Write your name here

| Surname | Other names |
|---|---|
| | |

**In the style of:**

**Edexcel GCSE**

| Centre Number | Candidate Number |
|---|---|
| | |

# Mathematics A

## Histograms

**Higher Tier**

Past Paper Style Questions
Arranged by Topic

Paper Reference
**1MA0/2H**

**You must have:** Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser, calculator. Tracing paper may be used.

Total Marks

### Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
  – *there may be more space than you need.*
- **Calculators may be used.**

### Information

- The total mark for this paper is 100
- The marks for **each** question are shown in brackets
  – *use this as a guide as to how much time to spend on each question.*
- Questions labelled with an **asterisk** (*) are ones where the quality of your written communication will be assessed.

### Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

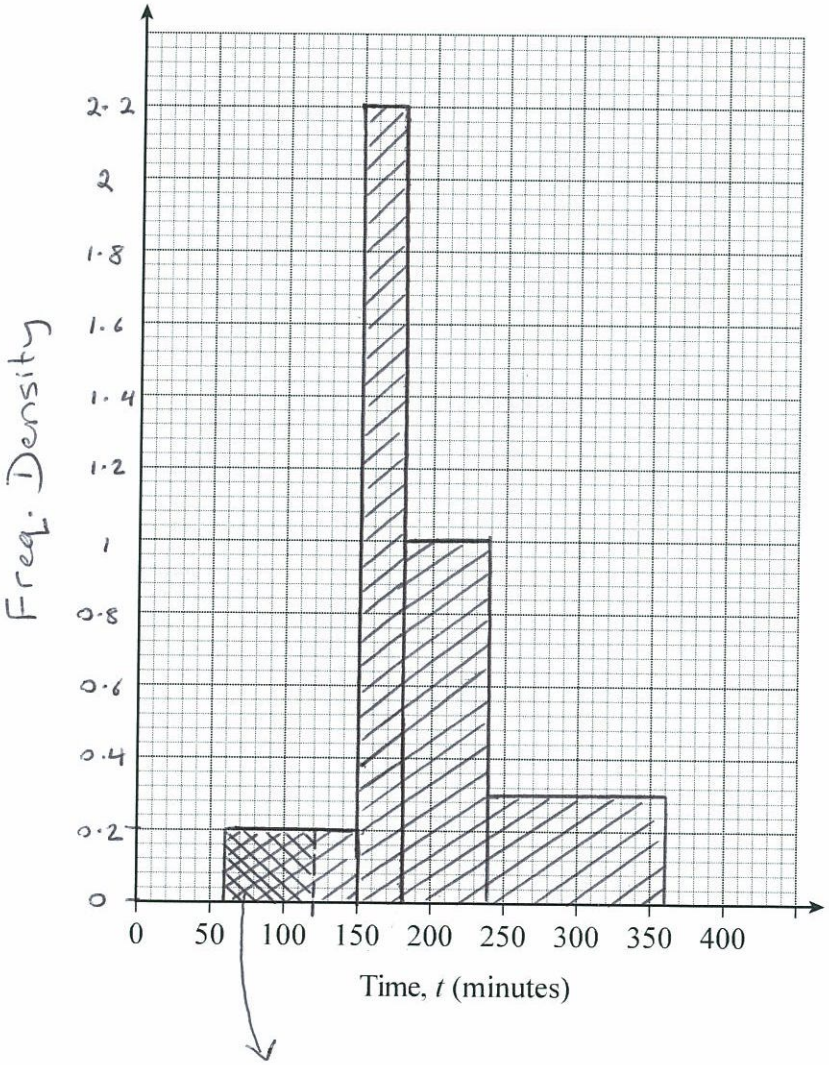
*Turn over* ▶



**1.** The table shows information about the length of time that 180 people spend gardening.

| Time, $t$ (minutes) | Frequency | Freq. Density = $\frac{\text{Freq.}}{\text{Class Width}}$ |
|---|---|---|
| $60 < t \leqslant 150$ | 18 | 0.2 |
| $150 < t \leqslant 180$ | 66 | 2.2 |
| $180 < t \leqslant 240$ | 60 | 1 |
| $240 < t \leqslant 360$ | 36 | 0.3 |

**(a)** Draw a suitable frequency diagram for the data.




Area of 60-120min section of bar = $0.2 \times 60 = 12$

**(3)**

**(b)** Calculate an estimate of the average length of time for those people who are gardening for over three hours.

$$\text{Mean estimate} = \frac{\Sigma(m \times f)}{\Sigma f} = \frac{(210 \times 60) + (300 \times 36)}{60 + 36}$$

$$= \frac{23,400}{96} = 243.75 \text{ mins}$$

243.75 minutes

**(2)**

**(c)** Two people are chosen at random from the 180 people.

Estimate the probability that both are gardening for less than two hours.

Estimate for Frequency of people gardening for less than 120 minutes is given by the area of the portion of the histogram bar indicated, namely $0.2 \times 60 = 12$.

