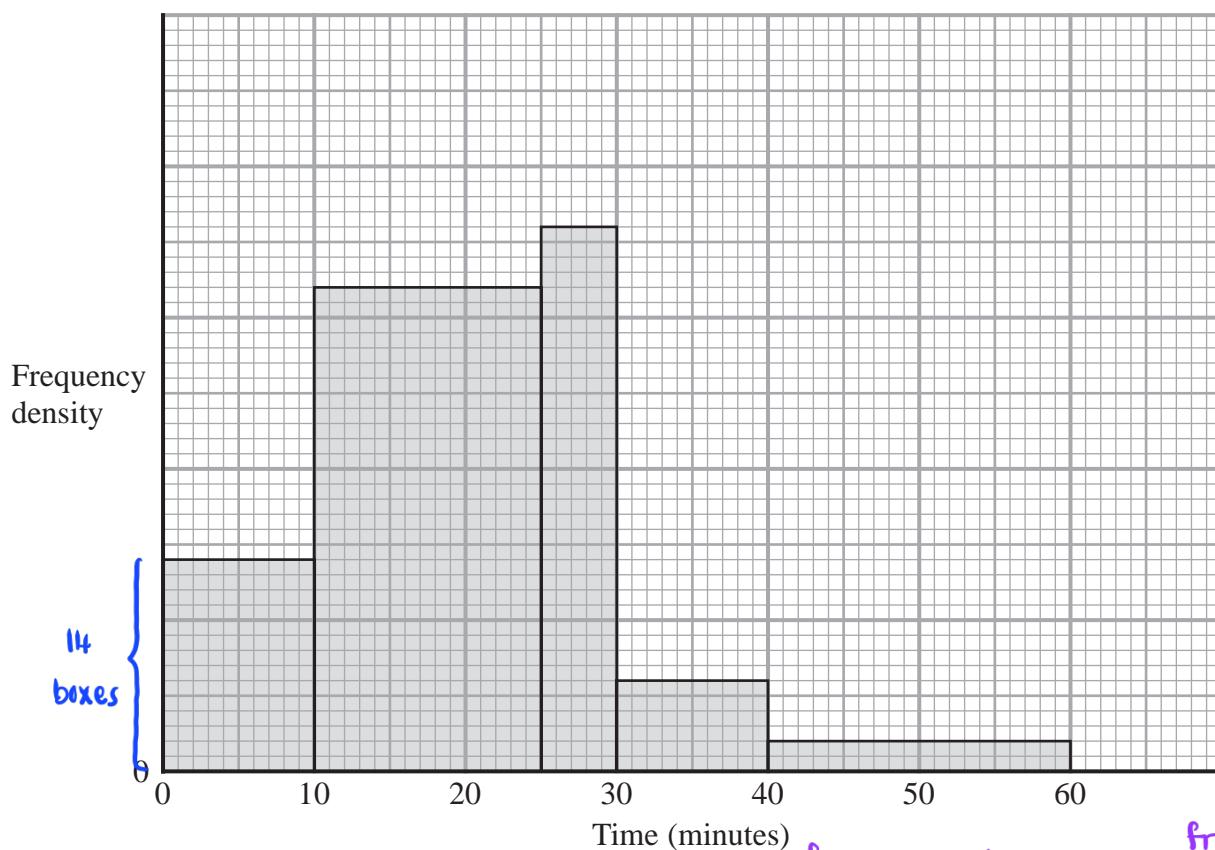


- 1 The histogram gives information about the times, in minutes, some customers had to wait to be served in a restaurant.



$$\text{frequency density} = \frac{\text{frequency}}{\text{class width}}$$

14 customers had to wait less than 10 minutes to be served.

Work out the number of customers who had to wait less than 60 minutes to be served.

$$\text{from } 0-10 \text{ minutes: frequency density} = \frac{14 \text{ customers}}{10} = 1.4 \quad (1)$$

\therefore since there are 14 small boxes for this class, means one small box (vertically) = 0.1

$$\text{from } 10-25 : \text{frequency} = 3.2 \times 15 = 48$$

$$\text{from } 25-30 : \text{frequency} = 3.6 \times 5 = 18 \quad (1)$$

$$\text{from } 30-40 : \text{frequency} = 0.6 \times 10 = 6$$

$$\text{from } 40-60 : \text{frequency} = 0.2 \times 20 = 4$$

$$\begin{aligned} \text{Total customers: } & 14 + 48 + 18 + \\ & 6 + 4 \\ & = 90 \quad (1) \end{aligned}$$

90

(Total for Question 1 is 3 marks)

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2 The table gives information about the heights, in centimetres, of some plants.

Height (h cm)	Frequency
$10 < h \leq 20$	35
$20 < h \leq 35$	45
$35 < h \leq 50$	75
$50 < h \leq 70$	40
$70 < h \leq 80$	8

frequency density

$$35/10 = 3.5$$

$$45/15 = 3$$

$$75/15 = 5$$

$$40/20 = 2$$

$$8/10 = 0.8$$

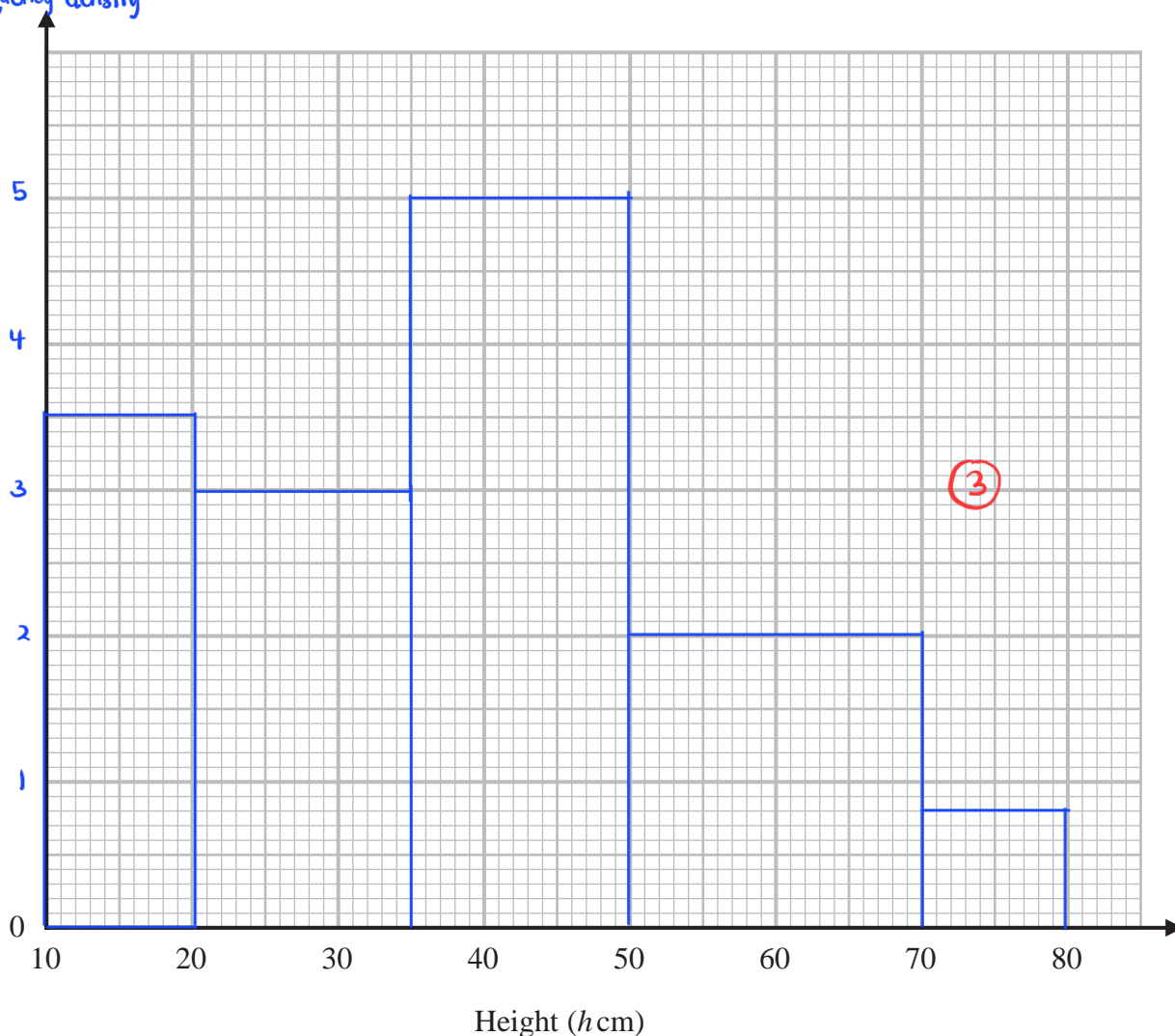
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(a) On the grid, draw a histogram for this information.

