



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.

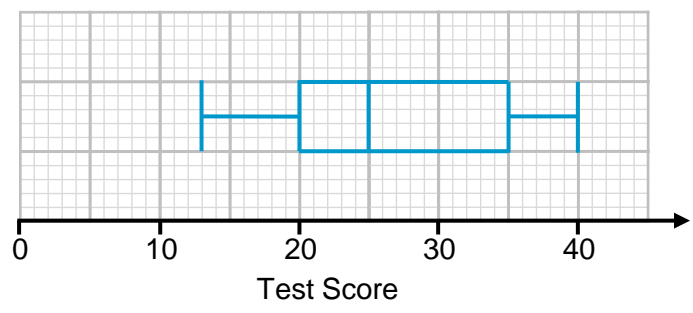
- ~~32~~ ~~29~~ ~~20~~ ~~24~~ ~~40~~ ~~38~~ ~~21~~ ~~25~~ ~~20~~ ~~30~~
- ~~23~~ ~~22~~ ~~35~~ ~~13~~ ~~31~~ ~~19~~ ~~15~~ ~~35~~ ~~38~~

1 (a) Complete the table. [2 marks]

- 13 15 19 20 20 21 22 23 24 25
- 29 30 31 32 35 36 38 38 40

	Lowest Score	13
5 th →	Lower Quartile	20
10 th →	Median	25
15 th →	Upper Quartile	35
	Highest Score	40

1 (b) Use your table to draw a box plot of the test scores of the 19 students. [2 marks]





15 + 1 = 16

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

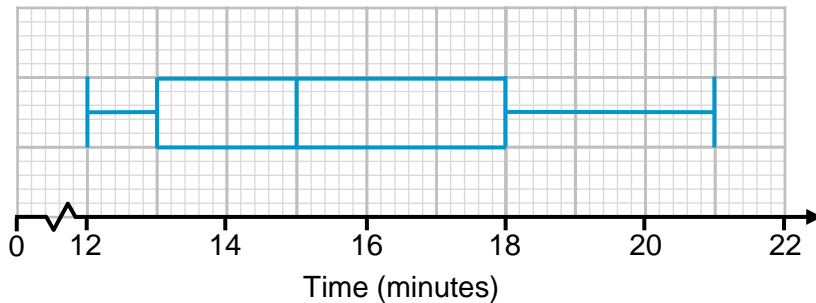
- ~~14~~
- ~~21~~
- ~~18~~
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- ~~18~~
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- ~~17~~
- ~~15~~
- ~~13~~
- ~~15~~
- ~~20~~
- ~~15~~
- ~~12~~
- ~~16~~
- ~~14~~

2 (a) Complete the table. [2 marks]

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

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

2 (b) Use your table to draw a box plot for Will's journey times to school. [2 marks]



2 (c) Write down the interquartile range of the times. [1 mark]

18 - 13

Answer 5 minutes





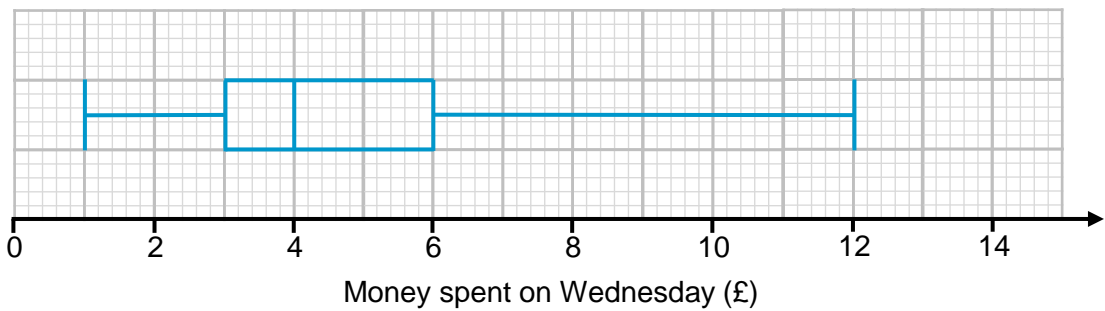
3 A shopkeeper collected information on how much money (to the nearest pound) 23 customers spent in their shop on a Wednesday.