$$P(< 120 \text{ mins AND } < 120 \text{ mins})$$

$$= \frac{12}{180} \times \frac{11}{179} = \frac{132}{32,220}$$

$$= \frac{11}{2685}$$

$\frac{11}{2685}$

**(3)**

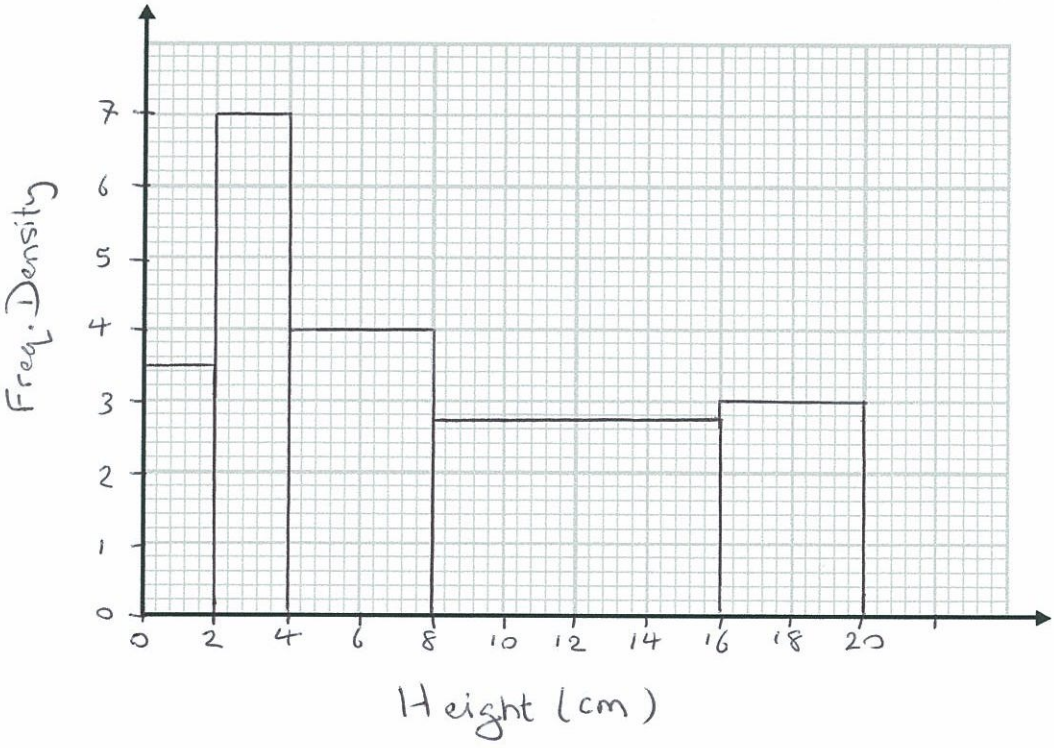


**(Total 8 marks)**

**2.** The table gives information about the heights, $h$ centimetres, of plants in a greenhouse.

| **Height ($h$ centimetres)** | **Frequency** | F.D |
|---|---|---|
| $0 < h \leqslant 2$ | 7 | 3.5 |
| $2 < h \leqslant 4$ | 14 | 7 |
| $4 < h \leqslant 8$ | 16 | 4 |
| $8 < h \leqslant 16$ | 22 | 2.75 |
| $16 < h \leqslant 20$ | 12 | 3 |

Draw a histogram to show this information.



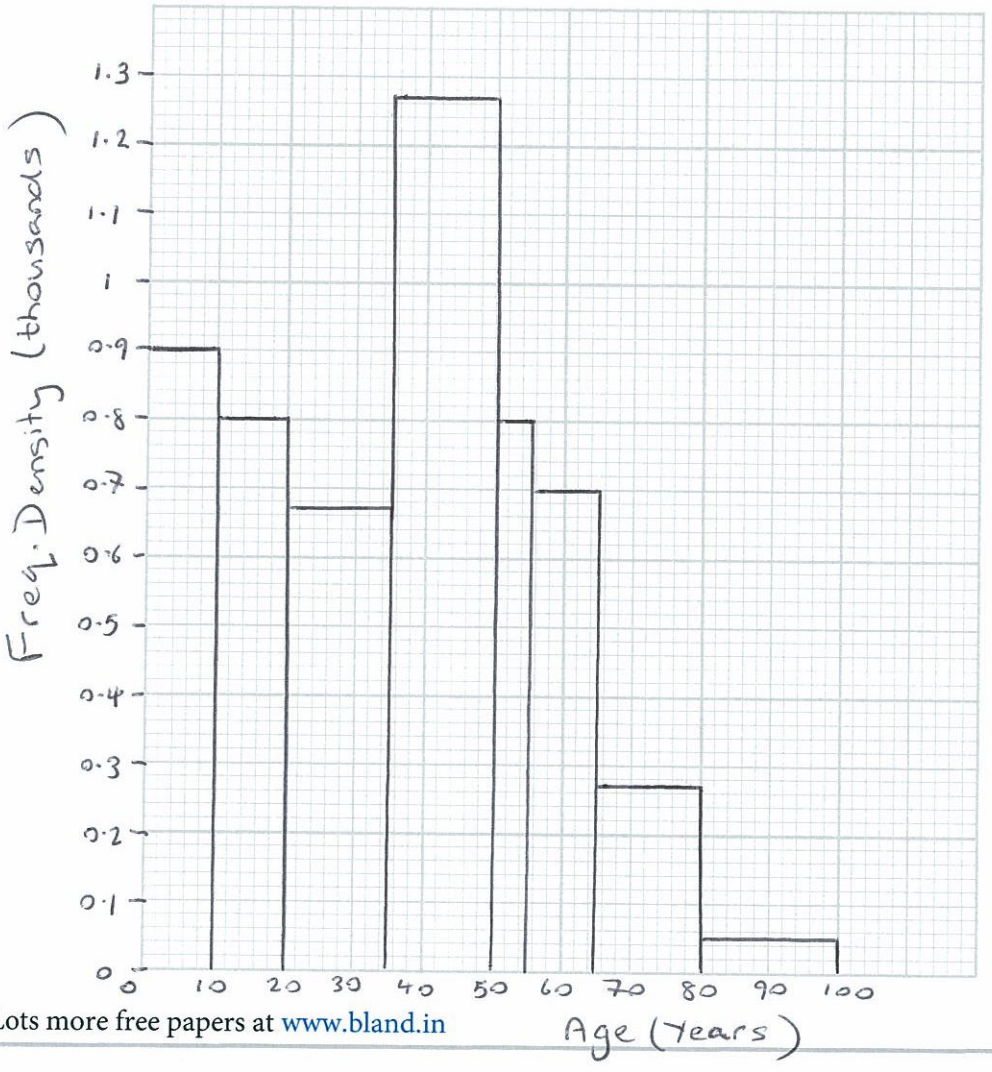

**(Total 3 marks)**

**3.** The table gives information about the ages of the population of a city.

| Age ($a$ years) | Number (thousands) | F.D (thousands) |
|---|---|---|
| $0 \leqslant a < 10$ | 9 | 0.9 |
| $10 \leqslant a < 20$ | 8 | 0.8 |
| $20 \leqslant a < 35$ | 10 | 0.67 (2d.p.) |
| $35 \leqslant a < 50$ | 19 | 1.27 (2d.p.) |
| $50 \leqslant a < 55$ | 4 | 0.8 |
| $55 \leqslant a < 65$ | 7 | 0.7 |
| $65 \leqslant a < 80$ | 4 | 0.27 (2d.p.) |
| $80 \leqslant a < 100$ | 1 | 0.05 |

(a) On the graph paper below, using a scale of 1 cm to represent 10 years on the Age axis, draw a histogram to represent this information.

**(4)**



(b) Write down the class interval in which the median lies. $35 \leq a < 50$

**(1)**

(c) Calculate, giving your answer in years and months, an estimate of the mean age of the population.

