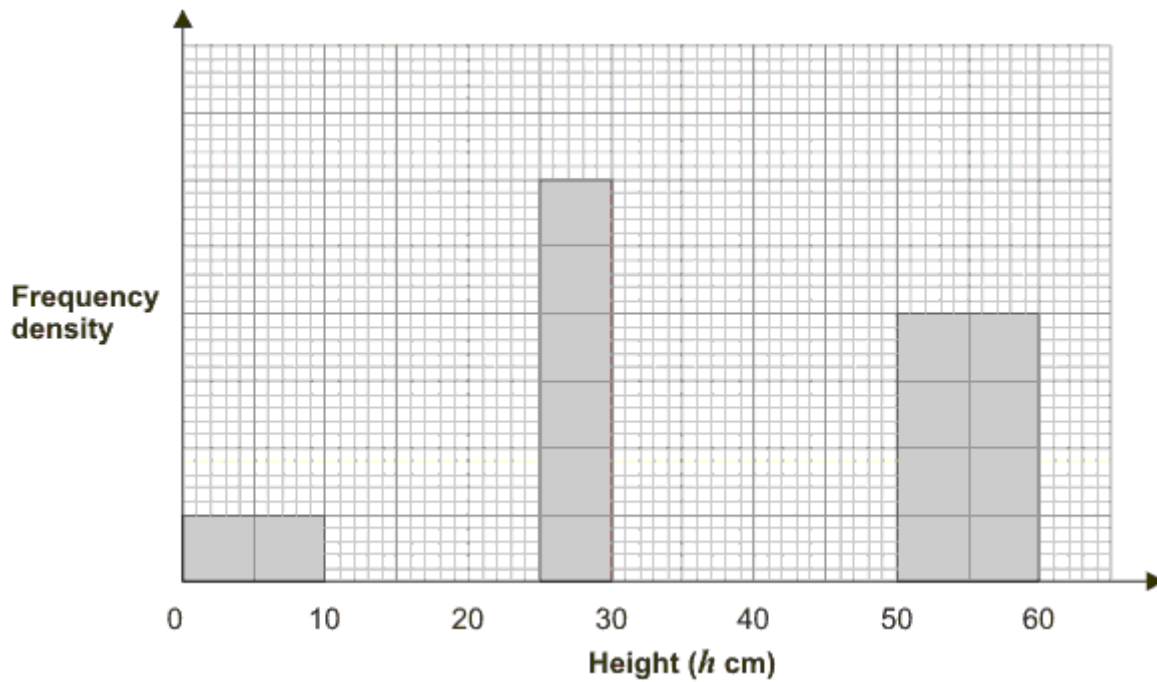**Q1.**   The incomplete frequency table and histogram give some information about the heights, in centimetres, of some tomato plants.

Height (h cm)	Frequency
$0 < h \leq 10$	
$10 < h \leq 25$	30
$25 < h \leq 30$	
$30 < h \leq 50$	50
$50 < h \leq 60$	20

(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)

Q2.   The table shows some information about the weights, in grams, of 60 eggs.

Weight (w grams)	Frequency		
$0 < w \leq 30$	0		
$30 < w \leq 50$	14		
$50 < w \leq 60$	16		
$60 < w \leq 70$	21		
$70 < w \leq 100$	9		

(a)   Calculate an estimate for the mean weight of an egg.

.... g

(4)

(b)   Complete the cumulative frequency table.

Weight (w grams)	Cumulative frequency
$0 < w \leq 30$	0
$0 < w \leq 50$	
$0 < w \leq 60$	

