

WA7MPSP3

Probability and statistics

Core + Challenge

Mean, Median, Mode and Range — Marking Key

I can find the mean, median, mode and range of a data set and decide which measure best describes the data.

For tutors and parents. Award method marks for correct working even if the final answer is wrong.

Marks summary

Section A Fluency: 16 Section B Core: 22 Section C Reasoning: 9 Section D Challenge: 9 **Total: 56**

Fluency: 1 mark each; accept an equivalent unsimplified answer for half credit at tutor's discretion.

A Fluency *answers and working*

/ 16 marks

Q	Answer	Working
1	8	sum $40 \div 5$
2	7	middle of ordered values
3	7	most frequent value
4	9	max – min
5	20	sum $120 \div 6$
6	19.5	middle of ordered values
7	no mode	most frequent value
8	18	max – min
9	3.025	sum $12.1 \div 4$
10	2.8	middle of ordered values
11	2.5	most frequent value
12	1.5	max – min
13	48	sum $336 \div 7$
14	48	middle of ordered values
15	52	most frequent value
16	22	max – min

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B

Core *answers, working and marks*

/ 22 marks

Q	Answer	Working / sample response	Marks
1	Mean 32, median 31, range 10	Sum $224 \div 7$; ordered: 28, 29, 30, 31, 33, 35, 38 <i>1 mark each</i>	3
2	73	$350 + 88 = 438$; $438 \div 6$ <i>1 mark: 438</i> <i>1 mark: 73</i>	2
3	21	Total 60; $60 - 39$ <i>1 mark: 60</i> <i>1 mark: 21</i>	2
4	Mode	The most common size is the one to stock; a mean size may not exist. <i>2 marks</i>	2
5	(a) mean \$812k, median \$510k (b) median	The \$2.1 million outlier pulls the mean up. <i>1 mark: mean</i> <i>1 mark: median</i> <i>1 mark: explanation</i>	3
6	Mean 37.5, median 39.5	$225 \div 6$; ordered middle: $(34 + 45) \div 2$ <i>1 mark each</i>	2
7	3.9	$6.8 - 2.9$ <i>1 mark: max/min</i> <i>1 mark: 3.9</i>	2
8	e.g. 8, 8, 8, 12, 14	Sum must be 50 <i>1 mark: sum 50</i> <i>1 mark: valid set</i>	2
9	Class B	Same mean, smaller spread <i>1 mark: B</i> <i>1 mark: range</i>	2
10	5	Symmetric about 5; or $45 \div 9$ <i>1 mark: 5</i> <i>1 mark: shortcut</i>	2

C

Reasoning *sample answers and marking criteria*

/ 9 marks

Q	Answer	Working / sample response	Marks
1	When there is an outlier	e.g. incomes or house prices <i>2 marks</i>	2
2	Yes	e.g. 1, 2, 3, 4 has mean 2.5 <i>1 mark: yes</i> <i>1 mark: example</i>	2

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Q	Answer	Working / sample response	Marks
3	Order first: median 7	3, 7, 9 $\rightarrow$ 7 1 mark: order 1 mark: 7	2
4	Mean +5, median +5, range unchanged	Every value shifts up by 5, but the gap between highest and lowest stays the same. 1 mark each	3

D

Challenge solutions and marking criteria

/ 9 marks

Q	Answer	Working / sample response	Marks
1	4, 4, 5, 6, 11	Sum 30; 4, 4, 5, x, y with $y - 4 = 7 \rightarrow y = 11, x = 6$ 1 mark: sum 30 1 mark: largest 11 1 mark: full set	3
2	22	$120 - 98$ 1 mark: totals 1 mark: 22	2
3	20	$100 \div 5$ 1 mark: 100 1 mark: 20	2
4	84	Needs total 400; $400 - 316$ 1 mark: 400 1 mark: 84	2