frequency density



(3)



(b) Work out an estimate for the number of these plants with a height greater than 40 cm.

only consider 40 to 50 from $35 < h \leq 50$ class.

$$\frac{2}{3} \times 75 + 40 + 8 \text{ (1)}$$

$$= 50 + 40 + 8$$

$$= 98 \text{ (1)}$$

98

(2)

(Total for Question 2 is 5 marks)

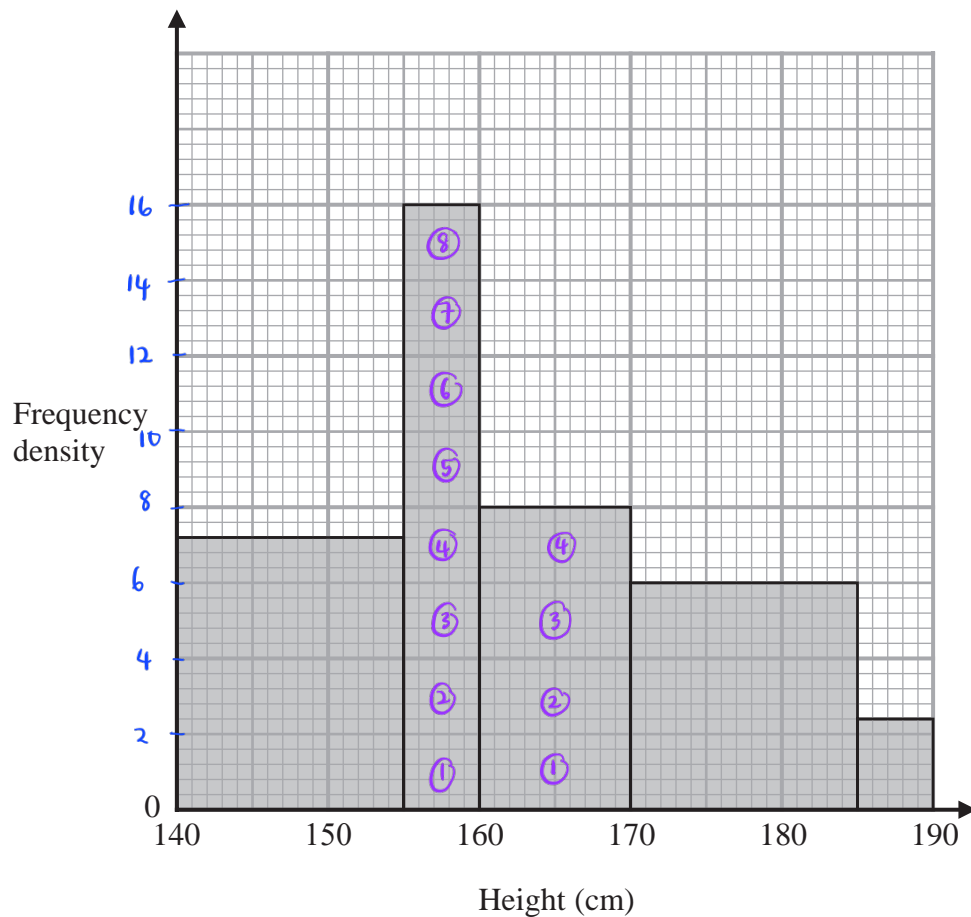
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3



The histogram gives information about the heights of all the Year 11 students at a school.

There are 160 students in Year 11 with a height between 155 cm and 170 cm.

Work out the total number of students in Year 11 at the school.

$$\text{Frequency density} = \frac{\text{Frequency}}{\text{Class width}}$$

$$\text{Frequency} = \text{Class width} \times \text{frequency density}$$

$$160 = 5 \times 8x + 10 \times 4x \quad (1)$$

$$160 = 40x + 40x$$

$$160 = 80x$$

$$x = 2 \quad (1)$$

$$\text{Total Students} : 15 \times 7.2 + 5 \times 16 + 10 \times 8 + 15 \times 6 + 5 \times 2.4 \quad (1)$$

$$= 370$$

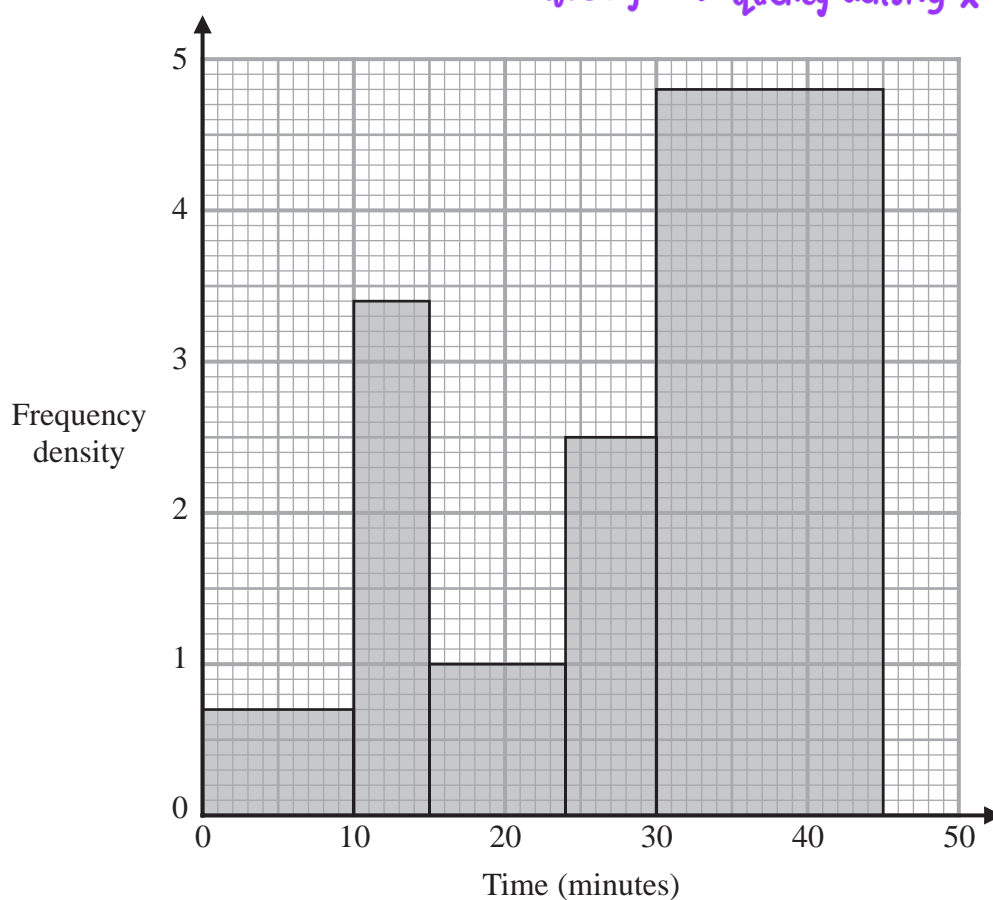
$$370 \quad (1)$$

(Total for Question 3 is 4 marks)



