frequency.

09. Only the best candidates were able to achieve full marks for this question. Many did not appreciate that they were dealing with a histogram rather than a bar chart, and consequently related the height of each bar to the frequency and visa versa.

In part (a), most candidates were able to write down the frequency 8, but many gave 3 as the frequency for the final interval. In part (b), most candidates were able to score a mark for drawing the second bar with height 5, but many drew the first bar with height 8.

10. Many candidates were well prepared for this histogram question and were able to score full marks. Both frequency density methods and area methods were in evidence, but often there was little sign of any working. Some otherwise competent candidates lost a mark on part (b) by drawing their rectangle to the right hand end of the given axis.
11. The great majority of candidates treated the histogram as a simple bar chart, equating frequencies to the height of each bar. 12.5 and 4 in part (a) and a 'bar' at height 2 cm in part (b) were therefore the most common answers seen. Very few candidates showed any understanding of frequency density. Those who did clearly understand what was required often found the correct frequency of 25 in (a) but then gave an answer of 15 in part (ii) as some candidates read the scale at 0.75 instead of 0.8
12. This question was very poorly attempted with many candidates displaying a lack of understanding of histograms. The majority used the given frequencies to draw bars of different widths and some drew frequency polygons. Very few candidates gained full marks.
- Candidates who showed understanding of frequency density often made mistakes carrying out the divisions involved. Some wrote down no calculations at all and went straight to drawing the histogram, often with errors. The final bar was frequently drawn with an incorrect width. Even when correct histograms were seen the candidates often failed to gain full marks because they did not label the vertical axis or provide a key. Some candidates used frequency \times class width as frequency density.
13. It was clear that this topic had not been covered by some centres. Of those candidates who understood how to draw a histogram, a number clearly struggled to evaluate $24 \div 15$ without a calculator. The majority of candidates used the frequencies given for the heights of their bars.
14. Generally well answered but there were still a number of candidates who used the frequency as the heights of the columns. A number of candidates failed to label the y axis.

15. This was mostly answered well. Candidates who had a clear understanding of histograms generally gave the four correct answers. Most weaker candidates just wrote down the heights of the bars.
16. This question was answered correctly by about 75% of the candidates.
17. A significant number of candidates just looked at the height of the bars and gave these as incorrect answers. The majority of candidates were able to appreciate the fact that the given diagram was a histogram.
18. Just over 45% of candidates were able to gain some marks for drawing a histogram. Of those 55% of candidates who failed to gain any marks in this question, the vast majority simply drew a bar chart using the frequency as the height of the bars rather than taking frequency density and area into consideration. Some candidates multiplied the frequency. Those candidates who knew to divide the frequency by the class width generally went on to score some marks. The most common error was the omission of labelling the vertical axis. In otherwise correct work $25 \div 25$ evaluated as 0 led to the final time interval being omitted.
19. Just under 50% of candidates were unable to gain any marks on this question. The most common error was to read the heights of the bars from the y axis and not to take the area of the histogram into account. Of those candidates who understood the concept of frequency density the majority scored full marks; just over a third of all candidates.
20. Many correct histograms were seen. Candidates should, however, be advised to show their division and write down the proposed heights of their bars before drawing the histogram. Some evidence of poor arithmetic was seen. The most common error was to give $11 \div 5$ as 2.1 rather than 2.2. A small minority of candidates drew the final bar with a width of 15 rather than 5 and so failed to gain full credit.
21. This question was well answered with approximately 70% of candidates scoring full marks. Once again, there was evidence of poor arithmetic with 30×3 being evaluated as 60 being the most common error.

22. A fully correct histogram was drawn by approximately 30% of candidates. The most common error was to evaluate the height of the final bar incorrectly. Many candidates were unable to deal with the division of $6 \div 15$. This calculation was generally done correctly by those candidates who wrote it down as a fraction. Many candidates calculated $15 \div 6$ and obtained the commonly seen incorrect height of 2.5
23. Approximately 70% of candidates were able to give all the correct frequencies. The most common error was for candidates to read off the y axis as they would for a bar chart.
24. Approximately 35% of candidates were able to complete the histogram correctly while just over 50% of candidates were able to complete the table correctly.
25. This was not well answered. Candidates who knew something about frequency density were able to obtain the correct missing response in the table, but even fewer were able to draw the missing column on the grid.
26. No Report available for this question.
27. It was clear that many candidates were unfamiliar with histograms of unequal width with answers of 40 in part (a) followed by bars of heights 3 cm and 2.4 cm (15 small blocks and 12 small blocks) being extremely common in (b). As the frequency density of the $15 < A \leq 25$ interval was 2.4, the vertical axis had to be numbered correctly if only this bar had the correct height to score any marks. 46% of the candidates were able to provide the correct answer of 16 in part (a) with a similar percentage scoring a mark in (b). 27% scored both marks in (b).
28. Even though this question is regularly tested on these modular tests many candidates failed to recognise the true nature of a histogram and treated it as though the different bar widths were irrelevant. Hence they thought the frequencies related to the height of the bars. As a result answers of : 70 50, 35, 10 were the most commonly seen response in about 50% of cases. 9% of candidates were able relate frequency, class width and frequency density or managed to show the correct frequency density scale and gained 1 mark. Fully correct solutions were seen in 41% of cases

29. More able candidates with a good understanding of histograms found this question straightforward. Over 40% of candidates were awarded full marks. However many candidates cited “34” as their answer suggesting that they had used the height of the bars as proportional to the frequencies. Incorrect answers of 17, and 7 (from adding how many 2 block bar widths there were), were also often seen.
30. More than half the candidates were able to score at least 1 mark for this question. The most popular approach was to do a calculation of the frequency densities, e.g. $4/10 = 0.4$, etc and then to write down an appropriate scaling on the vertical axis. A common error here was to use frequencies on the vertical axis. Examiners reported that it was sometimes difficult to see the bars in students’ responses. Candidates should be advised to draw bold lines in their diagrams.
31. 57% of the candidates scored no marks on this question, generally for drawing a histogram with heights 16, 18, 32, 30 and 24, clearly having no understanding of a histogram with bars of unequal width. Those that did often correctly calculated some of the frequency density values. Many of those that did know what they were doing tended to not number the Frequency Density axis whilst others made errors in the proportion of the bars by starting their numbering at 0.5 or 1 rather than 0 losing a mark. Quite a few candidates did everything correctly but extended the last bar to 110. Many who constructed the histogram accurately using “blocks” then failed to show a key. Nearly a quarter of the candidates scored all 3 available marks.
32. Candidates did not perform very well on this histogram question. Only 31% of candidates scored all 3 marks for a fully correct histogram with correctly labelled and scaled frequency density axis. For this question they needed to work out the frequency density for each of the groups and then draw appropriate bars. Many candidates (about 40%) drew a bar chart and they received no marks. Marks for partial success were awarded to those candidates that could work out the frequency density or who could draw bars of correct the height but omitted the scaling on the frequency density axis. Insufficient heed was paid to the x-axis values with some candidates extending the first and last bars to cover values outside of the ranges given. There was a disappointing tendency for candidates to simply multiply or divide various values given, finding mid points etc, indicating that they were trying to apply poorly remembered rules rather than demonstrating understanding.