



# Box Plots and Quartiles



REVISE THIS TOPIC  $19 \div 4 = 20$

1 The test scores of 19 students in a science class are shown below.

32    29    20    24    40    38    21    25    20    30

23    22    35    13    31    19    15    36    38

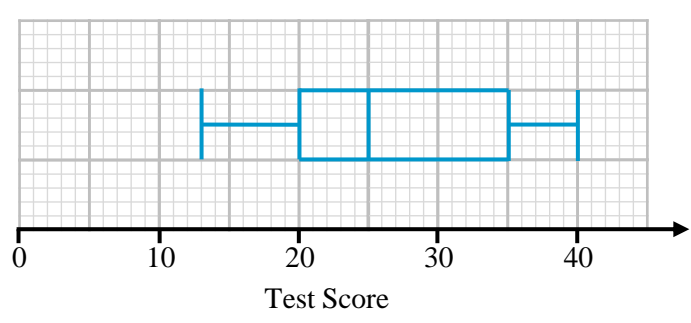
(a) Complete the table. 13 15 19 20 20 21 22 23 24 25  
 29 30 31 32 35 36 38 38 40

5<sup>th</sup> →  
 10<sup>th</sup> →  
 15<sup>th</sup> →

Lowest Score	13
Lower Quartile	20
Median	25
Upper Quartile	35
Highest Score	40

(2)

(b) Use your table to draw a box plot of the test scores of the 19 students.



(2)



(Total for Question 1 is 4 marks)

1

$15 + 1 = 16$

2 Will timed how many minutes it took him to walk to school on 15 different days.

14      21      18      13      18      13      17      15  
 13      15      20      15      12      16      14

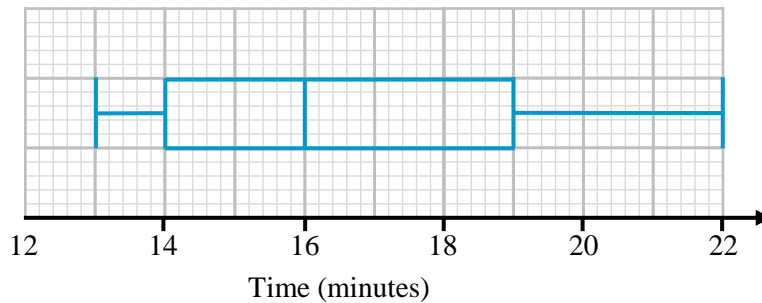
(a) Complete the table

12 13 13 13 14 14 15 15 15 16 17 18 18 20 21

	Lowest Time	12
4 <sup>th</sup>	→ Lower Quartile	13
8 <sup>th</sup>	→ Median	15
12 <sup>th</sup>	→ Upper Quartile	18
	Highest Time	21

(2)

(b) Use your table to draw a box plot for Will's journey times to school.



(2)

(c) Write down the interquartile range of the times.

18 - 13

..... 5 ..... minutes

(1)

(Total for Question 2 is 5 marks)



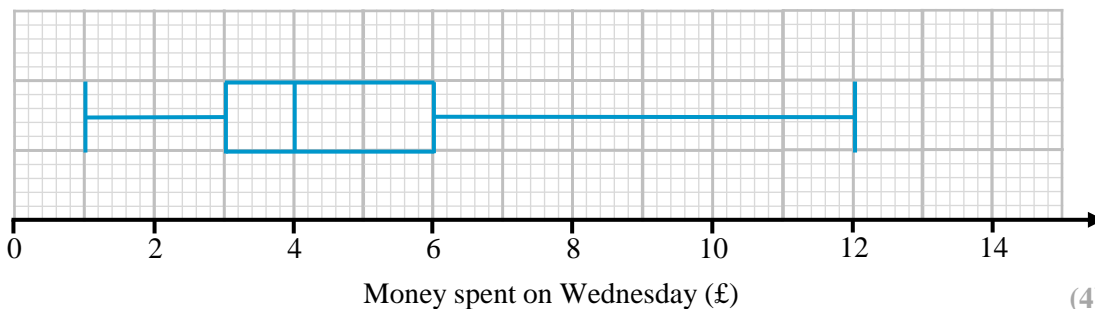
3 A shopkeeper collected information on how much money (to the nearest pound) 23 customers spent in their shop on a Wednesday.