- 4 The histogram gives information about the times, in minutes, that some customers spent in a supermarket.

$$\text{Frequency} = \text{frequency density} \times \text{class width}$$



- (a) Work out an estimate for the proportion of these customers who spent between 17 minutes and 35 minutes in the supermarket.

$$\begin{aligned} \text{Total customers} &: (0.7 \times 10) + (3.4 \times 5) + (1 \times 9) + (2.5 \times 6) + (4.8 \times 15) \\ &= 7 + 17 + 9 + 15 + 72 \\ &= 120 \quad \textcircled{1} \end{aligned}$$

$$\text{From } t = 17 \text{ to } t = 24 :$$

$$(24 - 17) \times 1 = 7$$

$$\text{From } t = 24 \text{ to } t = 30 :$$

$$(30 - 24) \times 2.5 = 15$$

$$\text{From } t = 30 \text{ to } t = 35 :$$

$$(35 - 30) \times 4.8 = 24$$

$$\text{Total from } t = 17 \text{ to } t = 35 :$$

$$7 + 15 + 24 = 46 \quad \textcircled{1}$$

$$\text{Proportion} = \frac{46}{120} \quad \textcircled{1}$$

$$\frac{46}{120}$$

(3)

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One of the customers is selected at random.

Given that this customer had spent more than 30 minutes in the supermarket,

(b) find the probability that this customer spent more than 36 minutes in the supermarket.

customer spending more than 30 mins :

$$15 \times 4.8$$

customer spending more than 36 mins :

$$(45 - 36) \times 4.8 \quad (1)$$

$$= 9 \times 4.8$$

$$\text{Probability} : \frac{9 \times 4.8}{15 \times 4.8} = \frac{9}{15} \quad (1)$$

$$\frac{9}{15} \quad (2)$$

(Total for Question 4 is 5 marks)

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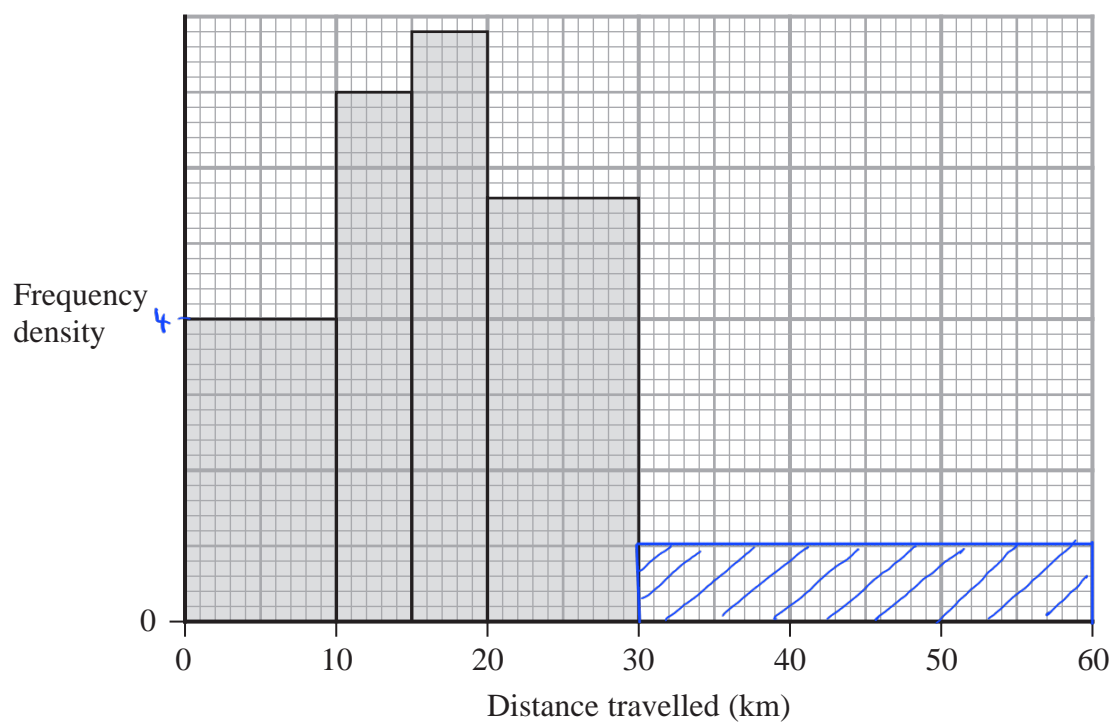


- 5 The table and histogram give information about the distance travelled, in order to get to work, by each person working in a large store.

Distance (d km)	Frequency
$0 \leq d < 10$	40
$10 \leq d < 15$	35
$15 \leq d < 20$	39
$20 \leq d < 30$	56
$30 \leq d < 60$	30

②

$$\text{frequency} = \text{Frequency density} \times \text{class width}$$



Finding height of first bar :

$$\text{Frequency density} = \frac{40}{10} = 4$$

$$\therefore 5 \text{ small square} = 1 \text{ frequency density}$$

$$\text{2nd bar} : 5 \times 7 = 35$$

$$\text{3rd bar} : 5 \times 7.8 = 39$$

$$\text{4th bar} : 10 \times 5.6 = 56$$



Using the information in the table and in the histogram,

(a) complete the table,

(2)

(b) complete the histogram.

(1)

One of the people working in the store is chosen at random.

(c) Work out an estimate for the probability that the distance travelled by this person, in order to get to work, was greater than 25 km.

