FOUNDATION & HIGHER

HIGHER EXTENDS

Name ..... Class .....

S4: Averages and spread

Interpret, analyse and compare distributions

20 marks · 25 minutes · Calculator allowed

1) Explain why the median is often better than the mean when the data have an outlier.

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[Question 1: 2 marks]

2) Show that the mean of 3, 5, 7, 9, 26 is 10 and the median is 7. Which is the better average here? Explain.

[Question 2: 3 marks]

3) Kim says the range shows consistency better than the interquartile range. Explain why she may be wrong.

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[Question 3: 2 marks]

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4) Class A: median 62, IQR 10. Class B: median 58, IQR 20. Make two comparisons in context.

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[Question 4: 2 marks]

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5) Explain why a mean calculated from a grouped frequency table is an estimate.

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[Question 5: 2 marks]

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6) Show that adding 5 to every value increases the mean by 5 but does not change the range.

[Question 6: 2 marks]

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7) Explain what a box plot shows about a set of data.

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[Question 7: 2 marks]

8) Explain why the mode is the only average that can be used for categorical data.

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[Question 8: 1 marks]

9) Is 100 an outlier in 1, 2, 2, 3, 100? Explain how it affects the mean.

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[Question 9: 2 marks]

10) Two data sets have the same mean but different ranges. What does this tell you?

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[Question 10: 2 marks]

End of paper – 20 marks in total

Answers and brief mark scheme

Q	Answer	Method / notes
1	Explanation	The mean is pulled towards the outlier (C1); the median is not (C1).
2	Shown; median	$\frac{50}{5} = 10$ (M1); median 7 (A1); 26 is an outlier, so median (C1).
3	Explanation	The range uses extreme values only, and outliers affect it (C2).
4	Explanation	A has a higher median, so did better on average (C1); A has a smaller IQR, so is more consistent (C1).
5	Explanation	Midpoints are used instead of actual values (C2).
6	Shown	Sum increases by $5n$, so mean by 5 (M1); max and min both increase by 5 (C1).
7	Explanation	Minimum, quartiles, median and maximum (C1); spread and centre (C1).
8	Explanation	Categories cannot be added or ordered (C1).
9	Yes	Far from other values (C1); it raises the mean a lot (C1).
10	Explanation	Similar average (C1); one is more spread out (C1).