$23 + 1 = 24$

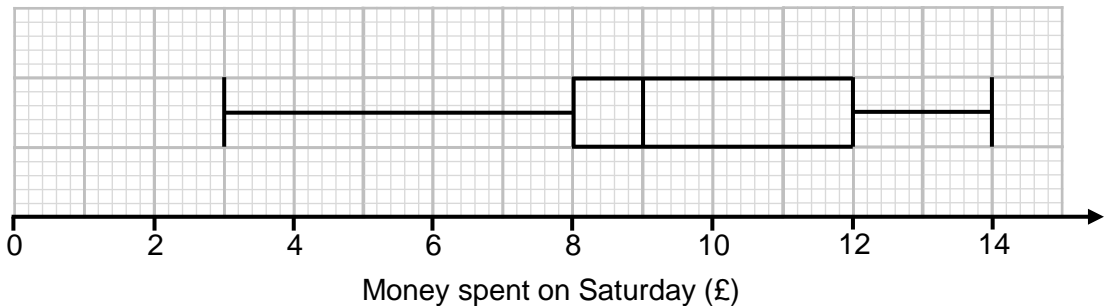
~~£6~~ ~~£3~~ ~~£4~~ ~~£3~~ ~~£2~~ ~~£3~~ ~~£4~~ ~~£5~~ ~~£6~~ ~~£9~~ ~~£12~~ ~~£3~~
~~£10~~ ~~£11~~ ~~£3~~ ~~£1~~ ~~£3~~ ~~£6~~ ~~£2~~ ~~£4~~ ~~£5~~ ~~£9~~ ~~£3~~

3 (a) Draw a box plot for the money spent by customers on Wednesday. [4 marks]

1 2 2 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.



3 (b) On average, which day did customers spend more money? Give a reason for your answer. [2 marks]

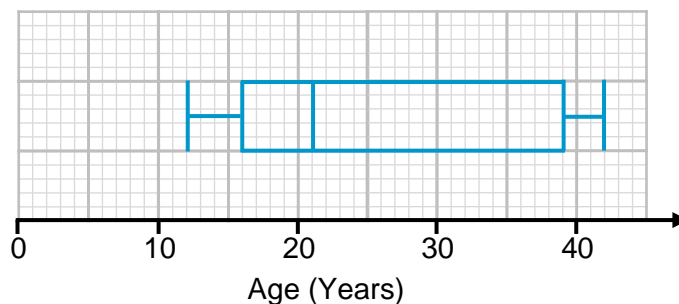
Saturday - as the median is higher at £9 compared to £4 on Wednesday



- 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

- 4 (a) Draw a box plot to represent this information. [3 marks]



- 4 (b) Estimate the number of people watching the film that were between 12 and 16 years old. [2 marks]

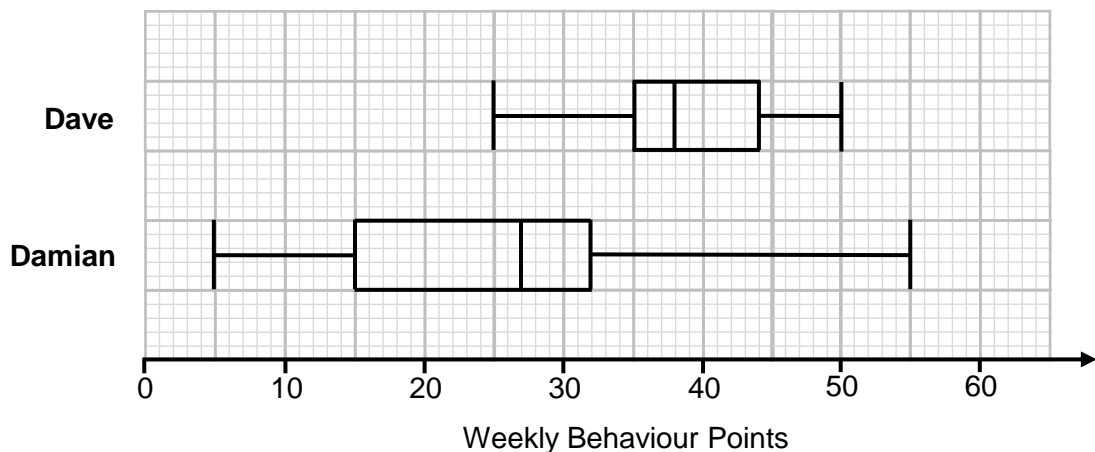
25% between minimum and LQ

$$260 \times 0.25 = 65$$

Answer 65



- 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.



- 5 (a) On average, who scored more weekly behaviour points? Give a reason for your answer. [2 marks]

Dave - as his median is higher at 38 compared to Damian's at 27.

