Box plots and comparing distributions

Grade 5 | Worked solutions

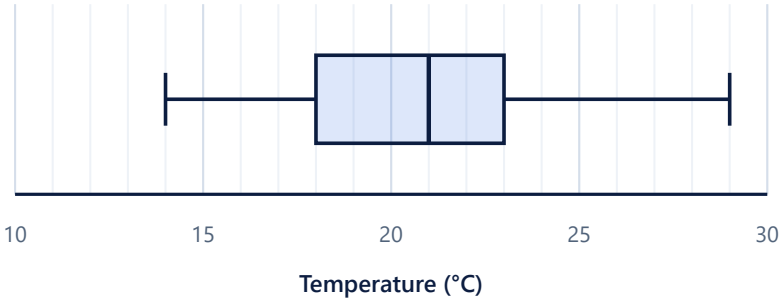
GCSE Statistics topic practice

1 The box plot shows the highest temperature, in °C, recorded in Leeds on each day in July.

a. Write down the median temperature. (1)

b. Work out the range of the temperatures. (1)

c. Work out the interquartile range of the temperatures. (1)



(3 marks)

a)

The line inside the box is at 21

b)

The whiskers end at 14 and 29

$29 - 14 = 15$

c)

The box goes from 18 to 23

$23 - 18 = 5$

a) 21°C b) 15°C c) 5°C

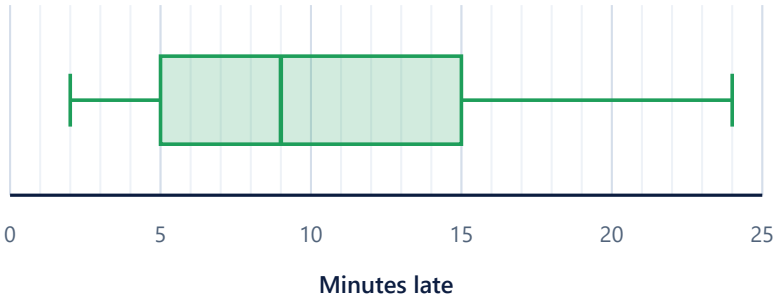
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2 Here are the numbers of minutes that 11 trains were late arriving at York. The numbers are in order.

2 3 5 6 8 9 11 14 15 18 24

a. Find the median, the lower quartile and the upper quartile. (2)

b. On the grid, draw a box plot for this information. (2)



(4 marks)

a)

$(11 + 1) \div 2 = 6$

Median is the 6th value, which is 9

$(11 + 1) \div 4 = 3$

Lower quartile is the 3rd value, which is 5

$3 \times 3 = 9$

Upper quartile is the 9th value, which is 15

b)

Box from 5 to 15 with the median line at 9.

Whiskers out to 2 and to 24.

a) median 9, quartiles 5 and 15 b) box plot drawn

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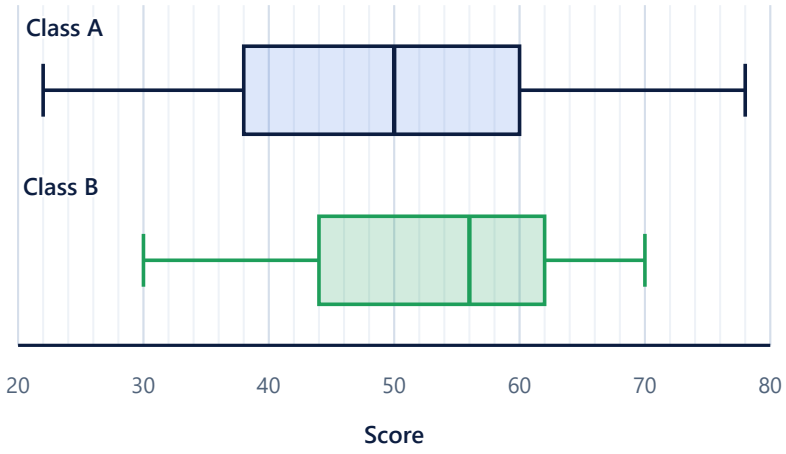
3 Class A and Class B sat the same statistics test. The box plot shows the scores for Class A. The table gives information about the scores for Class B.