$\uparrow 23 + 1 = 24$

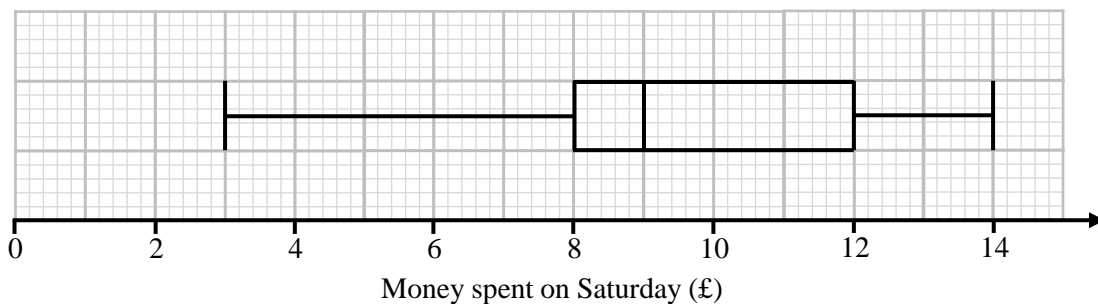
£6   £3   £4   £3   £2   £3   £4   £5   £6   £9   £12   £3  
 £10   £11   £3   £1   £3   £6   £2   £4   £5   £9   £3

(a) Draw a box plot for the money spent by customers on Wednesday.

1 2 2 3 3 3 3 3 3 4 4 4 5 5 6 6 6 9 9 10 11 12



The box plot below shows information about how much customers spent in the same shop on a Saturday.



(b) Compare the distributions of money spent by customers on Wednesday and Saturday.

The median for Saturday was higher. This means more money was spent on Saturday on average.

The interquartile range for Saturday was higher.

This means the amounts spent were less consistent (2) (on Saturday)

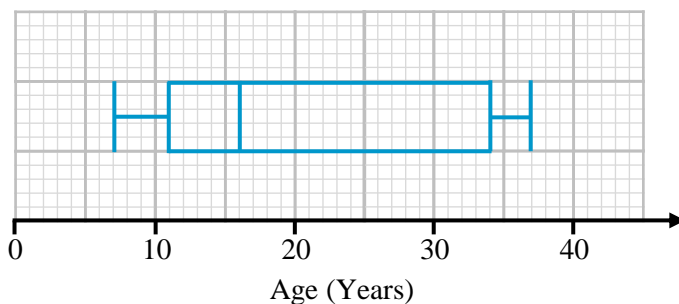
(Total for Question 3 is 6 marks)



4 The table below shows information about the ages of 260 people who watched a film at the cinema.

	Age (Years)
Lowest Age	12
Lower Quartile	16
Median	21
Inter Quartile Range	23
Range	30

(a) Draw a box plot to represent this information.



(3)

(b) Estimate the number of people watching the film that were between 12 and 16 years old.

25% between minimum and LQ

$$260 \times 0.25 = 65$$

65

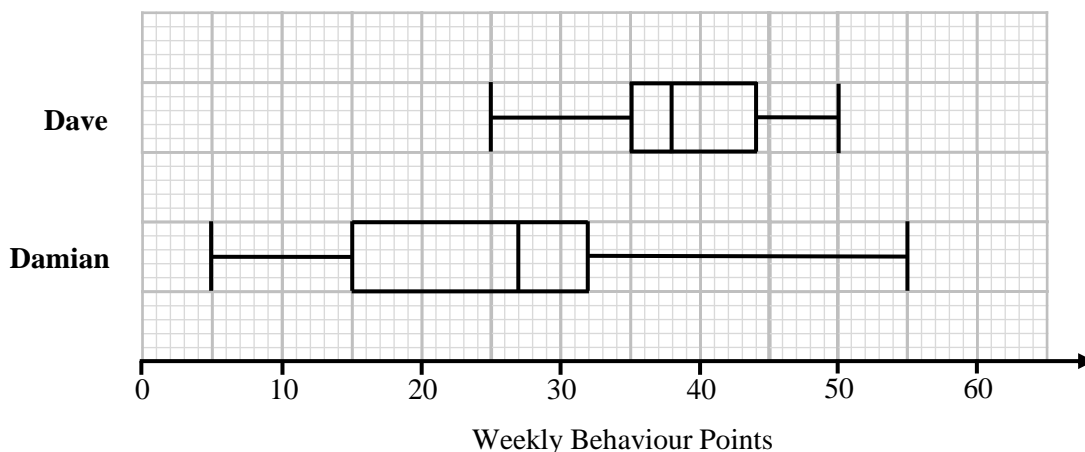
(2)