$0 < w \leq 70$	
$0 < w \leq 100$	

(1)
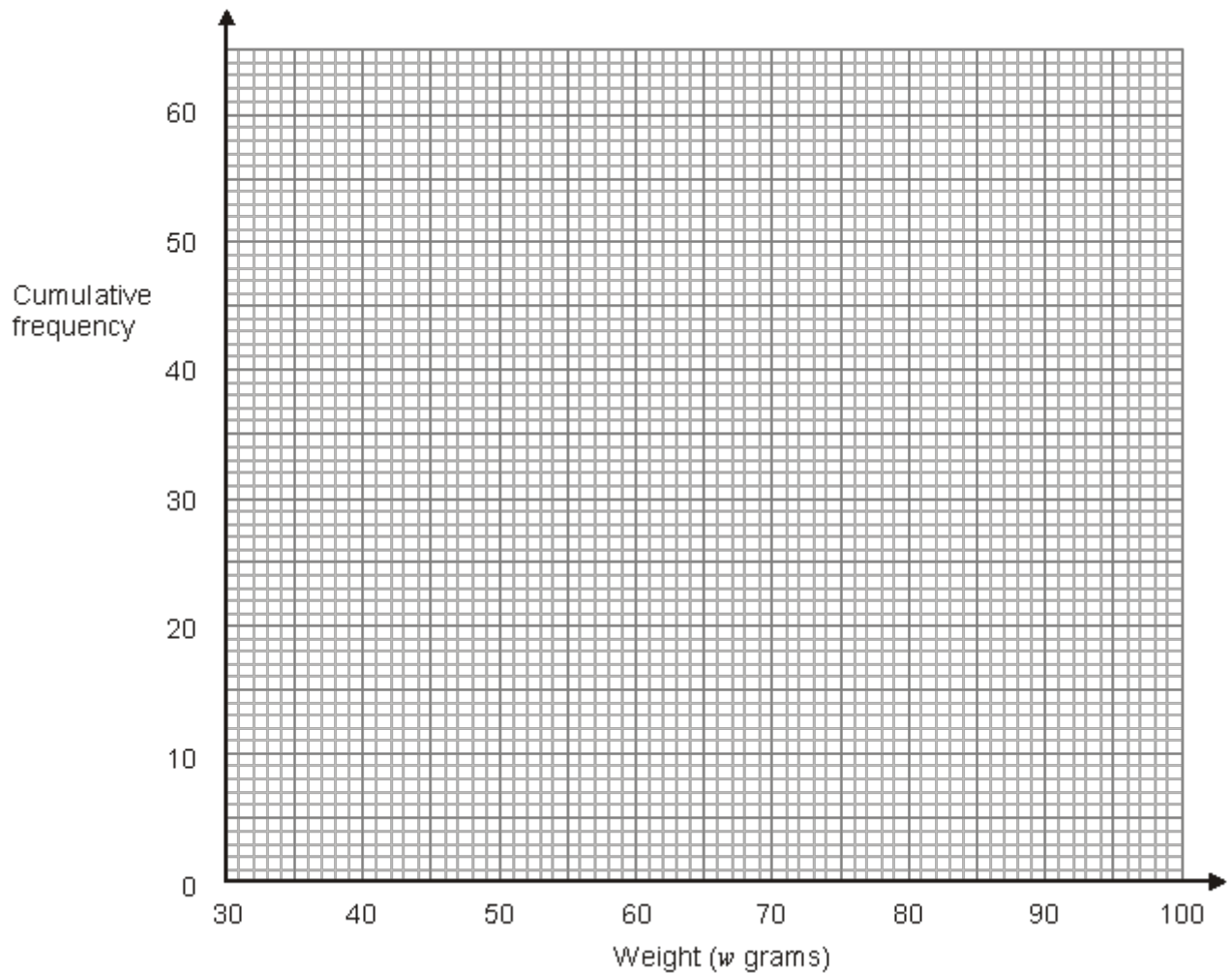
(c)   On the grid, draw a cumulative frequency graph for your table.

(2)

(d)   Use your graph to find an estimate for the number of eggs with a weight greater than 63 grams.

....
(2)
(Total 9 marks)

Q3.   Kelly recorded the length of time 48 teachers took to travel to school on Monday.

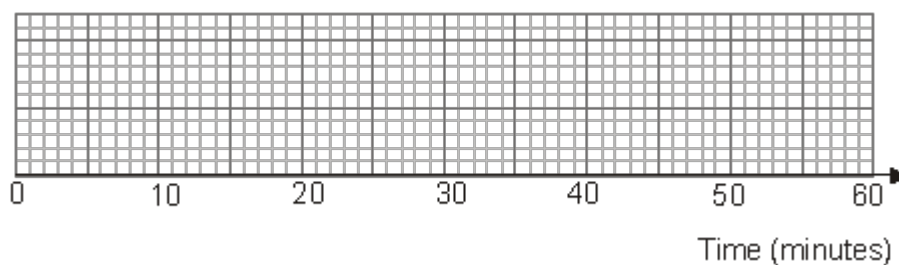The table shows information about these travel times in minutes.

Least time	5
Greatest time	47
Median	28
Lower quartile	18
Upper quartile	35

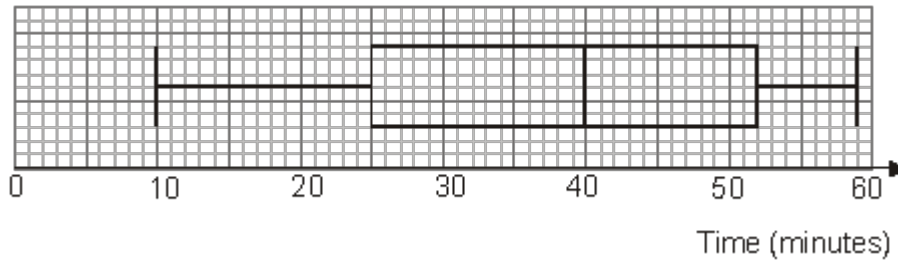(a)   Work out the number of teachers with a travel time of 35 minutes or more.

....
(2)

(b)   On the grid, draw a box plot to show the information in the table.