- 5 (b) Who had more consistent weekly behaviour points? Give a reason for your answer. [2 marks]

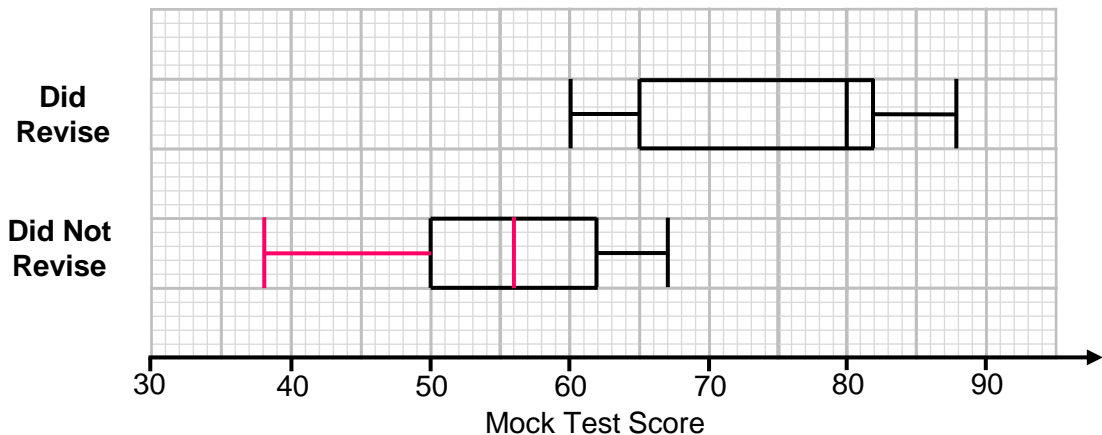
Dave - as his Interquartile range is lower at $44 - 35 = 9$ compared to Damian's at $32 - 15 = 17$.

- 5 (c) Dave says: "40% of my scores were below 35 points" Is Dave correct? Explain your answer. [1 mark]

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



- 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.



- 6 (a) The median test score for those who **did not** revise is 70% of the median score for those who **did** revise.
The range of the test scores for those who **did not** revise is 29.

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

[2 marks]

- 6 (b) Which students scored more marks on average? Tick one box.



Students who **did** revise.



Students who **did not** revise.

Give a reason for your answer.

[2 marks]

They have a higher median score of 80 compared to 56.

- 6 (c) Which test scores were more consistent? Tick one box.



Students who **did** revise.



Students who **did not** revise.

Give a reason for your answer.

[2 marks]

They have a lower interquartile range of $62 - 50 = 12$ compared to $82 - 65 = 17$



- 7 On Monday 15 students were late to school.
For each of the students, a teacher records their lateness in minutes.
The lateness for 14 of the 15 students is shown below.

1	1	1	2	2	3	4
4	5	5	6	7	10	12

The following statements apply to **all 15 students** that were late.
For each of the statements, tick the correct box.

[4 marks]

	Must be true	Could be true	Cannot be true
The maximum is 15 minutes	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
The median is 4 minutes	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The lower quartile is 1 minute	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
The interquartile range is 6 minutes	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>



- 8 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.

[4 marks]