From 25 to 30 km :

$$0.5 \times 56 = 28$$

From 30 to 60 km :

$$30$$

$$\text{Total frequency : } 40 + 35 + 39 + 56 + 30 = 200 \quad (1)$$

$$\text{Probability } d > 25 \text{ km} = \frac{30 + 28}{200} = \frac{58}{200} \quad (1)$$

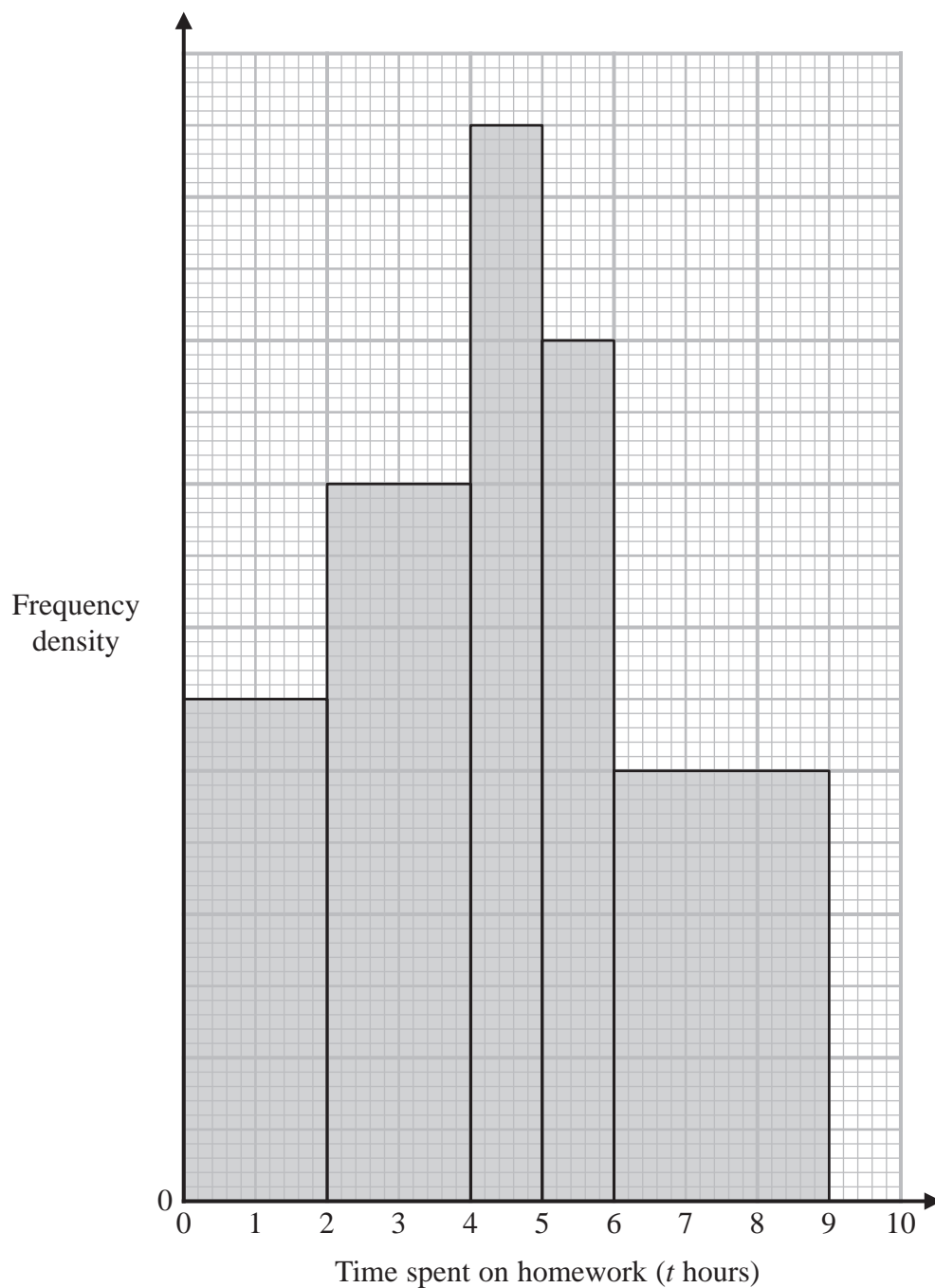
$$\frac{58}{200}$$

(2)

(Total for Question 5 is 5 marks)



- 6 The histogram and the table give some information about the amounts of time, in hours, that Year 11 students at Bergdesh Academy spent, in total, on their homework last week. No student in Year 11 spent longer than 9 hours on their homework.



$$\text{frequency} = \text{frequency density} \times \text{class width}$$

Finding height of first bar :

$$\text{f.d} = \frac{28}{2} = 14$$

(5 small square represents 2) ①



Time spent on homework (t hours)	Frequency
$0 < t \leq 2$	28
$2 < t \leq 4$	40
$4 < t \leq 5$	30
$5 < t \leq 6$	24
$6 < t \leq 9$	36

$$20 \times 2 = 40$$

$$30 \times 1 = 30$$

$$24 \times 1 = 24$$

$$12 \times 3 = 36$$

Using the information in the histogram and in the table, work out an estimate for the mean amount of time the Year 11 students spent on their homework last week. Give your answer in hours correct to 3 significant figures.

$$\text{estimated mean} = \frac{(1 \times 28) + (3 \times 40) + (4.5 \times 30) + (5.5 \times 24) + (7.5 \times 36)}{28 + 40 + 30 + 24 + 36}$$

$$= \frac{28 + 120 + 135 + 132 + 270}{158}$$

$$= \frac{685}{158}$$

$$= 4.34$$

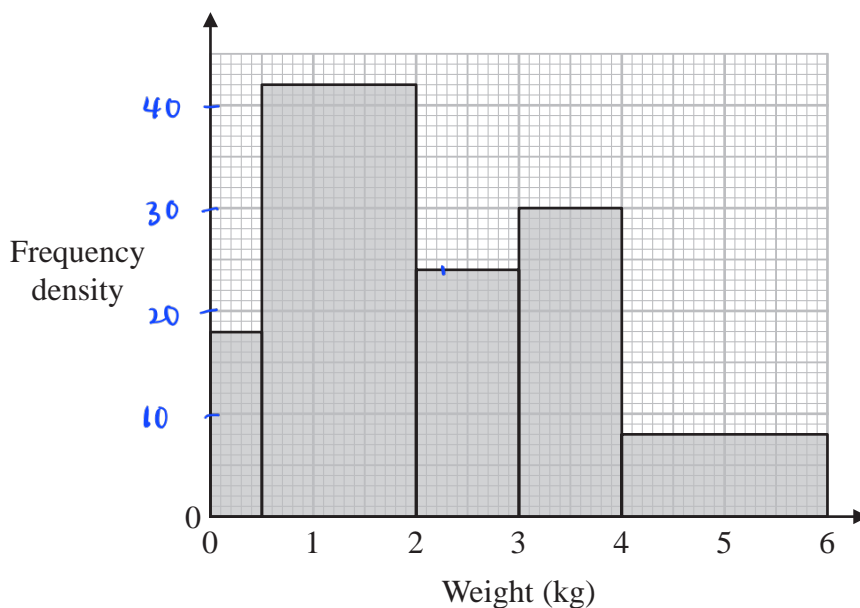
..... 4.34 hours

(Total for Question 6 is 5 marks)



7 A postman records the weight of each parcel that he delivers.

The histogram shows information about the weights of all the parcels that the postman delivered last Monday. No parcels weighed more than 6 kg.



63 of the parcels that the postman delivered last Monday each had a weight between 0.5 kg and 2 kg.

(a) Work out the total number of parcels the postman delivered last Monday.

$$4.2x \times 1.5 = 63$$

$$6.3x = 63$$

$$x = 10, \text{ that means 1 small square is equal to 1 fd } \textcircled{1}$$

$$= 18(0.5) + 63 + 24(1) + 30(1) + 8(2) \textcircled{1}$$

$$= 142 \textcircled{1}$$

142

(3)

The postman picks at random two of the records of the parcels he delivered last Monday.