Class B	Lowest score	Lower quartile	Median	Upper quartile	Highest score
Score	30	44	56	62	70

a. Work out the interquartile range of the scores for Class A. (1)

b. On the grid, draw a box plot for Class B. (2)

c. Compare the distributions of the scores for Class A and Class B. (2)



(5 marks)

a)

Lower quartile is 38 and upper quartile is 60

60 - 38 = 22

b)

Box from 44 to 62 with the median line at 56.

Whiskers out to 30 and to 70.

c)

Median for B is 56 and for A it is 50.

Class B scored higher on average.

IQR for B = 62 - 44

= 18

This is less than 22 for Class A.

The scores in Class B are more consistent.

a) 22 b) box plot drawn c) B higher, B more consistent

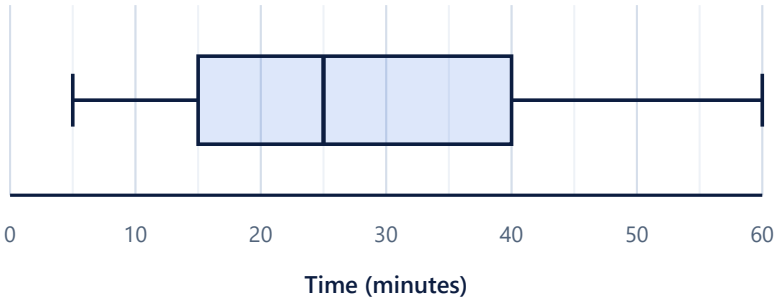
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4 The box plot shows the times, in minutes, that 200 pupils take to travel to school.

a. Work out the number of pupils who take more than 40 minutes. (2)

b. Write down the percentage of pupils who take between 15 minutes and 40 minutes. (1)

c. Abena says, "More pupils take between 25 and 40 minutes than between 15 and 25 minutes, because that part of the box is wider." Explain why Abena is wrong. (1)



(4 marks)

a)

40 is the upper quartile

25% of the pupils take longer than this

200 ÷ 4 = 50

b)

15 and 40 are the lower and upper quartiles

The box holds the middle 50% of the pupils

c)

Each part of the box holds 25% of the pupils,

which is 50 pupils in each part.

The wider part shows the times are more spread out.

a) 50 pupils b) 50% c) both parts hold 25%

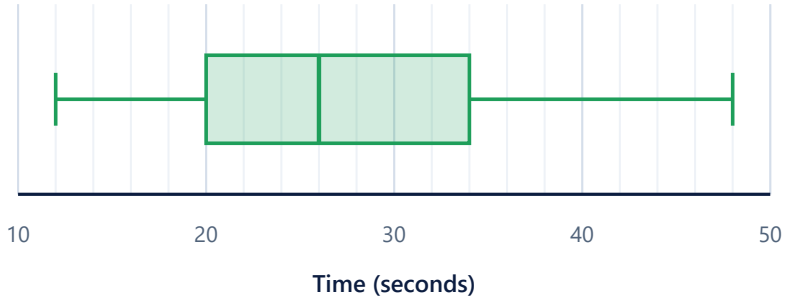
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5 Lin records the time, in seconds, that each pupil in Year 10 takes to solve a puzzle. Here is some information about the times.

Shortest time	Range	Lower quartile	Interquartile range	Median
12	36	20	14	6 more than the lower quartile

a. On the grid, draw a box plot for the Year 10 times. (3)

b. For the pupils in Year 11, the median time is 23 seconds and the interquartile range is 20 seconds. Compare the distributions of the times for Year 10 and Year 11. (2)



(5 marks)

a)

Longest time = 12 + 36

= 48

Upper quartile = 20 + 14

= 34

Median = 20 + 6

= 26

Box from 20 to 34 with the median line at 26.

Whiskers out to 12 and to 48.

b)

Median for Year 11 is 23 and for Year 10 it is 26.

Year 11 were quicker on average.

Interquartile range is 14 for Year 10

and 20 for Year 11.

The Year 10 times were more consistent.

a) box plot drawn b) Y11 quicker, Y10 more consistent

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