**(4)**

$$\frac{\Sigma (m \times f)}{\Sigma f} = \frac{1000\,(9(5) + 8(15) + 10(27.5) + 17(42.5) + 4(52.5) + 7(60) + 4(72.5) + 1(90))}{1000\,(62)}$$

$$= \frac{2257.5}{62} = 36.41 \text{ yrs (2d.p.)}.$$

or 36 years and 5 months (to the nearest month).

N.B: $\left(\frac{2257.5}{62} - 36\right) \times 12 = 4.94$ or 5 months rounded to nearest month).

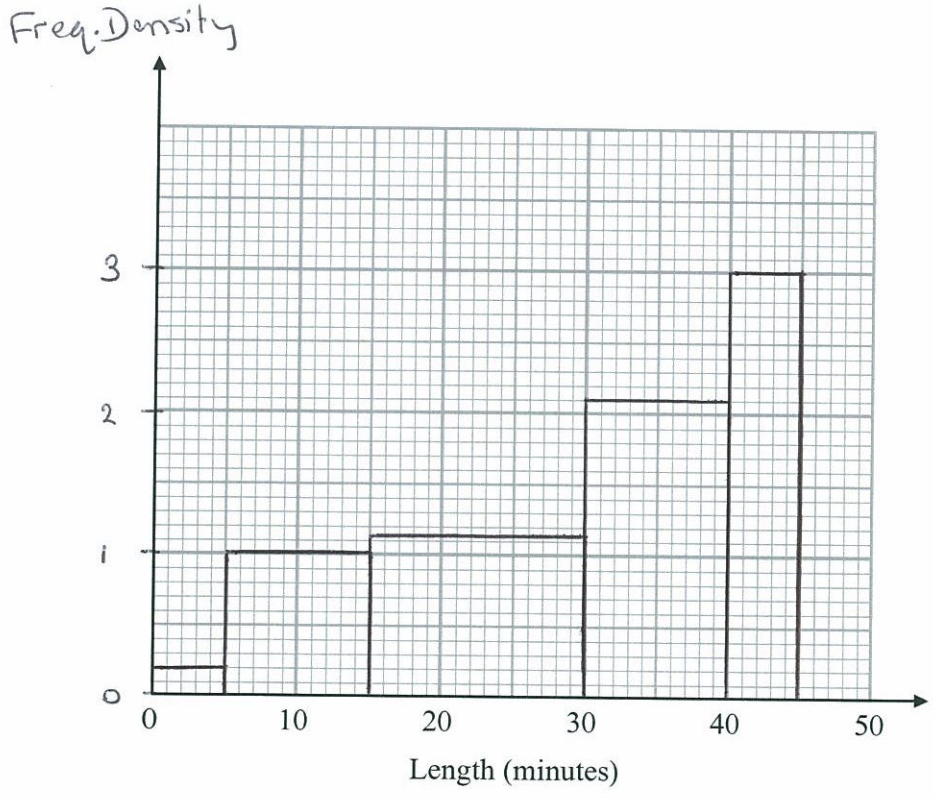


**(Total 9 marks)**

**4.** A pub has 64 customers one evening.
The table gives information about the lengths, in minutes, of the time the customers stayed for.

| Length ($x$) minutes | Frequency | F.D. |
|---|---|---|
| $0 < x \leqslant 5$ | 1 | 0.2 |
| $5 < x \leqslant 15$ | 10 | 1 |
| $15 < x \leqslant 30$ | 17 | 1.13 |
| $30 < x \leqslant 40$ | 21 | 2.1 |
| $40 < x \leqslant 45$ | 15 | 3 |

Draw a histogram for this information.




**(Total 4 marks)**

**5.** The incomplete histogram and table show information about the weights of some vehicles.

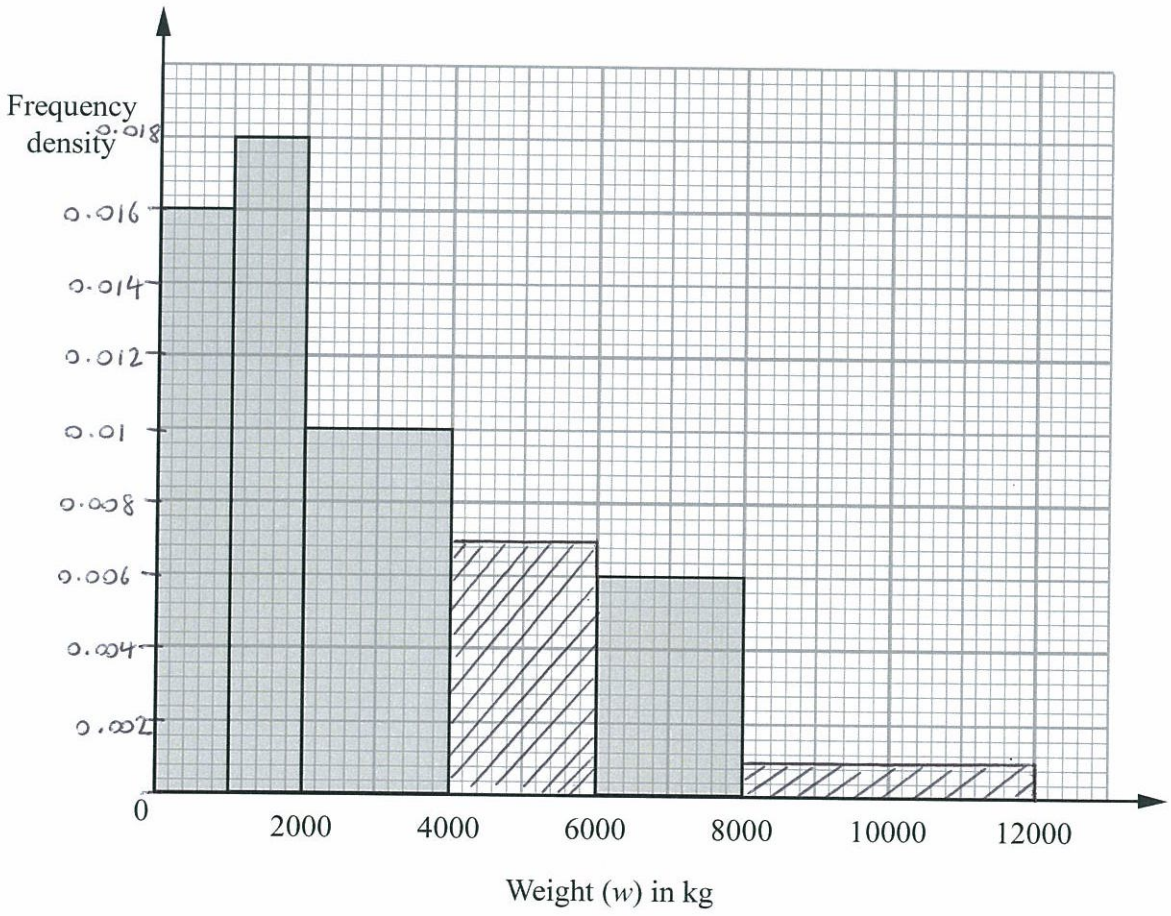
| Weight ($w$) in kg | Frequency | F.D. |
|---|---|---|
| $0 < w \leqslant 1000$ | 16 | 0.016 |
| $1000 < w \leqslant 2000$ | 18 | 0.018 |
| $2000 < w \leqslant 4000$ | 20 | 0.01 |
| $4000 < w \leqslant 6000$ | 14 | 0.007 |
| $6000 < w \leqslant 8000$ | 12 | 0.006 |
| $8000 < w \leqslant 12000$ | 4 | 0.001 |

