2.18 Box Plots: 1-hour Pack

EDEXCEL 1ST0 · Calculator allowed · about 60 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 Two box plots show the masses, in kilograms, of each group. The five-figure summaries are in the table.

Statistic	Class 11A	Class 11B
Minimum	7	30
Lower quartile	19	35
Median	23	47
Upper quartile	34	59
Maximum	45	77

(a) Work out the interquartile range for Class 11A and for Class 11B.

(b) Write down one comparison of the averages and one comparison of the spread, in context.

(Total for Question 1 is 4 marks)

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2 Here are the number of customers served in a cafe in each of 11 hours.

38, 37, 43, 20, 42, 12, 11, 21, 25, 47, 16

Use position $(n + 1)/4$ for the lower quartile and $3(n + 1)/4$ for the upper quartile, where n is the number of values.

(a) Find the median.
(b) Work out the interquartile range.
(c) Work out the range.

(Total for Question 2 is 5 marks)

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3 Two box plots show the numbers of messages sent by each group in a day. The five-figure summaries are in the table.

Statistic	Class 11A	Class 11B
Minimum	23	9
Lower quartile	34	22
Median	41	32
Upper quartile	44	38
Maximum	55	47

(a) Work out the interquartile range for Class 11A and for Class 11B.
(b) Write down one comparison of the averages and one comparison of the spread, in context.

(Total for Question 3 is 4 marks)

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4 For the numbers of messages sent by a group of people in a day, the lower quartile is 24 and the upper quartile is 50. The smallest value is 14 and the largest value is 86. A value is an outlier if it is more than 1.5 x interquartile range below the lower quartile or above the upper quartile.

(a) Work out the interquartile range.

(b) Work out the limits beyond which a value is an outlier.

(c) State which of the smallest and the largest value, if any, are outliers.

(Total for Question 4 is 4 marks)

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5 Two box plots show the heights, in centimetres, of each group. The five-figure summaries are in the table.

Statistic	the north branch	the south branch
Minimum	28	27
Lower quartile	39	39
Median	51	48
Upper quartile	62	60
Maximum	76	69

(a) Work out the interquartile range for the north branch and for the south branch.

(b) Write down one comparison of the averages and one comparison of the spread, in context.

(Total for Question 5 is 4 marks)

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6 For the heights, in centimetres, of a group of people, the lower quartile is 24 and the upper quartile is 46. The smallest value is 14 and the largest value is 88. A value is an outlier if it is more than 1.5 x interquartile range below the lower quartile or above the upper quartile.

(a) Work out the interquartile range.

(b) Work out the limits beyond which a value is an outlier.

(c) State which of the smallest and the largest value, if any, are outliers.

(Total for Question 6 is 4 marks)

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7 Here are the time, in minutes, Hamza took to walk to school on 11 mornings.

37, 28, 29, 34, 15, 32, 11, 19, 35, 24, 20

Use position $(n + 1)/4$ for the lower quartile and $3(n + 1)/4$ for the upper quartile, where n is the number of values.

(a) Find the lower quartile.

(b) Find the upper quartile.

(c) Work out the interquartile range.

(Total for Question 7 is 6 marks)

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8 For the heights, in centimetres, of a group of people, the lower quartile is 22 and the upper quartile is 40. The smallest value is 10 and the largest value is 64. A value is an outlier if it is more than 1.5 x interquartile range below the lower quartile or above the upper quartile.

(a) Work out the interquartile range.

(b) Work out the limits beyond which a value is an outlier.

(c) State which of the smallest and the largest value, if any, are outliers.

(Total for Question 8 is 4 marks)

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9 Here are the waiting times, in minutes, of 15 patients at a clinic.

49, 41, 11, 5, 36, 24, 16, 42, 14, 7, 38, 53, 28, 41, 43

Use position $(n + 1)/4$ for the lower quartile and $3(n + 1)/4$ for the upper quartile, where n is the number of values.

(a) Find the median.

(b) Work out the interquartile range.

(c) Work out the range.

(Total for Question 9 is 5 marks)

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10 Two box plots show the numbers of messages sent by each group in a day. The five-figure summaries are in the table.

Statistic	boys	girls
Minimum	15	22
Lower quartile	26	30
Median	31	38
Upper quartile	37	44
Maximum	50	56

(a) Work out the interquartile range for boys and for girls.
(b) Write down one comparison of the averages and one comparison of the spread, in context.

(Total for Question 10 is 4 marks)

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11 Here are the number of emails Tom received on each of 15 school days.

27, 32, 20, 2, 24, 16, 3, 43, 7, 41, 18, 29, 14, 26, 32

Use position $(n + 1)/4$ for the lower quartile and $3(n + 1)/4$ for the upper quartile, where n is the number of values.

