



S30-test Box Plots: Test Pack

EDEXCEL 1ST0 · Calculator allowed · about 20 minutes

Total Marks

Name: _____ Date: ____ / ____ / ____

Answer ALL questions. Show all your working.

- 1** Here is a list of five statistical terms used with box plots:

median, lower quartile, upper quartile, interquartile range, range

For each description (i) to (v), write down the term from the list that matches it.

- (i)** The value exactly in the middle of an ordered data set. **(1)**

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- (ii)** The value below which the bottom quarter of the data lies. **(1)**

.....

- (iii)** The value below which the top quarter of the data lies (i.e. 75% of the data is below it). **(1)**

.....

- (iv)** The difference between the upper quartile and the lower quartile. **(1)**

.....

- (v)** The difference between the maximum and the minimum values. **(1)**

.....

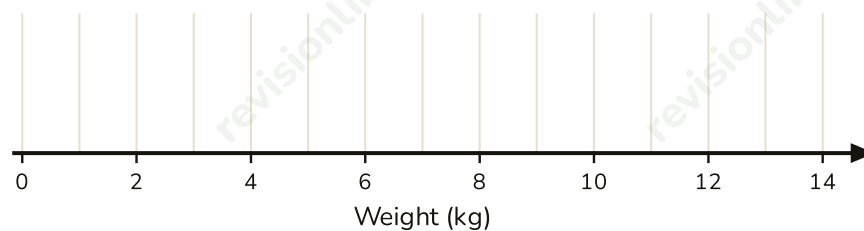
(Total for Question 1 is 5 marks)

2 The weights, in kg, of 11 parcels sent by a courier are shown below, in order:

2, 3, 3, 4, 5, 6, 6, 7, 8, 9, 12

(a) Find the median, the lower quartile and the upper quartile of the weights. **(3)**

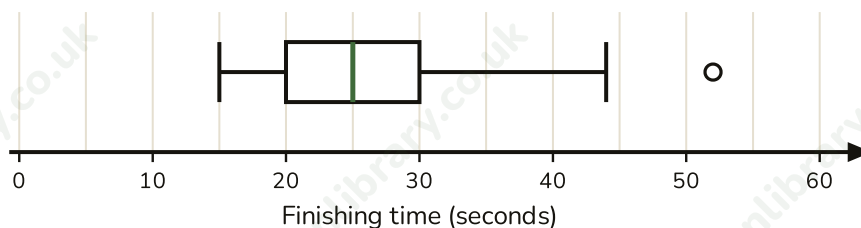
(b) On the grid provided, draw a box plot to show this data. **(3)**



(Total for Question 2 is 6 marks)

- 3** The box plot shows the finishing times, in seconds, of 30 runners in a sprint race. One runner's time, 52 seconds, is much slower than the rest and is plotted as a separate circle beyond the whisker, because it is an outlier.

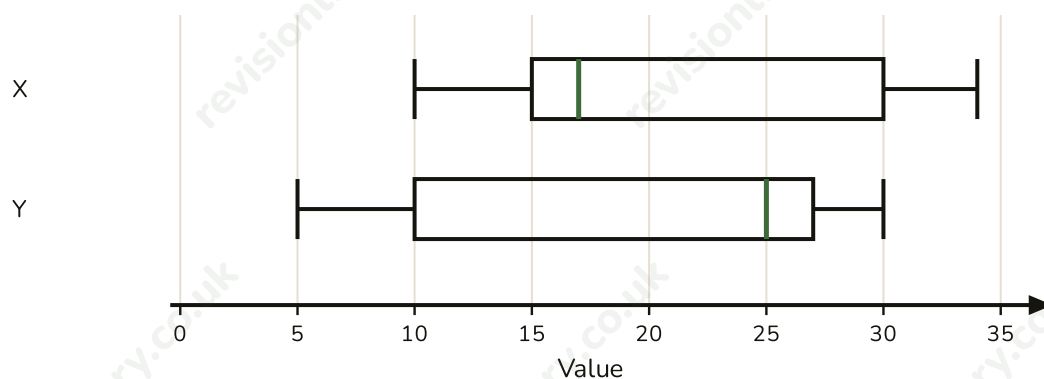
A value is classed as an outlier if it is more than $1.5 \times \text{IQR}$ above the upper quartile, or more than $1.5 \times \text{IQR}$ below the lower quartile.



- (a) Show that 52 seconds is an outlier. (2)
- (b) Write down the value that the upper whisker of the box plot is drawn to. (1)
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- (c) Write down the least finishing time recorded in the race. (1)
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(Total for Question 3 is 4 marks)

- 4 The box plots show two distributions, X and Y, plotted on the same scale.



- (a) State whether Distribution X is positively skewed, negatively skewed, or symmetrical. Give a reason based on the position of the median within the box. (2)
- (b) State whether Distribution Y is positively skewed, negatively skewed, or symmetrical. Give a reason based on the position of the median within the box. (2)

(Total for Question 4 is 4 marks)

Mark scheme · S30-test Box Plots: Test Pack

Question 1

- (i) **B1** median cao
- (i) **Answer: Median**
- (ii) **B1** lower quartile cao
- (ii) **Answer: Lower quartile**
- (iii) **B1** upper quartile cao
- (iii) **Answer: Upper quartile**
- (iv) **B1** interquartile range cao
- (iv) **Answer: Interquartile range**
- (v) **B1** range cao
- (v) **Answer: Range**

Question 2

- (a) **B1** median = 6 cao
- (a) **B1** lower quartile = 3 cao
- (a) **B1** upper quartile = 8 cao
- (a) **Answer: Median = 6 kg, lower quartile = 3 kg, upper quartile = 8 kg**
- (b) **B1** whiskers drawn to the minimum (2) and maximum (12)
- (b) **B1** box drawn from the lower quartile (3) to the upper quartile (8)
- (b) **B1** median (6) marked correctly inside the box, ft from (a), drawn accurately to scale
- (b) **Answer: Box plot: min 2 kg, LQ 3 kg, median 6 kg, UQ 8 kg, max 12 kg.**

Question 3

- (a) **M1** IQR = $30 - 20 = 10$, upper boundary = $30 + 1.5 \times 10 (= 45)$
- (a) **A1** $52 > 45$, so 52 seconds is an outlier
- (a) **Answer: $52 > 45$, so 52 seconds is an outlier.**
- (b) **B1** 44 cao
- (b) **Answer: 44 seconds**
- (c) **B1** 15 cao
- (c) **Answer: 15 seconds**

Question 4

- (a) **B1** median is much closer to the lower quartile ($17 - 15 = 2$) than to the upper quartile ($30 - 17 = 13$)
- (a) **B1** positively skewed (skewed to the right)
- (a) **Answer: Positively skewed (skewed to the right).**
- (b) **B1** median is much closer to the upper quartile ($27 - 25 = 2$) than to the lower quartile ($25 - 10 = 15$)
- (b) **B1** negatively skewed (skewed to the left)
- (b) **Answer: Negatively skewed (skewed to the left).**