(Total for Question 4 is 5 marks)



5 Dave and Damian both attend the same school. Each week they are awarded behaviour points.

The box plots below show information about their weekly totals for one term.



(a) Dave says:

“40% of my scores were below 35 points”

Is Dave correct?  
Explain your answer.

No 25% of data is between the minimum and the lower quartile.

(1)

(b) Compare the distributions of behaviour points scored by Dave and Damian.

Dave had a higher median. This means he scored more points on average.

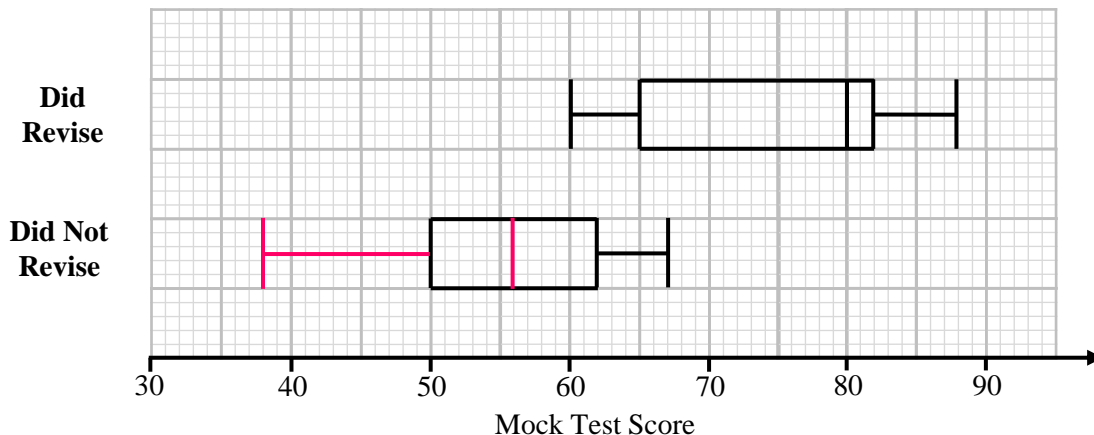
Dave had a lower interquartile range. This means his scores were more consistent

(2)

(Total for Question 5 is 3 marks)



- 6 A teacher asked their students if they revised for their mock exams. The box plot below shows the test scores for students who **did** revise. The box plot for those who **did not** revise is incomplete.



- (a) The range of the mock test scores for those who **did not** revise is 38. The median mock test score for those who **did not** revise is 70% of the median score for those who **did** revise.

Complete the box plot for those who **did not** revise.

(2)

- (b) Compare the distributions of mock test scores for those who did revise and those who did not.

The median for those who revised is higher.  
 This means they scored more marks on average.  
 The interquartile range for those who revised is higher.  
 This means their test scores were less consistent.

(2)

(Total for Question 6 is 4 marks)



7 Hannah writes down 7 integers.  
For the 7 integers:

- The range is 12
- The interquartile range is 6
- The lower quartile is 1 greater than the smallest value
- The upper quartile is 2 greater than the median
- The lower quartile = the mode
- The sum of the integers is 109

Work out the value of the smallest integer in the list.

