

Box PLOTS AND OUTLIERS

1a) Median: 53
Lower quartile: 35
Upper quartile: 60

$$b) \quad 60 + 1.5(60 - 35) = 97.5$$
$$35 - 1.5(60 - 35) = -2.5$$

only 110 is out of the range \therefore 110 is the only outlier.

2a) Median: 94
Lower quartile: 62
Upper quartile: 159

$$b) \quad 159 + 1.5(159 - 62) = 304.5$$
$$62 - 1.5(159 - 62) = -83.5$$

No data out of range \therefore no outliers.

3a) 17 minutes

b) They are outliers. Children who took much longer to complete the puzzle.

$$c) \quad 12 - 1.5(17 - 12) = 4.5$$
$$17 + 1.5(17 - 12) = 24.5$$

There are no outliers.

e) The median time for school B is greater (15 mins) than school A (14 mins) on average school B took longer to complete the puzzle. School B's times were less spread out IQR (5 mins) than school A IQR (6 mins).

- 1 In a study of how students use their mobile telephones, the phone usage of a random sample of 11 students was examined for a particular week.

The total length of calls, y minutes, for the 11 students were

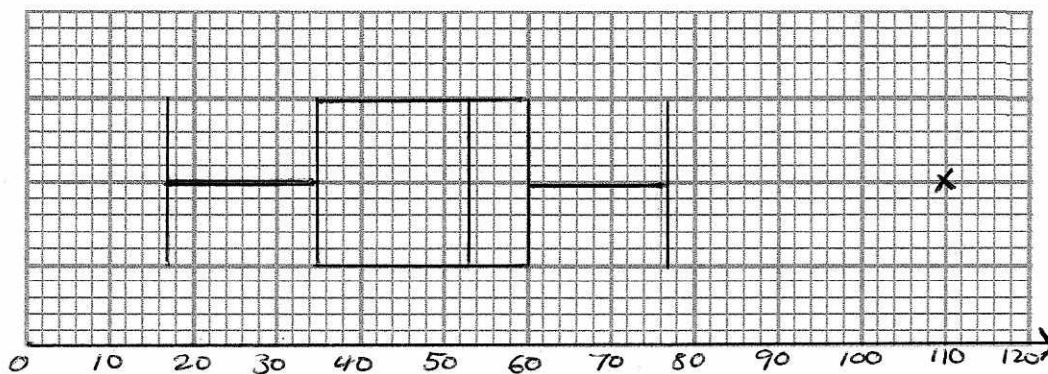
17, 23, 35, 36, 51, 53, 54, 55, 60, 77, 110

- (a) Find the median and quartiles for these data. (3)

A value that is greater than $Q3 + 1.5 \times (Q3 - Q1)$ or smaller than $Q1 - 1.5 \times (Q3 - Q1)$ is defined as an outlier.

- (b) Show that 110 is the only outlier. (2)

- (c) Draw a box plot for these data indicating clearly the position of the outlier. (3)



(Total for question 1 is 8 marks)

- 2 In a study of how much time students spend on social media, usage of a random sample of 15 students was examined for a particular day.

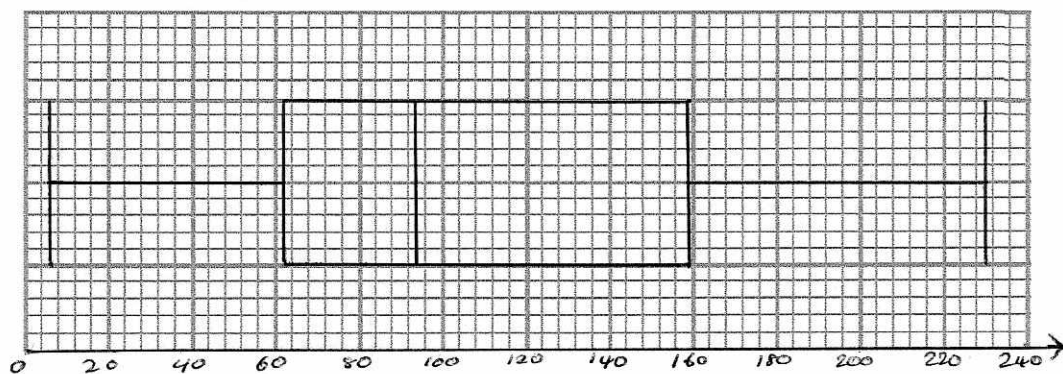
The total time of usage, x minutes, for the 15 students were

