HIGHER

6.12 Box Plots: 30-minute Pack

EDEXCEL 1MA1 · Calculator allowed · about 30 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 Eshaal recorded the number of minutes she spent practising the guitar on 7 days last week. The times, already written in order, were:

10, 15, 15, 20, 25, 30, 40

(a) Write down the median practice time. **(1)**

(b) Work out the range of practice times. **(1)**

(Total for Question 1 is 2 marks)

2 Box plots are a common way of displaying data.

(a) State one advantage of displaying data as a box plot rather than as a list of raw values. **(1)**

(b) State one piece of information about the data set that is lost when it is displayed as a box plot instead of the original list of values. **(1)**

(Total for Question 2 is 2 marks)

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3 A book club recorded the number of pages read last week by each of its 8 members, listed in order:

45, 52, 58, 60, 65, 70, 74, 81

(a) Find the median number of pages read. **(1)**

.....

(b) Find the lower quartile. **(1)**

.....

(c) Find the upper quartile. **(1)**

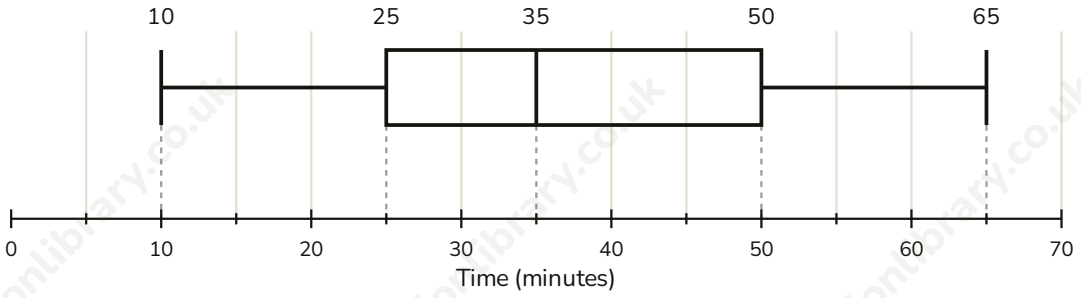
.....

(Total for Question 3 is 3 marks)

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4 The box plot below shows the time, in minutes, that a sample of Year 11 students spent on their maths homework one evening.

Minimum = 10, Lower quartile = 25, Median = 35, Upper quartile = 50, Maximum = 65



(a) Write down the median homework time. **(1)**

.....

(b) Work out the range of the homework times. **(1)**

.....

(c) Work out the interquartile range of the homework times. **(2)**

.....

(Total for Question 4 is 4 marks)

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5 A cafe measures the waiting time for coffee orders on a busy Saturday morning and on a quiet Tuesday morning. On the busy Saturday, the interquartile range of waiting times is 6 minutes. On the quiet Tuesday, the interquartile range of waiting times is 2 minutes. Explain what this tells you about the consistency of the waiting times on the two mornings.

.....

.....

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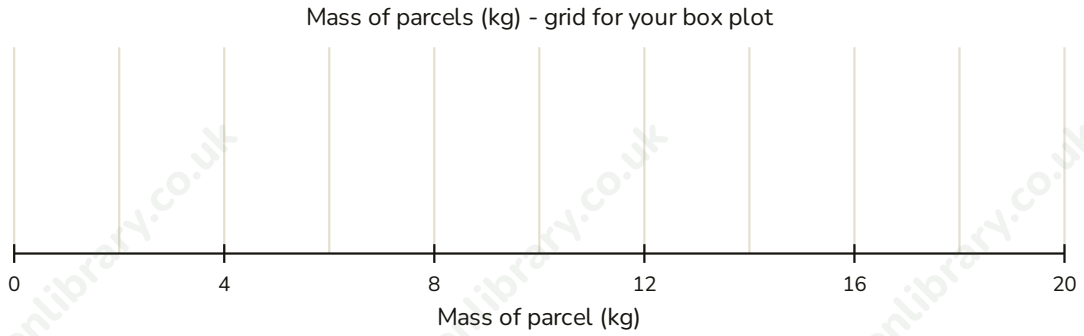
(Total for Question 5 is 2 marks)

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6 The five-number summary for the mass, in kg, of 45 parcels processed at a delivery depot is:

Minimum = 2, Lower quartile = 6, Median = 9, Upper quartile = 14, Maximum = 20

On the grid provided, draw a box plot for this data.