Lowest value =  $x$

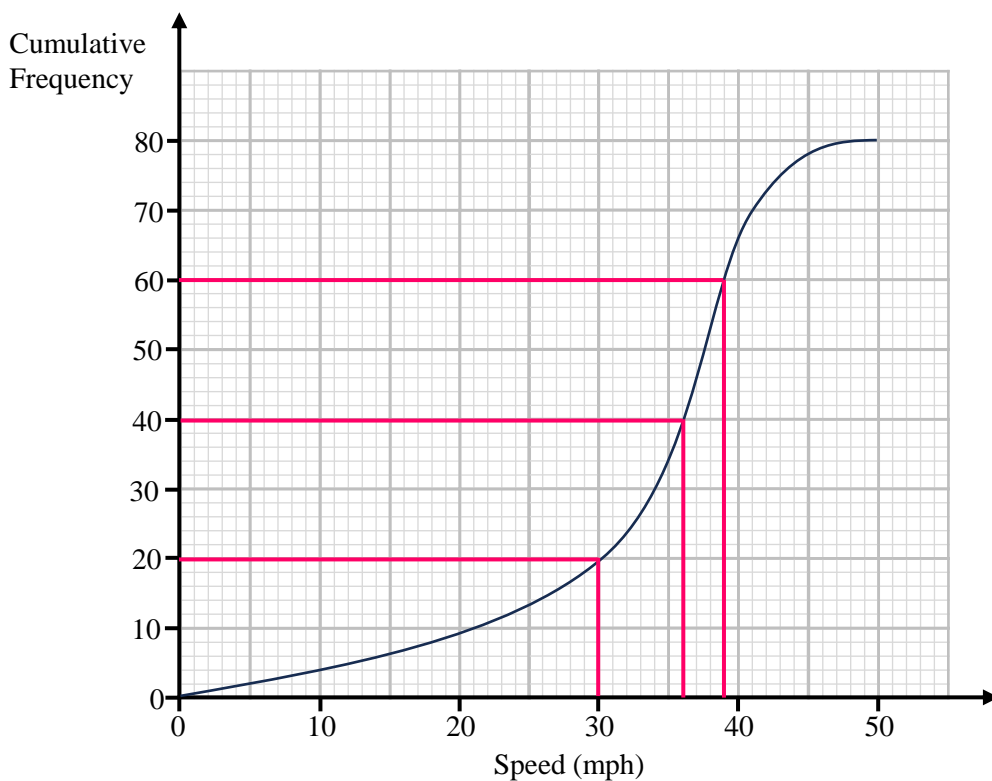
$$\begin{array}{ccccccc}
 \underline{x} & \underline{x+1} & \underline{x+1} & \underline{x+5} & \underline{x+6} & \underline{x+7} & \underline{x+12} \\
 & LQ & & M & & & UQ
 \end{array}$$

$$\begin{aligned}
 x + x + 1 + x + 1 + x + 5 + x + 6 + x + 7 + x + 12 &= 109 \\
 7x + 32 &= 109 \\
 7x &= 77 \\
 x &= 11
 \end{aligned}$$

11  
 .....  
 (Total for Question 7 is 4 marks)

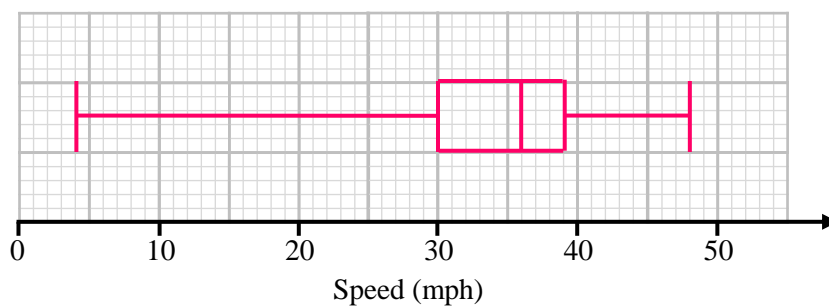


8 The cumulative frequency diagram shows information about the speeds of 80 vehicles travelling on a road.



The speed of the slowest vehicle was 4 mph.  
The speed of the fastest vehicle was 48 mph.