Lowest value = x

x	$x+1$	$x+1$	$x+5$	$x+6$	$x+7$	$x+12$
	LQ		M		UQ	

$$x + x + 1 + x + 1 + x + 5 + x + 6 + x + 7 + x + 12 = 109$$

$$7x + 32 = 109$$

$$7x = 77$$

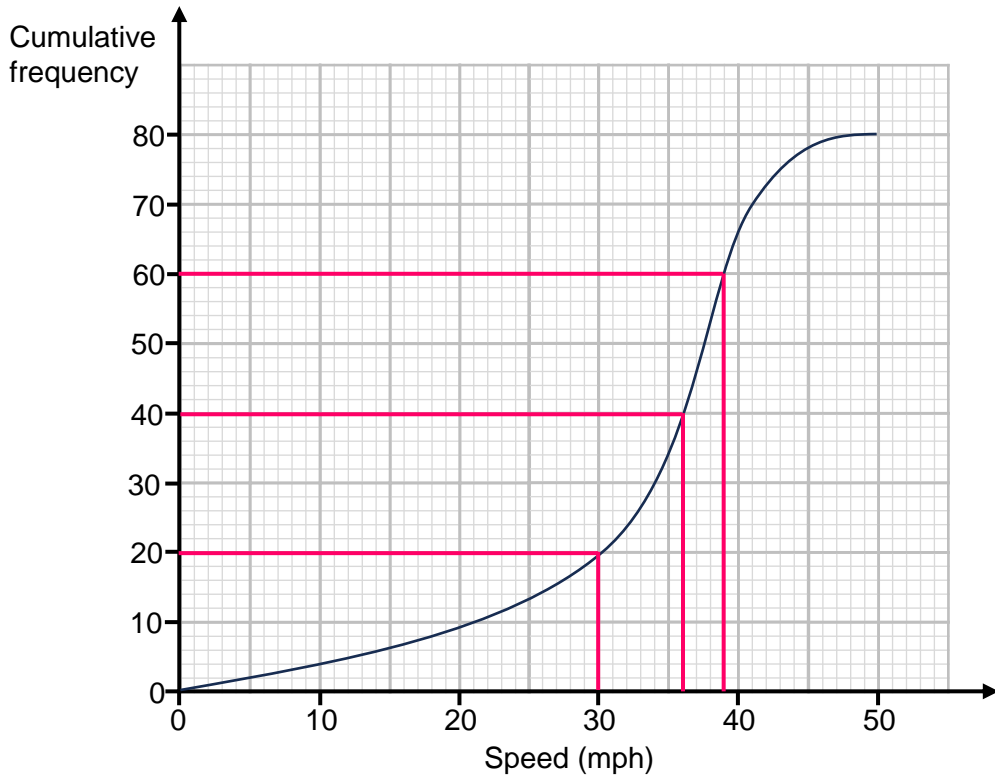
$$x = 11$$

Answer

11

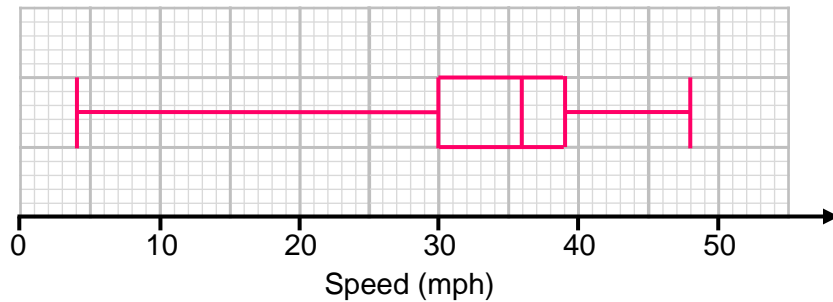


9 The cumulative frequency diagram shows information about the speeds of 80 vehicles travelling on a road.

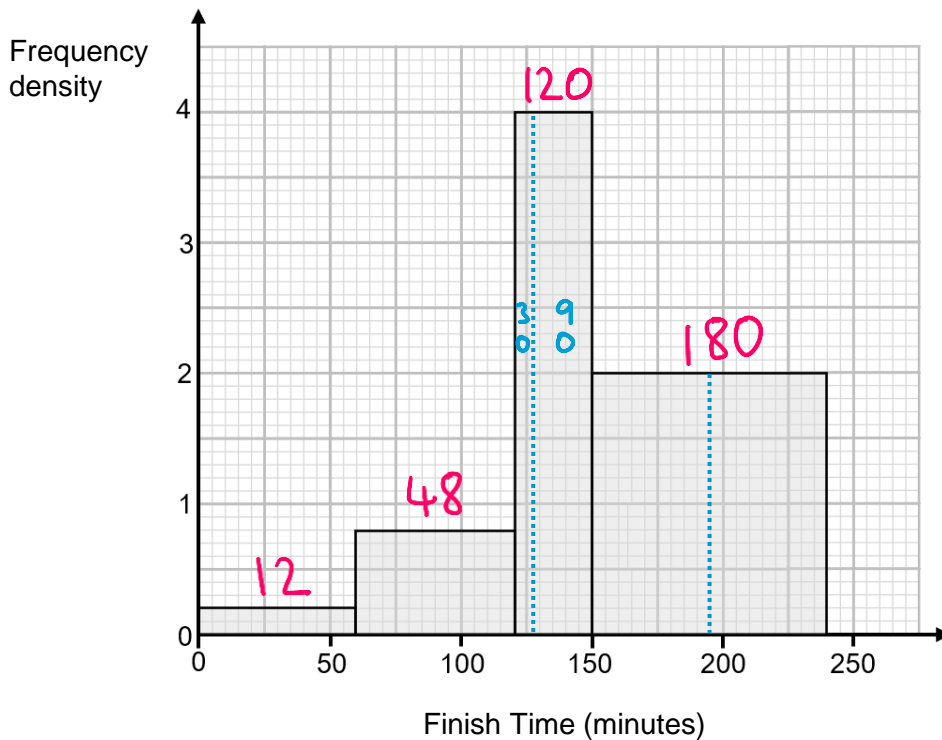


The speed of the slowest vehicle was 4 mph.
The speed of the fastest vehicle was 48 mph.

Draw a box plot on the grid below to show the speeds of the 80 vehicles. [3 marks]



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



The winner completed 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. [6 marks]

$$360 \div 2 = 180^{\text{th}} \text{ (median)} = 150 \text{ minutes}$$

$$360 \div 4 = 90^{\text{th}} \text{ (LQ)} = 127.5 \text{ minutes}$$

$$90 \times 3 = 270^{\text{th}} \text{ (UQ)} = 195 \text{ minutes}$$