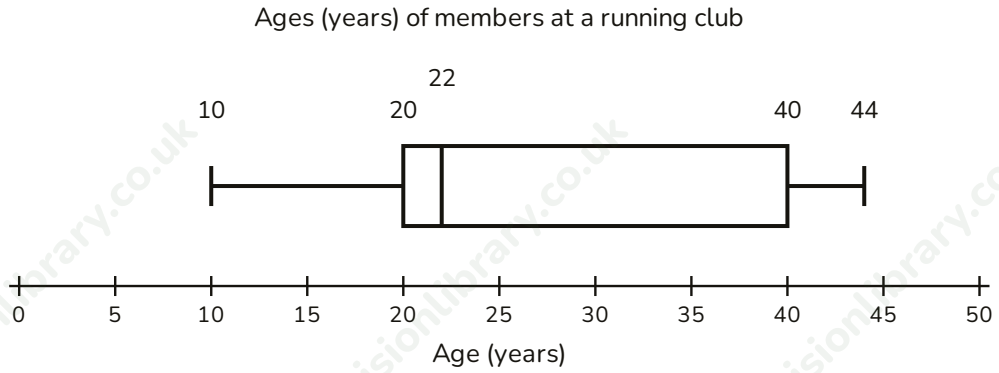
(Total for Question 6 is 4 marks)

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7 The box plot below shows the ages, in years, of members at a running club.

Minimum = 10, Lower quartile = 20, Median = 22, Upper quartile = 40, Maximum = 44

Describe the skewness of the distribution, giving a reason for your answer.



(Total for Question 7 is 2 marks)

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8 A list of 8 numbers, written in ascending order, is:

12, 15, 18, x, 24, 27, 30, 33

The median of the 8 numbers is 21.

(a) Find the value of x. **(2)**

.....

(b) Using your value of x, find the interquartile range of the 8 numbers. **(2)**

.....

(Total for Question 8 is 4 marks)

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Mark scheme · 6.12 Box Plots: 30-minute Pack

Question 1

(a) 20 minutes cao **B1**

(a) Answer: 20 minutes

(b) 30 minutes cao **B1**

(b) Answer: 30 minutes

Question 2

(a) oe: a box plot summarises a large data set clearly and makes it easy to compare the spread and location of two or more distributions at a glance **B1**

(a) Answer: A box plot summarises a large data set clearly, making it easy to compare the spread and centre of different distributions at a glance.

(b) oe: individual data values / exact frequencies are not shown, so, for example, the mode cannot be found from a box plot **B1**

(b) Answer: The individual data values are lost, so, for example, you cannot find the mode from a box plot.

Question 3

(a) 62.5 pages cao **B1**

(a) Answer: 62.5 pages

(b) 55 pages cao **B1**

(b) Answer: 55 pages

(c) 72 pages cao **B1**

(c) Answer: 72 pages

Question 4

(a) 35 minutes cao **B1**

(a) Answer: 35 minutes

(b) 55 minutes cao **B1**

(b) Answer: 55 minutes

(c) 50 - 25 oe **M1**

(c) 25 minutes cao **A1**

(c) Answer: 25 minutes

Question 5

oe: waiting times on the quiet Tuesday were much less spread out / far more consistent than on the busy Saturday **B1**

oe: because a smaller interquartile range means the middle 50% of waiting times varied by only 2 minutes on the quiet Tuesday, compared with 6 minutes on the busy Saturday **B1**

Answer: The quiet Tuesday's waiting times were far more consistent: the middle 50% of orders only varied by 2 minutes, compared with 6 minutes on the busy Saturday.

Question 6

box drawn correctly from the lower quartile (6) to the upper quartile (14) **B1**

median (9) correctly marked with a vertical line inside the box **B1**

whiskers drawn correctly from the box to the minimum (2) and to the maximum (20) **B1**

correct linear scale used with the axis labelled (mass, kg) **B1**

Answer: Box plot with min 2, LQ 6, median 9, UQ 14, max 20 (kg).

Question 7

correct conclusion: the distribution is positively skewed (skewed to the right, towards older ages) oe **B1**

valid reason, e.g. the gap between the upper quartile and the median (40 - 22 = 18) is much bigger than the gap between the median and the lower quartile (22 - 20 = 2), showing greater spread among the older members oe **B1**

Answer: Positively (right) skewed

Question 8

(a) $(x + 24)/2 = 21$ oe **M1**

(a) $x = 18$ cao **A1**

(a) Answer: $x = 18$

(b) ft: identifying LQ from the lower half (12,15,18,18) and UQ from the upper half (24,27,30,33) **M1**

(b) ft: IQR = 12 cao **A1**

(b) Answer: IQR = 12

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