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

N.B: $F.D = \frac{F}{CW} \Rightarrow F = F.D \times C.W.$ (i.e. area of bars). **(2)**

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

**(2)**




**(Total 4 marks)**

**6.** One hundred hikers went for a walk. The times taken by the hikers to complete the walk are summarised in the table.

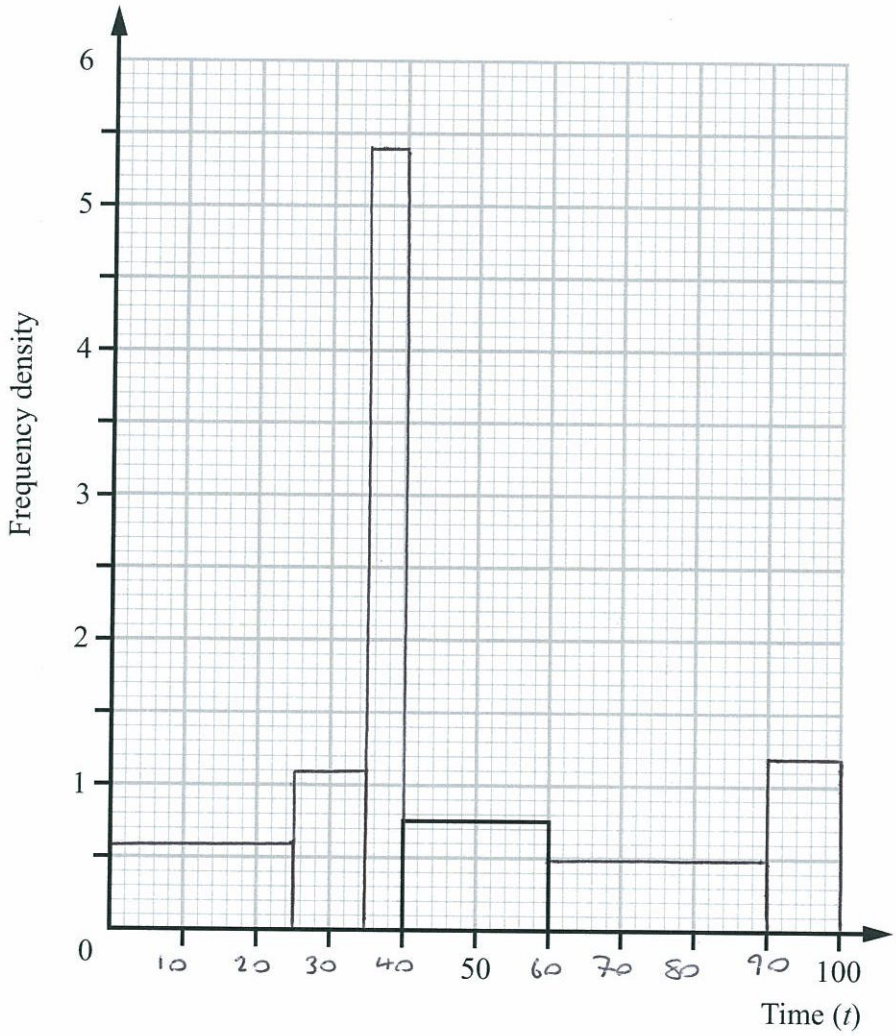
| Time ($t$) | Number of hikers | m x f | F.D. |
|---|---|---|---|
| $0 \leqslant t < 25$ | 15 | 187.5 | 0.6 |
| $25 \leqslant t < 35$ | 11 | 330 | 1.1 |
| $35 \leqslant t < 40$ | 27 | 1012.5 | 5.4 |
| $40 \leqslant t < 60$ | 15 | 750 | 0.75 |
| $60 \leqslant t < 90$ | 15 | 1125 | 0.5 |
| $90 \leqslant t < 100$ | 12 | 1140 | 1.2 |

(a) Use the information given in the table to calculate an estimate for the mean time taken, to one decimal place.

$\frac{\Sigma(m \times f)}{\Sigma f} = \frac{4545}{95} = 47.8$ mins (1 d.p.).