(b) Work out an estimate for the probability that each parcel weighed more than 2.25 kg.

$$= 24(3 - 2.25) + 30(1) + 8(2)$$

$$= 24(0.75) + 30 + 16$$

$$= 64 \textcircled{1}$$

$$\frac{64}{142} \times \frac{63}{141} = \frac{672}{3337}$$

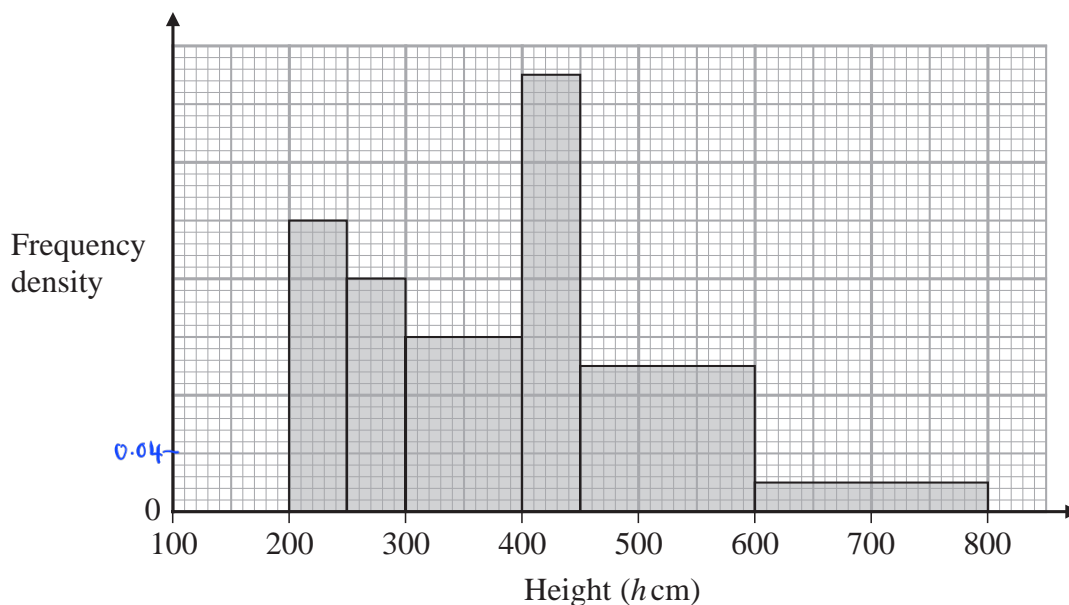
$$\frac{672}{3337} \textcircled{1}$$

(3)

(Total for Question 7 is 6 marks)



8 The histogram gives information about the height, h cm, of each tree in part of a forest.



There are no trees for which $h \leq 200$ and for which $h > 800$

The number of trees for which $300 < h \leq 400$ is 8 fewer than the number of trees for which $400 < h \leq 500$

Work out an estimate for the number of trees in this part of the forest that have a height greater than 500 cm.

$$\text{frequency} = \text{frequency density} \times \text{width of class}$$

Finding value of frequency density : $\rightarrow b = \text{square box of } 5 \times 5$

$$\text{frequency of tree with } h = 300 \text{ to } 400 : 3b \times 100 = 300b$$

$$\text{frequency of tree with } h = 400 \text{ to } 450 : 7.5b \times 50 = 375b$$

$$h = 450 \text{ to } 500 : 2.5b \times 50 = 125b$$

$$300b = (375b + 125b) - 8$$

$$300b = 500b - 8$$

$$500b - 300b = 8$$

$$200b = 8$$

$$b = 0.04 \quad \text{--- 1 square box of } 5 \times 5 = 0.04$$

$$\text{From } h = 500 \text{ to } 600 : 0.1 \times 100 = 10$$

$$600 \text{ to } 800 : 0.02 \times 200 = 4 \quad \textcircled{i}$$

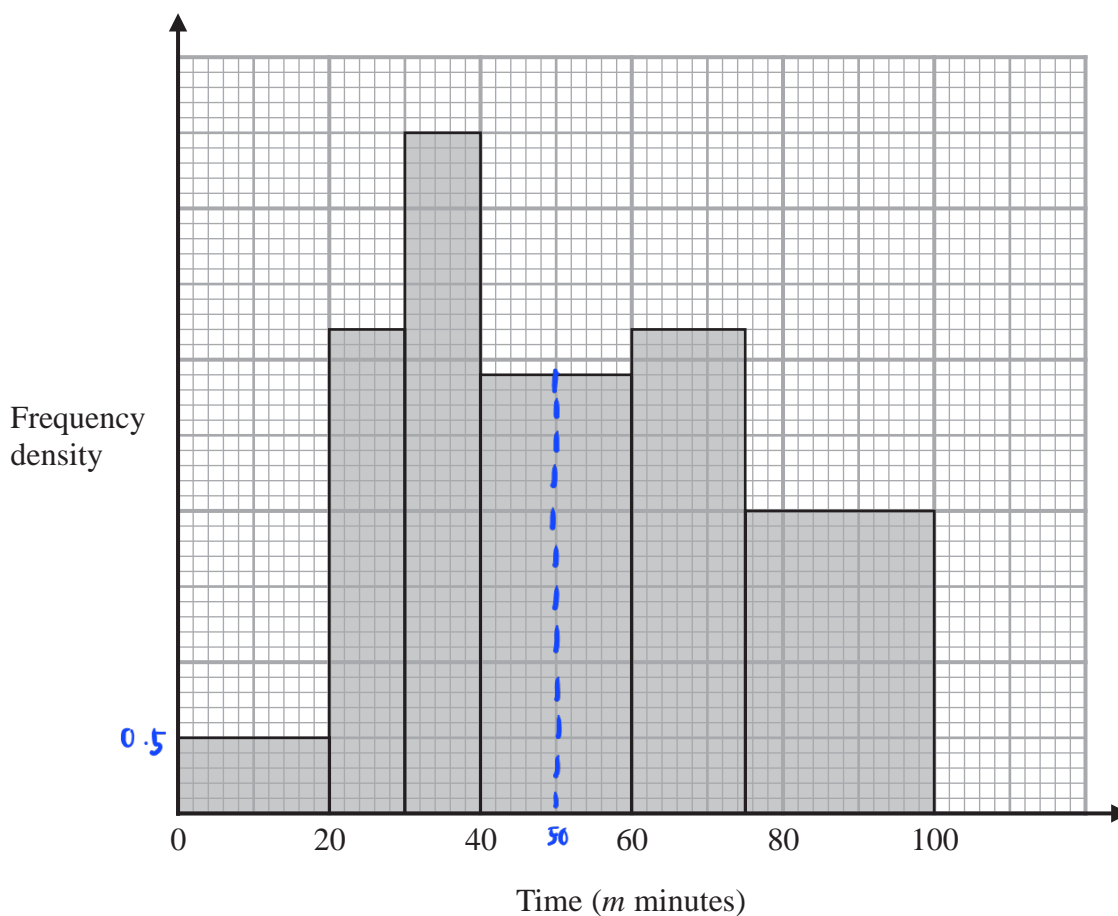
$$10 + 4 = 14 \quad \textcircled{i}$$

14

(Total for Question 8 is 3 marks)



- 9 The histogram shows information about the total time, m minutes, taken by each child in a school to walk to school every day for one week.