Time (minutes)

(2)

Kelly then recorded the times the same 48 teachers took to travel to school on Tuesday.

The box plot shows some information about these times.

Time (minutes)

(c)   Compare the travel times on Monday and on Tuesday.

....

....

....

....

(2)
(Total 6 marks)

M1.

	Answer	Mark	Additional Guidance
(a)	5 15	2	**B1** cao **B1** cao
(b)	fd = 2 (ht 4 cm) fd = 2.5 (ht 5 cm)	2	**B2** for 2 correct bars **B1** for 1 correct bar If **B0** is scored then you can award **M1** at least one correct frequency density calculated for the missing bars Or 1 sq = 2.5 plants oe
			Total for Question: 4 marks

M2.

	Working	Answer	Mark	Additional Guidance
(a)	15 × 0 = 0 40 × 14 = 560 55 × 16 = 880 65 × 21 = 1365 85 × 9 = 765 3570 ÷ 60	59.5	4	**M1** for finding at least 4 products fx consistently within interval (including end points) **M1** (dep) for use of at least 4 correct midpoints **M1** (dep on first M) for "Σfx" ÷ 60 **A1** for 59.5
(b)		14, 30, 51, 60	1	**B1** all 4 correct
(c)			2	**M1** for at least 4 of "5 points" plotted consistently within each interval, ± 0.5 full square, and joined by curve or line segments providing no gradient is negative. **A1** for a fully correct cf graph.
(d)			2	**B2** for answer in the range 21 – 25 (**B1** for answer in the range 35 – 39)

				OR **M1** (dep on graph being cf) for using $w = 63$ **A1** ft ($\pm$ 0.5 square)
				Total for Question: 9 marks

M3.

	Working	Answer	Mark	Additional Guidance
(a)	48 ÷ 4	12	2	**M1** 48 ÷ 4 or 49 ÷ 4 or 48 – 36 **A1** for 12
(b)		Box plot drawn	2	**B2** fully correct box plot (**B1** for the box plot drawn with one plotting error)
(c)		On Tuesday: Median higher (IQ) Range higher.	2	**B1** for median higher on Tuesday or journeys took longer on Tuesday **B1** for (IQ) range higher on Tuesday or more variation in journey length on Tuesday. (NB: For B2 at least one comparison must be in context)
				Total for Question: 6 marks

##

In (a), most candidates were able to find the first frequency, but a frequency of 30 was common for the second value in the table. Other wrong responses often seen were 10 and 30 or 50 and 150.

Many candidates left part (b) blank or produced answers with bars drawn off the graph or very tiny. Also, some candidates just drew bars of frequency 30 and 50, so in effect a bar chart with different size widths. Other candidates were able to calculate the frequency density correctly, so picked up a M1 mark, but then were unable to draw the two bars required.

In general candidates appear not to be aware that the area of the bars of a histogram are the frequencies, evidenced by a lack of frequency density calculations. A few of them had used 1 sq. cm = 2.5 to calculate the frequencies and the drawing of the bars but this was rarely seen.

##

In part (a) many candidates scored the 2 marks for obtaining the products of the midpoints and the frequencies, showing correct calculations for at least 4 of the 5 products fx and using the correct midpoints. The most common error seemed to be
15 x 0 = 15. After gaining the first two marks many went on to add and then divide by 60 but division by 260 or 5 were common errors. In some cases it was clear that candidates did not know how to approach this question and instead used the columns to calculate cumulative frequency or frequency density.

Part (b) was answered correctly by a majority of candidates although a few did not seem to know what was required and listed midpoints or worked out frequency density. Even though candidates had a calculator, again arithmetic errors were seen.

In part (c) students generally managed to plot the points that they had identified in (b) correctly but many lost the marks as they failed to join the points. Points were sometimes badly joined particularly the last two often resulting in a curve which contained a negative gradient. Encouragingly the plotting at midpoints was rarely seen.

Many candidates who had a cumulative frequency graph understood what to do in part (d), although a few had difficulty reading the vertical axis with 36 or 37 being read as 46 or 47. Some failed to read the question carefully and so did not subtract their value from 60 so giving an answer for a weight less than 63 grams rather than more than.

##

In part (a), candidates appeared to find this question challenging. Some scripts were blank

and many had the answer of 12 but it clearly came from incorrect working usually, the calculation 47 – 35 (greatest time – upper quartile), and so scored no marks. Some candidates calculated 75% of 48 to give 36 but then failed to subtract this from 48.

The majority of candidates attempted the box plot and usually scored full marks for part (b). The most common error was plotting 48 not 47 or omitting the median.

In part (c) many candidates concluded that journey times were longer on Tuesday than they were on Monday or that the median time was higher. However comparison of range or interquartile range was less common. Unfortunately many just listed times for Monday and times for Tuesday without making any comparison. One mark was often awarded for a correct comparison and the second mark not awarded as no context was offered for these comparisons.