6, 25, 39, 62, 65, 74, 80, 94, 125, 127, 154, 159, 184, 210, 231

- (a) Find the median and quartiles for these data. (3)

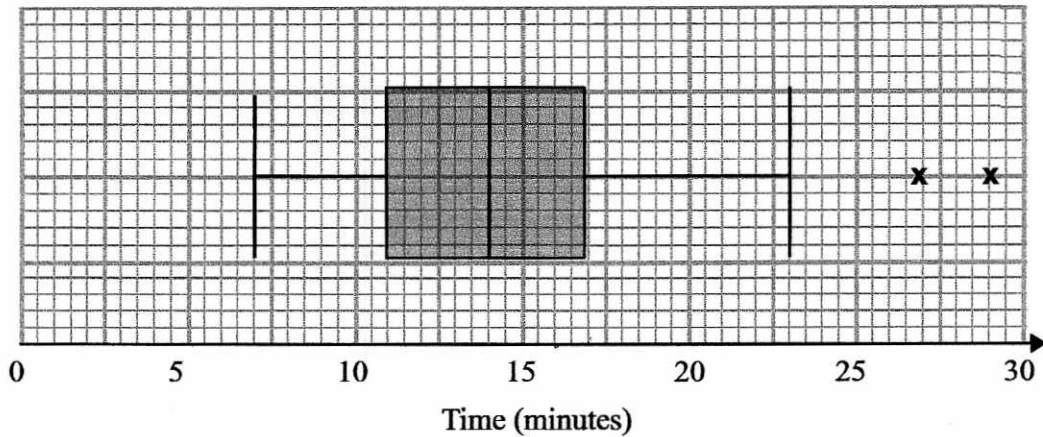
- (b) Show that there are no outliers. (2)

- (c) Draw a box plot for these data. (3)



(Total for question 2 is 8 marks)

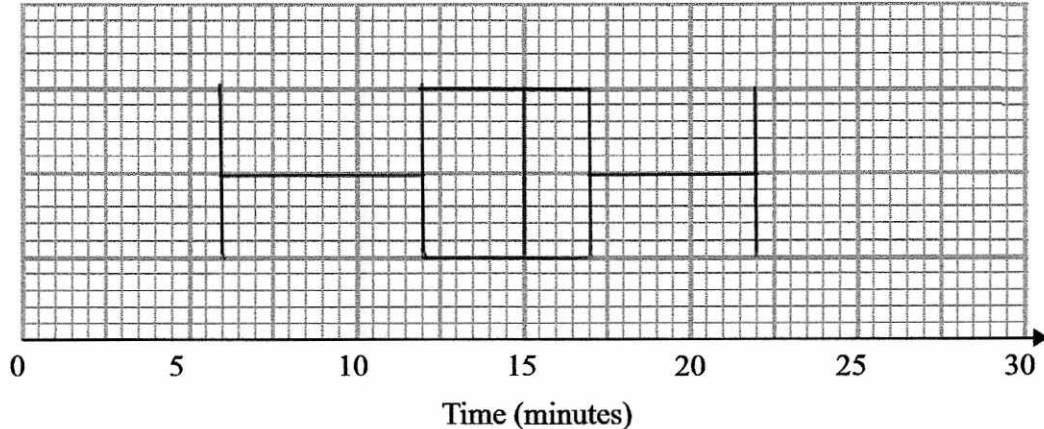
- 3 Children from two schools A and B took part in a competition to complete a puzzle. The distribution of times taken, to the nearest minute, by children in school A are shown in the box plot below.



- (a) Write down the time by which 75% of the children in school A had completed the puzzle. (1)
- (b) State what the two crosses (x) represent on the box plot above. Interpret these in context. (2)

For school B the shortest time taken was 6 minutes, the longest time taken was 22 minutes and the quartiles were 12, 15 and 17 minutes respectively.

- (c) Determine if there are any outliers. (3)
- (d) Draw a box plot for this information. (3)



- (e) Compare the two distributions. (3)

(Total for question 3 is 12 marks)