There are no children for whom $m > 100$

There are 10 children for whom $m \leq 20$

Work out an estimate for the number of children for whom $50 < m \leq 80$

$$\frac{10}{20} = 0.5 \quad (1)$$

$$50 \text{ to } 60 : 10 \times 2.9 = 29$$

$$60 \text{ to } 75 : 15 \times 3.2 = 48 \quad (1)$$

$$75 \text{ to } 80 : 5 \times 2 = 10$$

$$\text{Total} : 29 + 48 + 10$$

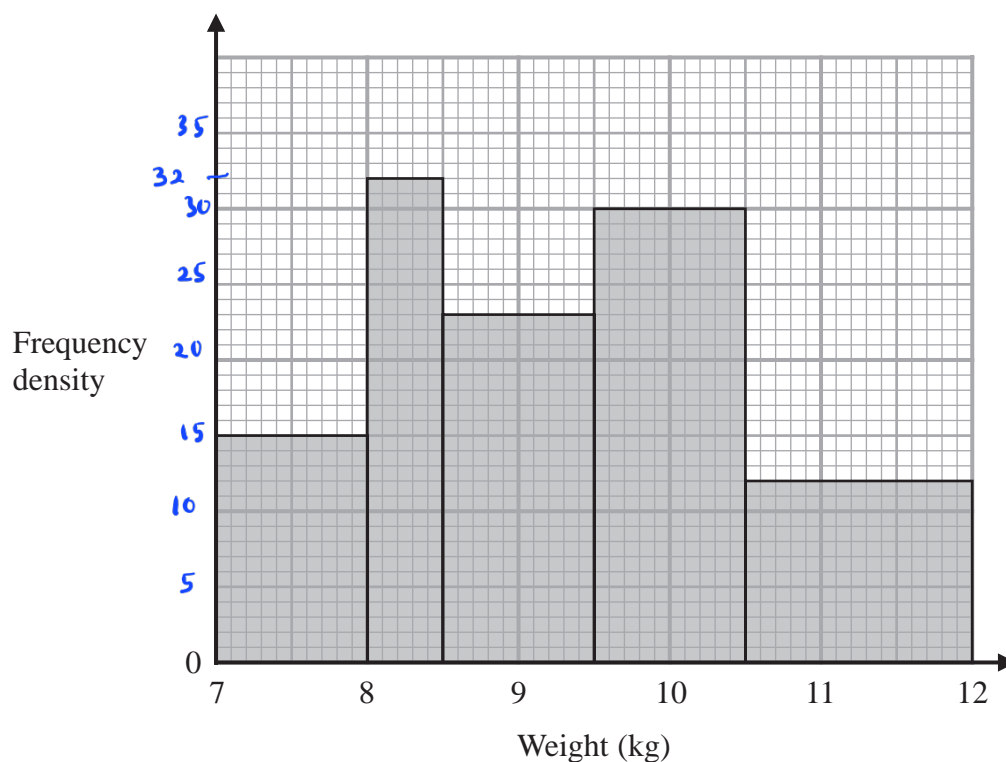
$$= 87 \quad (1)$$

87

(Total for Question 9 is 3 marks)



10



The histogram gives information about the weights, in kg, of all the watermelons in a field.

There are 16 watermelons with a weight between 8 kg and 8.5 kg

Work out the total number of watermelons in the field.

$$\frac{16}{8.5 - 8} = 32 \quad (1)$$

$$\text{Total} : (1 \times 15) + (16) + (1 \times 23) + (1 \times 30) + (1.5 \times 12)$$

$$= 15 + 16 + 23 + 30 + 18 \quad (1)$$

$$= 102 \quad (1)$$

102

(Total for Question 10 is 3 marks)

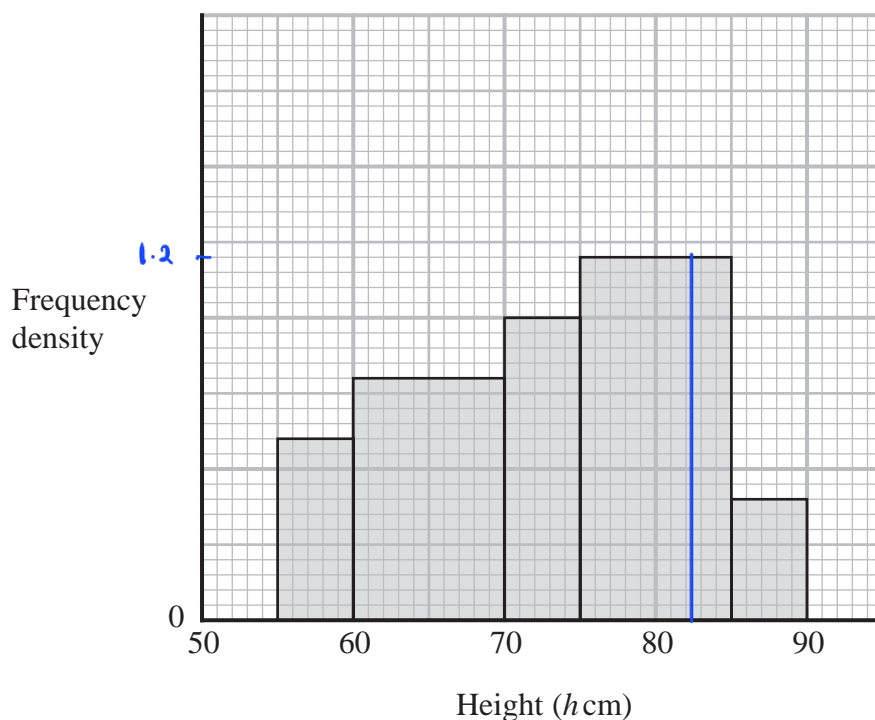
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11 The histogram gives information about the heights, h cm, of some tomato plants.



There are 12 tomato plants for which $75 < h \leq 85$
One of the tomato plants is selected at random.

Find an estimate for the probability that this tomato plant has a height greater than 82.5 cm

$$f.d = \frac{12}{10} = 1.2 \quad (1)$$

$$1 \text{ small square} = \frac{1.2}{24} = 0.05$$

$$82.5 \text{ to } 85 : 2.5 \times 1.2 = 3$$

$$85 \text{ to } 90 : 5 \times 0.4 = 2$$

$$\text{Total} : 3 + 2 = 5 \quad (1)$$

$$\text{Total all plants} : 5 \times 0.6 + 10 \times 0.8 + 5 \times 1 + 10 \times 1.2 + 5 \times 0.4$$

$$= 3 + 8 + 5 + 12 + 2 \quad (1)$$

$$= 30$$

$$\frac{5}{30} = \frac{1}{6} \quad (1)$$

$$\frac{1}{6}$$

(Total for Question 11 is 4 marks)