(a) Find the median.
(b) Work out the interquartile range.
(c) Work out the range.

(Total for Question 11 is 5 marks)

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12 Two box plots show the heights, in centimetres, of each group. The five-figure summaries are in the table.

Statistic	the north branch	the south branch
Minimum	30	29
Lower quartile	40	37
Median	51	47
Upper quartile	54	53
Maximum	68	71

(a) Work out the interquartile range for the north branch and for the south branch.
(b) Write down one comparison of the averages and one comparison of the spread, in context.

(Total for Question 12 is 4 marks)

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13 For the numbers of messages sent by a group of people in a day, the lower quartile is 28 and the upper quartile is 52. The smallest value is 15 and the largest value is 97. A value is an outlier if it is more than 1.5 x interquartile range below the lower quartile or above the upper quartile.
(a) Work out the interquartile range.
(b) Work out the limits beyond which a value is an outlier.
(c) State which of the smallest and the largest value, if any, are outliers.

(Total for Question 13 is 4 marks)

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Mark scheme · 2.18 Box Plots: 1-hour Pack

Question 1

upper quartile minus lower quartile	**M1**
15 and 24 cao	**A1**
Class 11B has the higher median (47 compared with 23)	**B1**
Class 11A has the smaller interquartile range, so the data is less spread out	**B1**

Answer: (a) Class 11A 15, Class 11B 24; (b) Class 11B has the higher median; Class 11A has the smaller IQR so is more consistent

Question 2

values put in order	**M1**
25 cao	**A1**
upper quartile minus lower quartile with both found	**M1**
26 cao	**A1**
36 cao	**B1**

Answer: (a) 25; (b) 26; (c) 36

Question 3

upper quartile minus lower quartile	**M1**
10 and 16 cao	**A1**
Class 11A has the higher median (41 compared with 32)	**B1**
Class 11A has the smaller interquartile range, so the data is less spread out	**B1**

Answer: (a) Class 11A 10, Class 11B 16; (b) Class 11A has the higher median; Class 11A has the smaller IQR so is more consistent

Question 4

26	**B1**
24 - 1.5 x 26 or 50 + 1.5 x 26	**M1**
-15 and 89 cao	**A1**
neither	**B1**

Answer: (a) 26; (b) -15 and 89; (c) neither

Question 5

upper quartile minus lower quartile	**M1**
23 and 21 cao	**A1**
the north branch has the higher median (51 compared with 48)	**B1**
the south branch has the smaller interquartile range, so the data is less spread out	**B1**

Answer: (a) the north branch 23, the south branch 21; (b) the north branch has the higher median; the south branch has the smaller IQR so is more consistent

Question 6

22	**B1**
24 - 1.5 x 22 or 46 + 1.5 x 22	**M1**
-9 and 79 cao	**A1**
the largest only	**B1**

Answer: (a) 22; (b) -9 and 79; (c) the largest only

Question 7

values in order; position 3 used	**M1**
19 cao	**A1**
values in order; position 9 used	**M1**
34 cao	**A1**
upper quartile minus lower quartile with both found	**M1**
15 cao	**A1**

Answer: (a) 19; (b) 34; (c) 15

Question 8

18	**B1**
22 - 1.5 x 18 or 40 + 1.5 x 18	**M1**
-5 and 67 cao	**A1**
neither	**B1**

Answer: (a) 18; (b) -5 and 67; (c) neither

Question 9

values put in order	**M1**
36 cao	**A1**
upper quartile minus lower quartile with both found	**M1**
28 cao	**A1**
48 cao	**B1**

Answer: (a) 36; (b) 28; (c) 48

Question 10

upper quartile minus lower quartile	**M1**
11 and 14 cao	**A1**
girls has the higher median (38 compared with 31)	**B1**
boys has the smaller interquartile range, so the data is less spread out	**B1**

Answer: (a) boys 11, girls 14; (b) girls has the higher median; boys has the smaller IQR so is more consistent

Question 11

values put in order	**M1**
24 cao	**A1**
upper quartile minus lower quartile with both found	**M1**
18 cao	**A1**
41 cao	**B1**

Answer: (a) 24; (b) 18; (c) 41

Question 12

upper quartile minus lower quartile	**M1**
14 and 16 cao	**A1**
the north branch has the higher median (51 compared with 47)	**B1**
the north branch has the smaller interquartile range, so the data is less spread out	**B1**

Answer: (a) the north branch 14, the south branch 16; (b) the north branch has the higher median; the north branch has the smaller IQR so is more consistent

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Question 13

24	**B1**
28 - 1.5 x 24 or 52 + 1.5 x 24	**M1**
-8 and 88 cao	**A1**
the largest only	**B1**

Answer: (a) 24; (b) -8 and 88; (c) the largest only

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