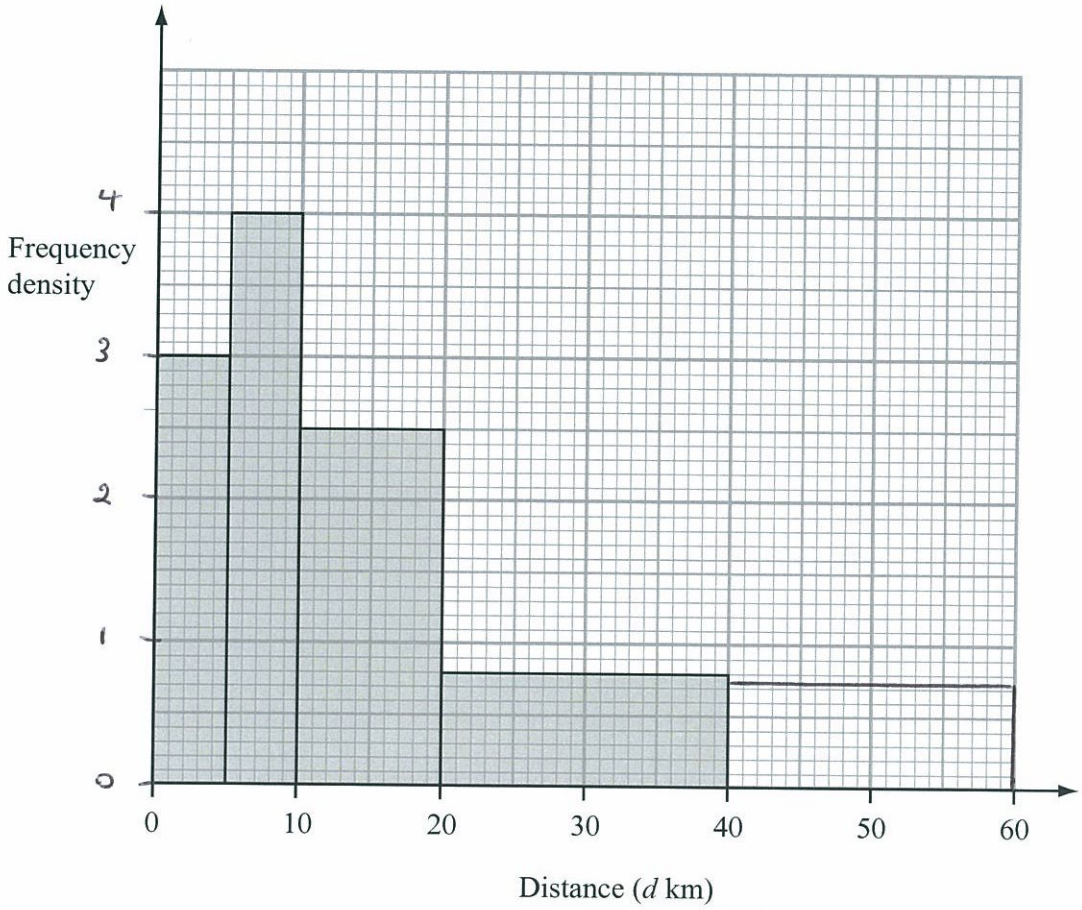
**(3)**

(b) Given that the frequency density for the $40 \leqslant t < 60$ time interval is 0.75, complete the histogram to represent this information on the graph paper.




**(4)**

7. The incomplete histogram and table give some information about the distances some cyclists travel each day.




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

| Distance ($d$ km) | Frequency | F.D. |
|---|---|---|
| $0 < d \leqslant 5$ | 15 | 3 |
| $5 < d \leqslant 10$ | 20 | 4 |
| $10 < d \leqslant 20$ | 25 | 2.5 |
| $20 < d \leqslant 40$ | 16 | 0.8 |
| $40 < d \leqslant 60$ | 15 | 0.75 |

**(2)**

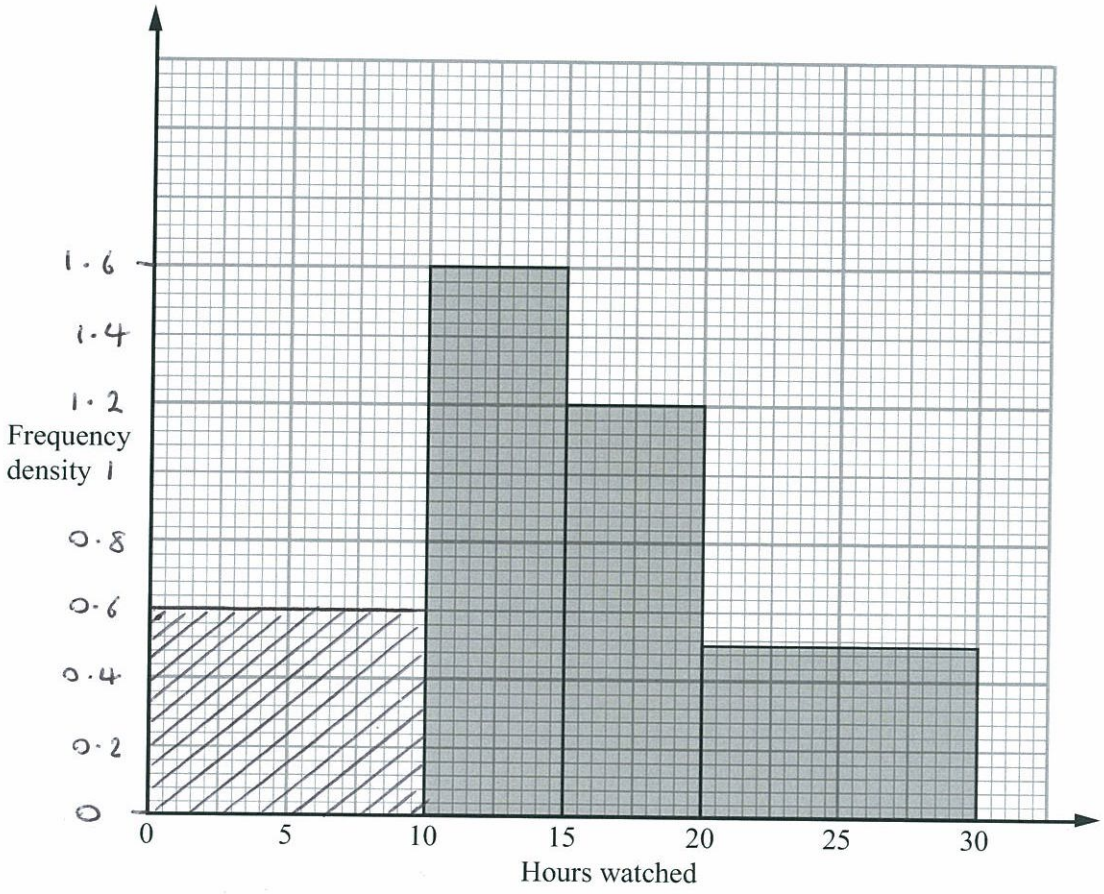
(b) Use the information in the table to complete the histogram.

**(1)**

**(Total 3 marks)**

**8.** Terry asked the students in his class how many hours they played on computers last week.

The incomplete histogram was drawn using his results.




Eight students played for between 10 and 15 hours. Six students played for between 0 and 10 hours.

(a) Use this information to complete the histogram.

$F.D._{10-15} = \frac{8}{5} = 1.6$ $F.D._{0-10} = \frac{6}{10} = 0.6$

**(2)**

No students watched television for more than 30 hours.

(b) Work out how many students Terry asked.