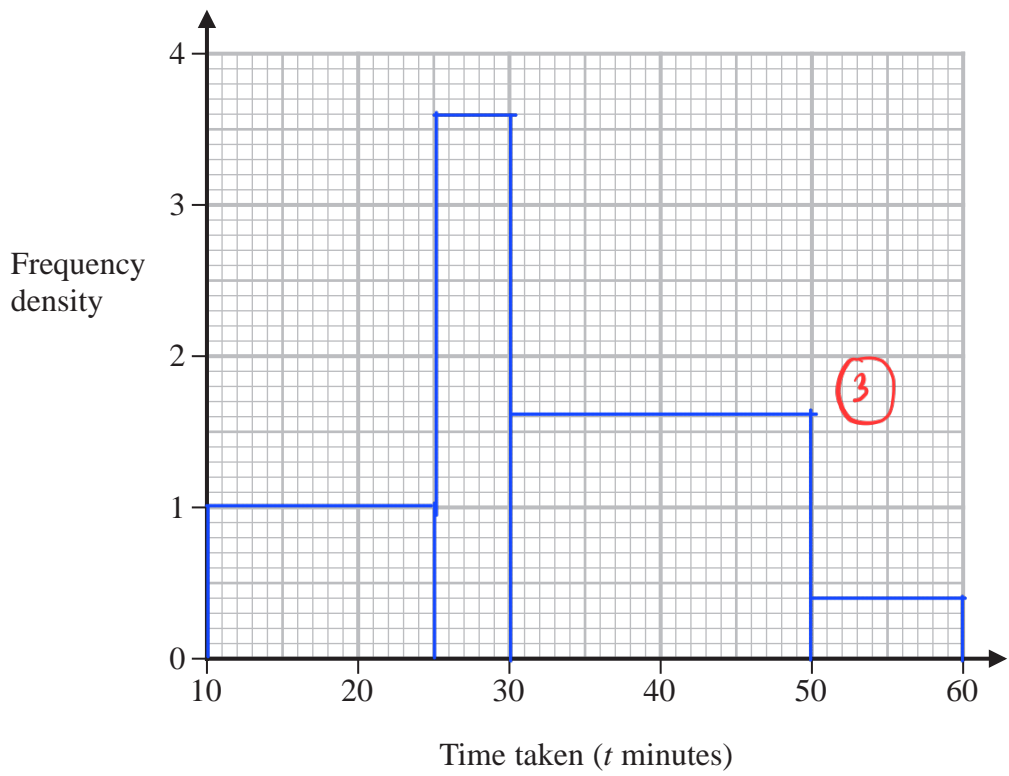


12 The table gives information about the time taken by each student in Year 11 to complete a homework task.

Time taken (t minutes)	Frequency
$10 < t \leq 25$	15
$25 < t \leq 30$	18
$30 < t \leq 50$	32
$50 < t \leq 60$	4

$15 \div 15 = 1$
 $18 \div 5 = 3.6$
 $32 \div 20 = 1.6$
 $4 \div 10 = 0.4$

(a) On the grid, draw a histogram for this information.



(3)

One of these students who took 50 minutes or less and more than 25 minutes to complete this homework task is chosen at random.

(b) Find an estimate for the probability that this student took 45 minutes or less to complete this homework task.

$25 < x < 50 = 18 + 32 = 50 \text{ students}$
 $(45 - 30) \times 1.6 = 24$
 $\frac{24 + 18}{50} = \frac{42}{50}$

(2)

(Total for Question 12 is 5 marks)

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13 The table gives information about the weights, in kg, of the parcels that Pedro delivers on Monday.

Weight (w kg)	Frequency
$0 < w \leq 2$	12
$2 < w \leq 3$	7
$3 < w \leq 6$	15
$6 < w \leq 9$	12
$9 < w \leq 14$	9

FD

$$\frac{12}{2} = 6$$

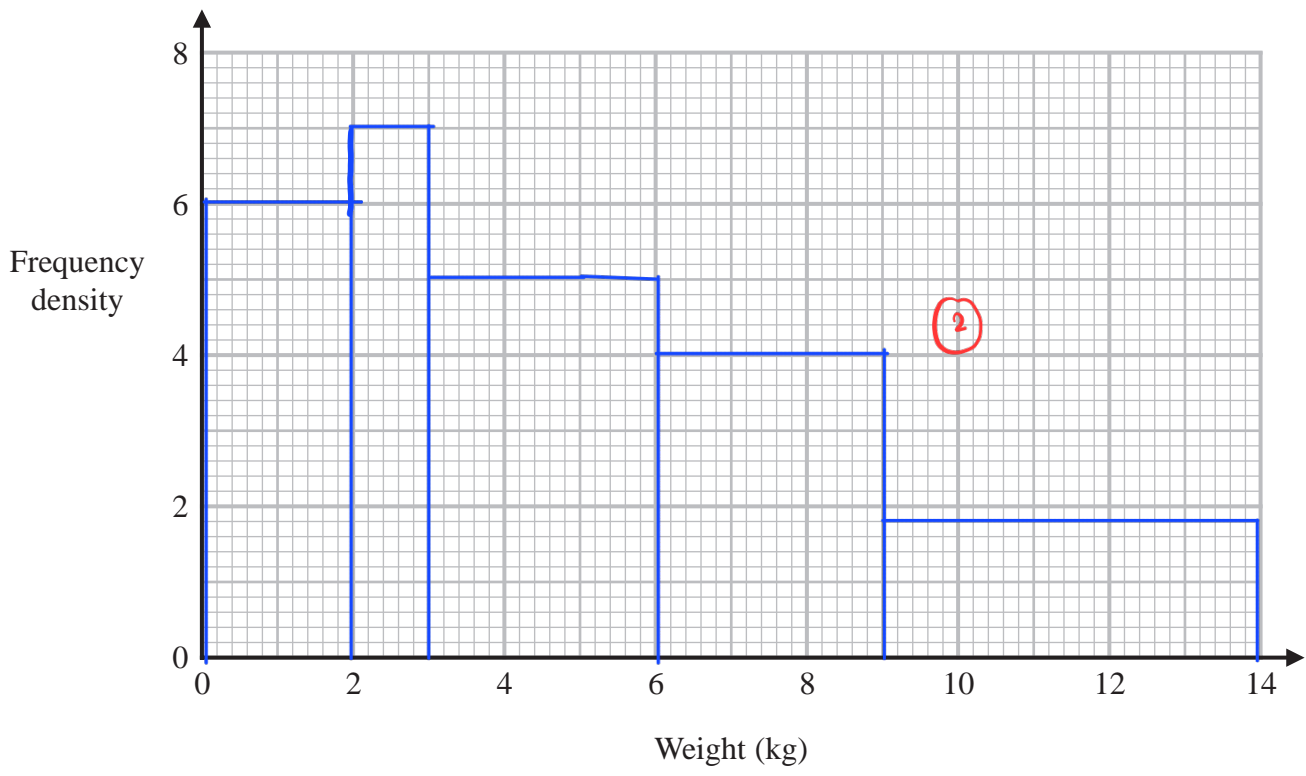
$$\frac{7}{1} = 7 \quad (1)$$

$$\frac{15}{3} = 5$$

$$\frac{12}{3} = 4$$

$$\frac{9}{5} = 1.8$$

(a) On the grid, draw a histogram for this information.