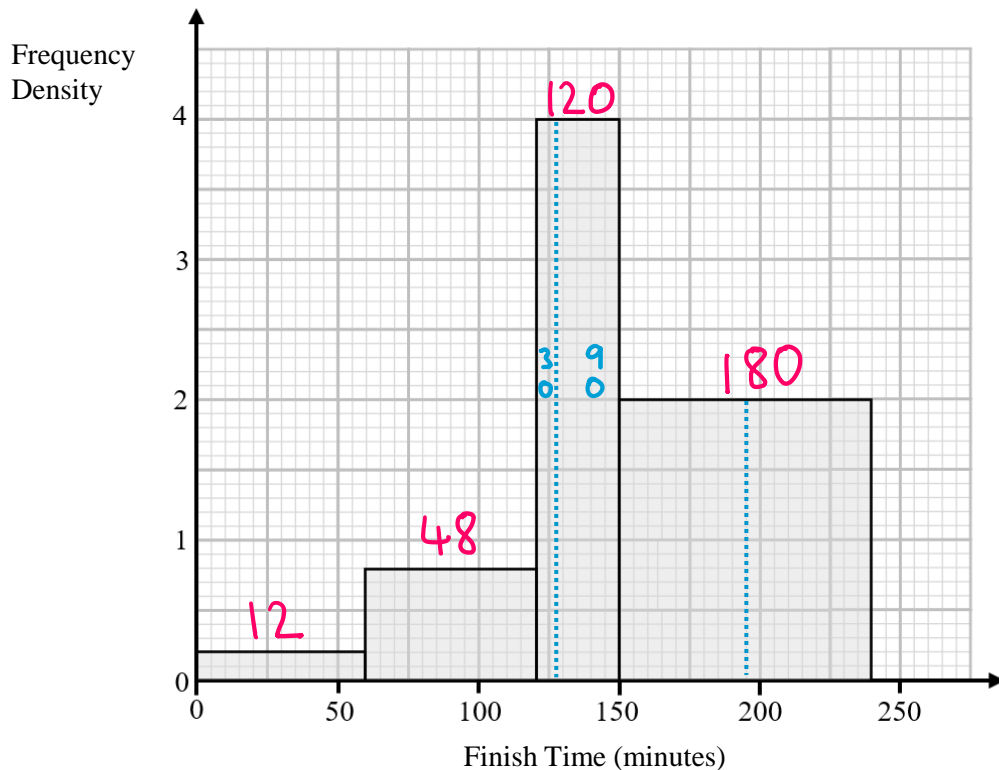
Draw a box plot on the grid below to show the speeds of the 80 vehicles.



(Total for Question 8 is 3 marks)



9 The histogram shows the finish times of 360 runners for a 10 mile race.

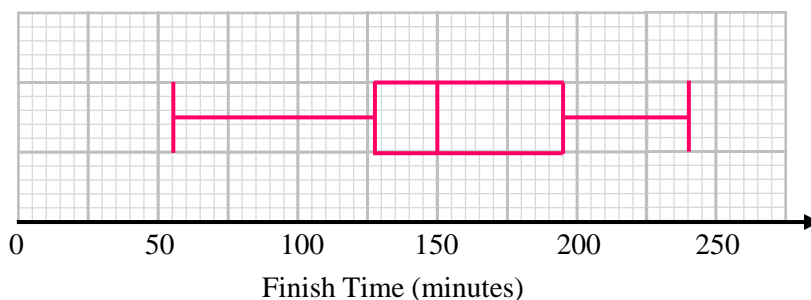


The winner complete the race in 55 minutes.

The final person to finish completed the race in 240 minutes.

On the grid below draw a box plot of the finish times for the 360 runners.

$$\begin{aligned}
 360 \div 2 &= 180^{\text{th}} \text{ (median)} &= 150 \text{ minutes} \\
 360 \div 4 &= 90^{\text{th}} \text{ (LQ)} &= 127.5 \text{ minutes} \\
 90 \times 3 &= 270^{\text{th}} \text{ (UQ)} &= 195 \text{ minutes}
 \end{aligned}$$



(Total for Question 9 is 6 marks)