$6 + 8 + 1.2(5) + 0.5(10)$

$= 25$

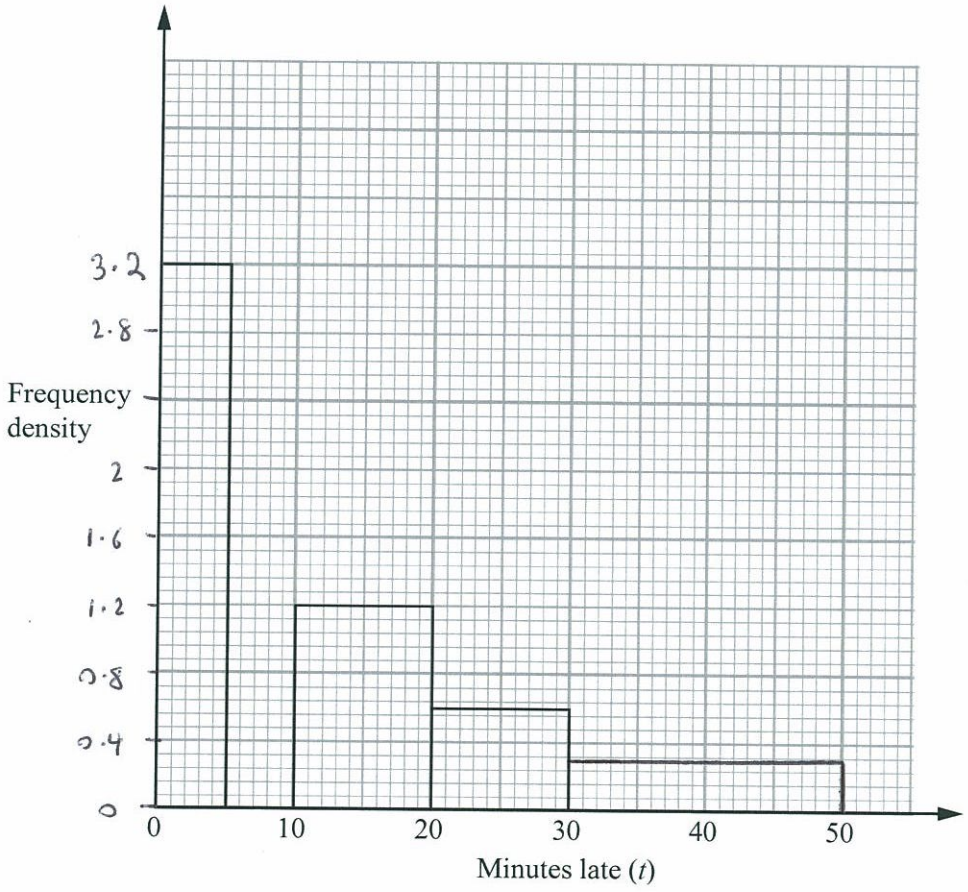
25

**(2)**

**(Total 4 marks)**

**9.** Some trains from London to Birmingham were late.
The incomplete table and histogram gives some information about how late the trains were.

| Minutes late ($t$) | Frequency | F.D. |
|---|---|---|
| $0 < t \leqslant 5$ | 16 | 3.2 |
| $5 < t \leqslant 10$ | 10 | 2 |
| $10 < t \leqslant 20$ | 12 | 1.2 |
| $20 < t \leqslant 30$ | 6 | 0.6 |
| $30 < t \leqslant 50$ | 6 | 0.3 |




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

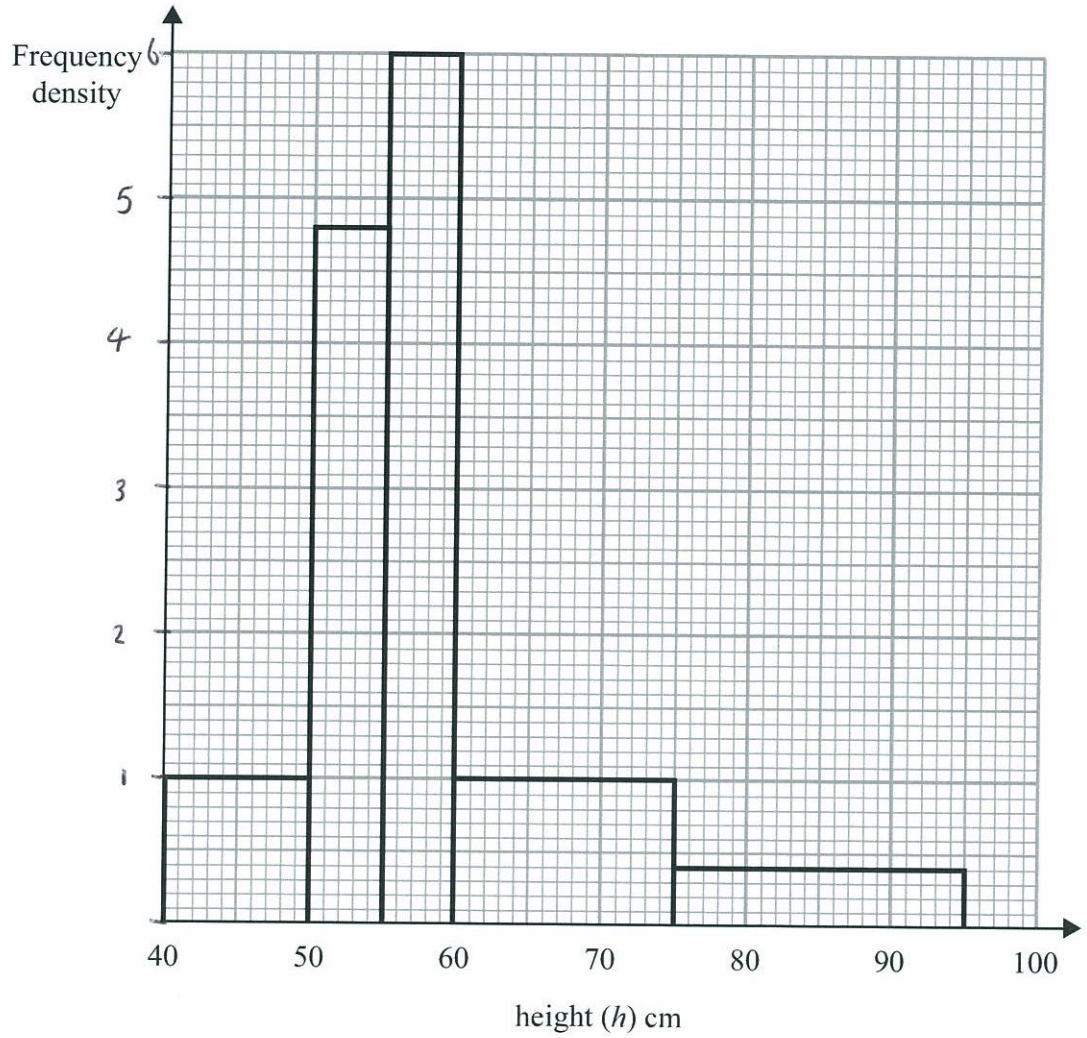
**(2)**

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

**(2)**

**(Total 4 marks)**

**10.** The incomplete table and histogram give some information about the heights of some tomato plants in a greenhouse.