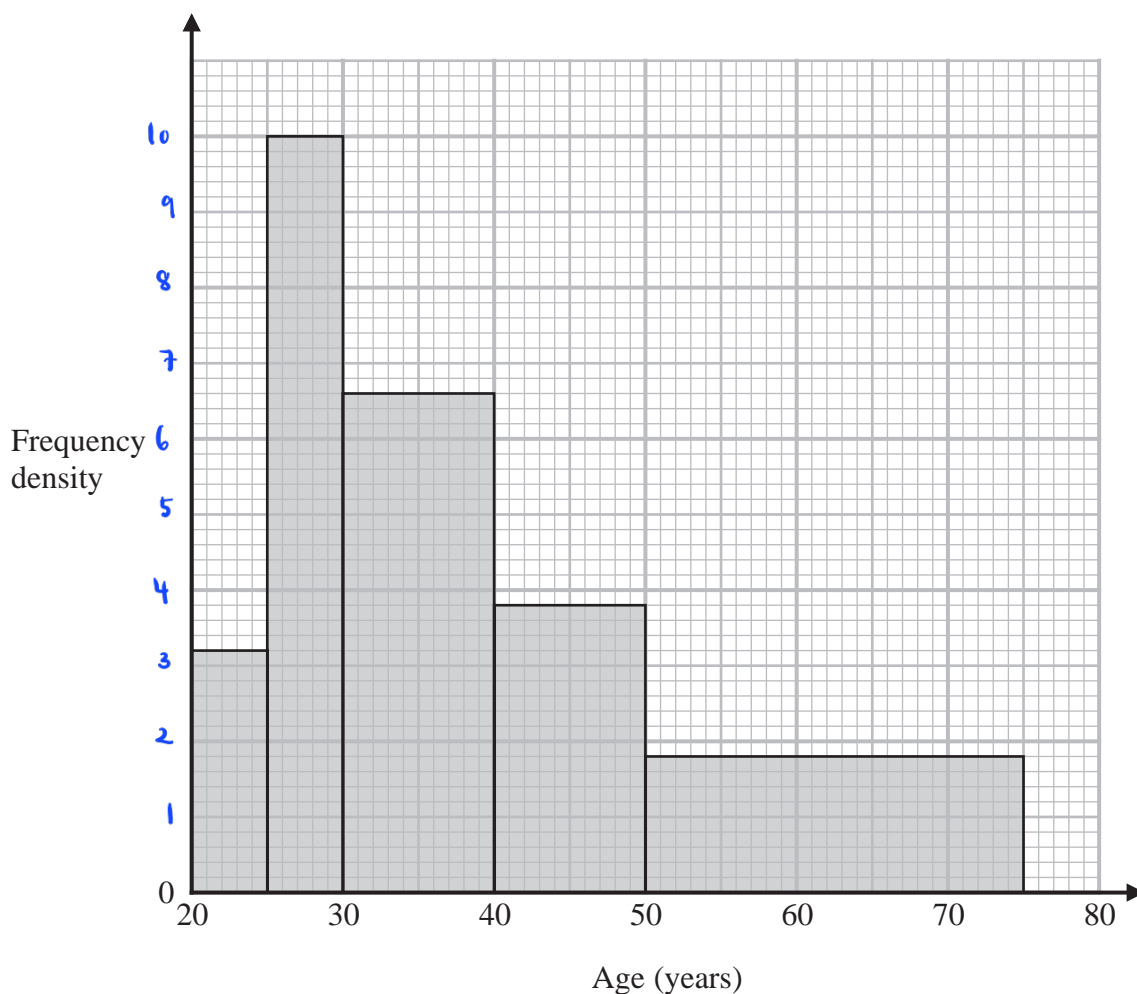
(3)

(Total for Question 13 is 3 marks)



14 Some people attend a concert.

The histogram shows information about the ages of these people.



Work out an estimate for the percentage of these people who are aged more than 55 years.

Give your answer correct to one decimal place.

let 5 small square vertically = 1

$$20 \text{ to } 25 : 5 \times 3.2 = 16$$

$$25 \text{ to } 30 : 5 \times 10 = 50$$

$$30 \text{ to } 40 : 10 \times 6.6 = 66 \quad (1)$$

$$40 \text{ to } 50 : 10 \times 3.8 = 38$$

$$50 \text{ to } 75 : 25 \times 1.8 = 45$$

$$\text{Total} = 16 + 50 + 66 + 38 + 45 = 215 \quad (1)$$

$$\text{People aged } 55+ : 20 \times 1.8 = 36$$

$$\frac{36}{215} \times 100\% = 16.7\% \quad (1)$$

(1)



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16.7 %

(Total for Question 14 is 4 marks)



15 The incomplete table and incomplete histogram give information about the times, in minutes, that 140 people waited at a station for a train.

Time (t minutes)	Frequency
$0 < t \leq 5$	23
$5 < t \leq 15$	25
$15 < t \leq 30$	60
$30 < t \leq 40$	18
$40 < t \leq 60$	14

$$140 - 23 - 18 - 14 = 85 \quad \textcircled{1}$$

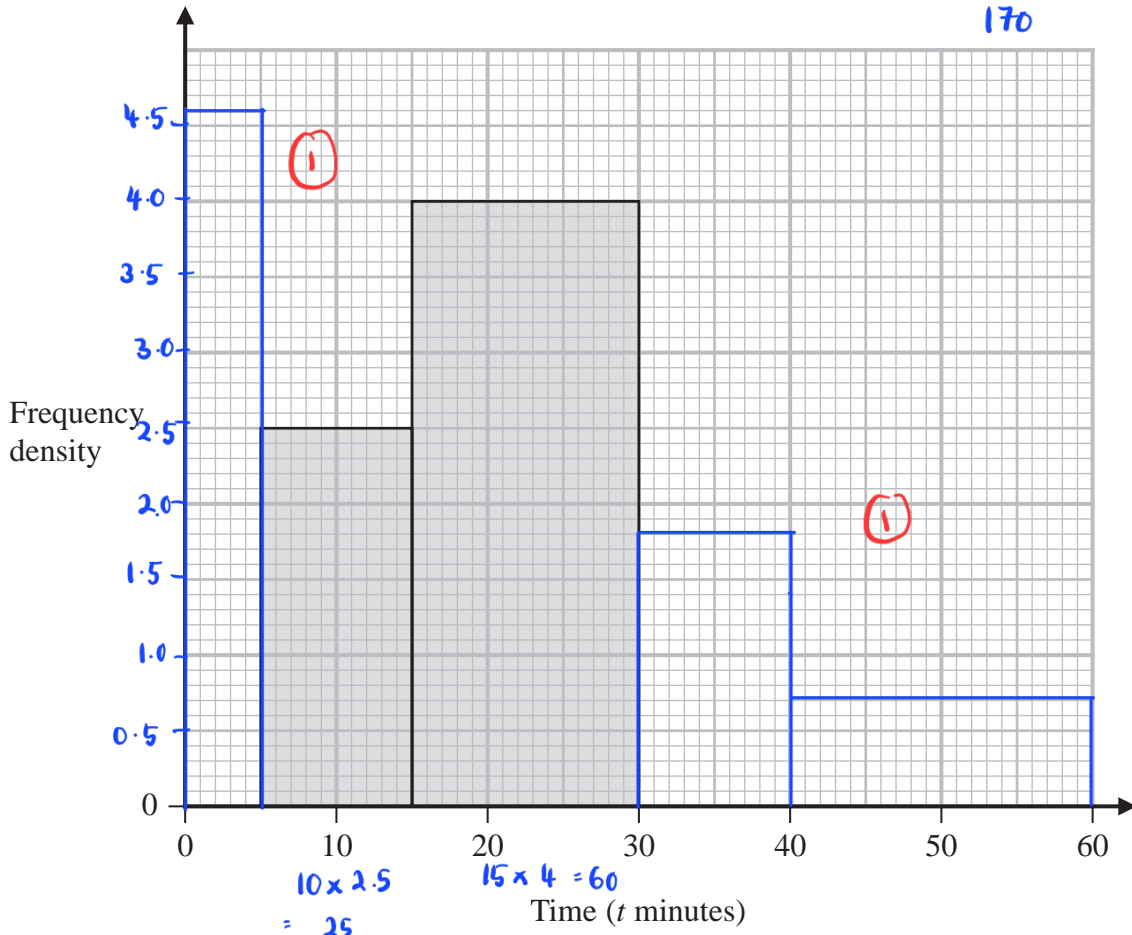
From graph: (let 5 small square = x)

$$(10 \times 5x) + (15 \times 8x) = 85$$

$$50x + 120x = 85$$

$$170x = 85$$

$$x = \frac{85}{170} = 0.5$$



Complete the table and the histogram.

1st class : $\frac{23}{5} = 4.6$

4th class : $\frac{18}{10} = 1.8$

5th class : $\frac{14}{20} = 0.7$

(Total for Question 15 is 4 marks)

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