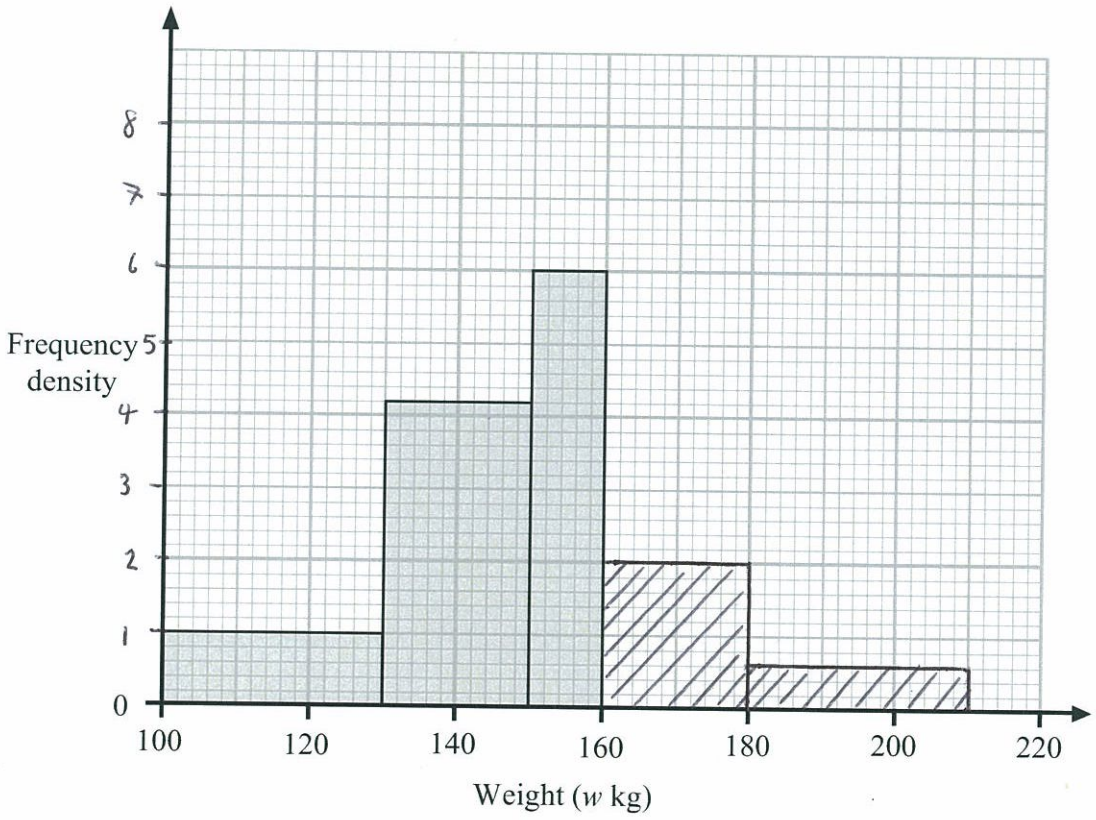

Use the information in the histogram to complete the frequency table.

| Height ($h$) cm | Frequency | F.D. |
|---|---|---|
| $40 \leqslant h < 50$ | 10 | 1 |
| $50 \leqslant h < 55$ | 24 | 4.8 |
| $55 \leqslant h < 60$ | 30 | 6 |
| $60 \leqslant h < 75$ | 15 | 1 |
| $75 \leqslant h < 95$ | 8 | 0.4 |

**(Total 2 marks)**

**11.** The incomplete table and histogram give some information about the weights (in kg) of some boxes.

| Weight ($w$ kg) | Frequency | F.D. |
|---|---|---|
| $100 < w \leqslant 130$ | 30 | 1 |
| $130 < w \leqslant 150$ | 84 | 4·2 |
| $150 < w \leqslant 160$ | 60 | 6 |
| $160 < w \leqslant 180$ | 40 | 2 |
| $180 < w \leqslant 210$ | 18 | 0·6 |




(a) Use the histogram to complete the table.

**(2)**

(b) Use the table to complete the histogram.

**(2)**

**(Total 4 marks)**

**12.** The table and histogram show information about the length of time it took 165 adults to drink some water.

| Time ($t$ seconds) | Frequency | F.D. |
|---|---|---|
| $0 < t \leqslant 10$ | 20 | 2 |
| $10 < t \leqslant 15$ | 32 | 6.4 |
| $15 < t \leqslant 17.5$ | 30 | 12 |
| $17.5 < t \leqslant 20$ | 40 | 16 |
| $20 < t \leqslant 25$ | 16 | 3.2 |
| $25 < t \leqslant 40$ | 12 | 0.8 |

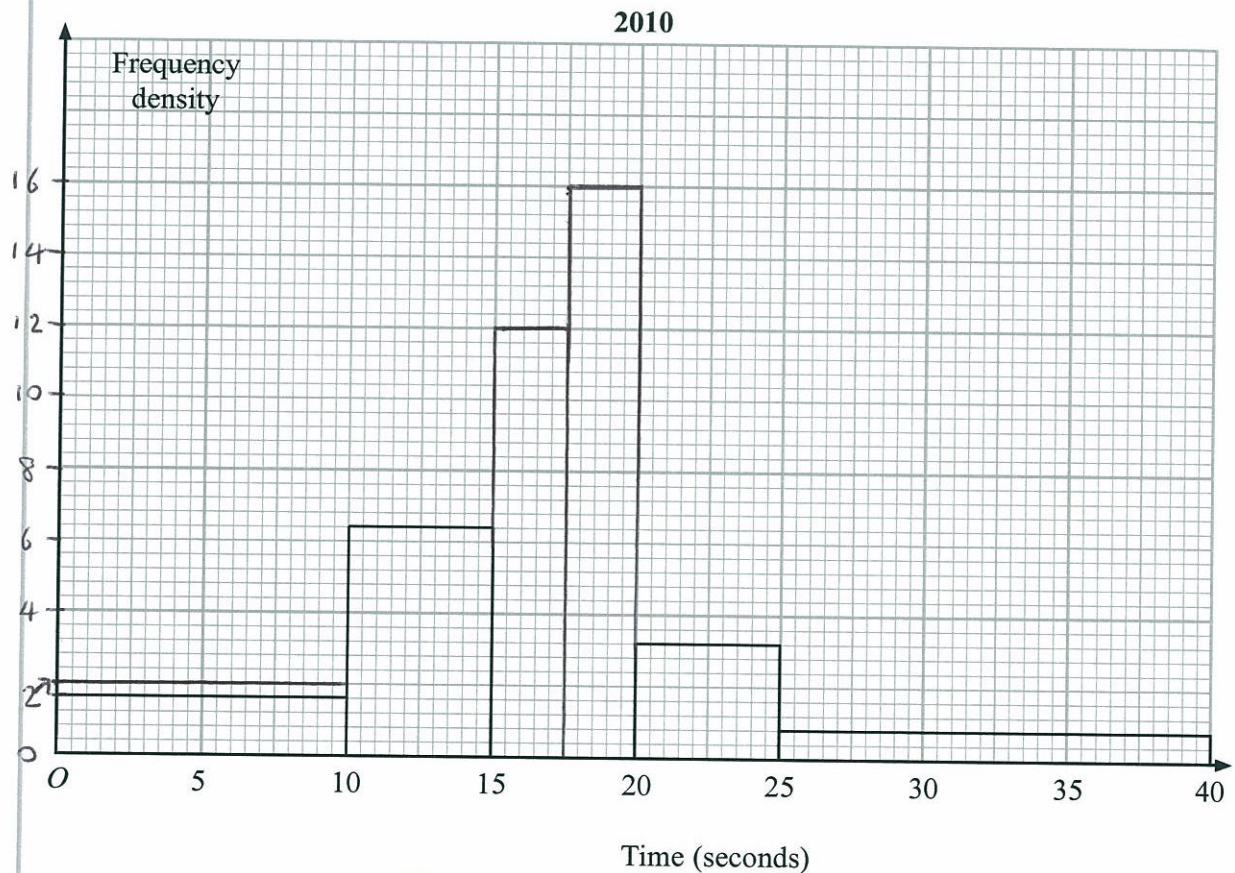
None of the adults took more than 40 seconds to drink the water

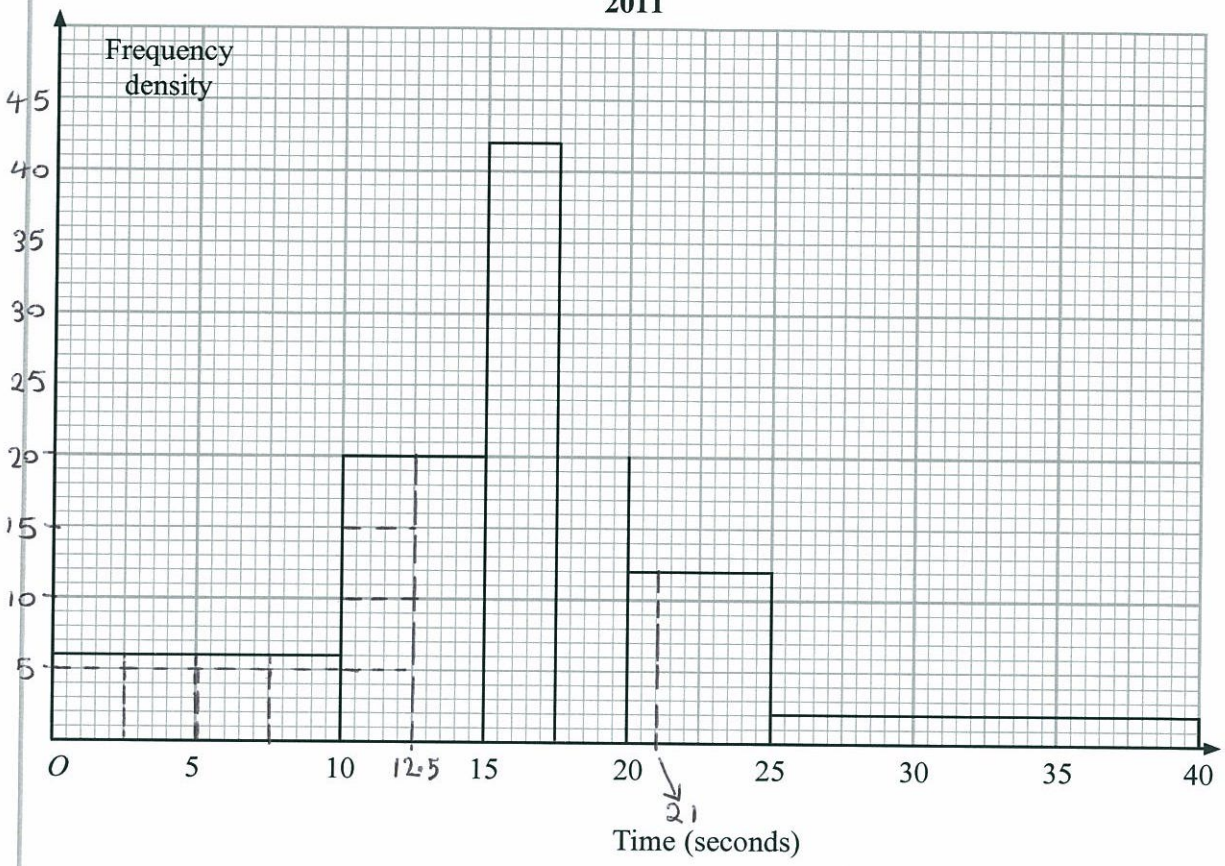
(a) Use the table to complete the histogram.

**(2)**

(b) Use the histogram to complete the table.

**(2)**






The histogram shows information about the time it took some children to drink the water
None of the children took more than 40 seconds to drink the water.

N.B: Area of histogram bars provide the Frequency.

110 children took up to 12.5 seconds to drink the water.

(c) Work out an estimate for the number of children who took 21 seconds or more to drink the water.

Frequency for each 5×5 box is given by

$$\frac{110}{8.8 \text{ boxes}} = 12.5$$

$\Rightarrow$ Frequency for second bar $= 4 \times 12.5 = 50$

$\Rightarrow$ F.D. for second bar $= \frac{50}{2.5} = 20$

From which we can calibrate the F.D axis.

No. of children who took $\geq 21$ s

$= 4(12) + 15(2) = 78$

78

**(3)**

**(Total 7 marks)**