Year 10 mean, median and mode worksheet

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Name: _____ Date: _____

Question 1

Find the median, Q1, Q3 and interquartile range for the dataset: 12, 7, 15, 3, 9, 18, 11, 5, 14.

Answer: _____

Question 2

A dataset of ten reaction times (in milliseconds) is: 210, 230, 245, 250, 260, 275, 280, 290, 310, 480. For this dataset, Q1 = 245, Q3 = 290, and IQR = 45. Use the 1.5 × IQR rule to determine whether any values are outliers.

Answer: _____

Question 3

The daily temperatures (in °C) recorded over 12 days are listed below.

3, 7, 9, 12, 14, 16, 18, 21, 24, 27, 31, 35

What is the interquartile range (IQR) of this dataset?

Answer: _____

Question 4

A dataset of eight values is: 4, 9, 13, 17, 22, 26, 31, 58. Find Q1, Q3 and the IQR, then use the 1.5 × IQR rule to determine whether 58 is an outlier.

Answer: _____

Question 5

The number of books read last year by 10 students is shown in order:

3, 5, 6, 8, 9, 11, 12, 14, 15, 18

(a) Find the median.

(b) Find the range.

Answer: _____

Question 6

The five-number summary for a set of test marks is: minimum 12, lower quartile Q_1 = 18, median 25, upper quartile Q_3 = 31, maximum 40.

(a) Find the range.

(b) Find the interquartile range (IQR).

Answer: _____

Question 7

Here are 8 values in order:

2, 4, 7, 9, 12, 13, 17, 20

Find:

(a) the lower quartile Q_1

(b) the upper quartile Q_3

(c) the interquartile range.

Answer: _____

Question 8

A call centre records how many minutes customers spend on hold. For one day, $Q_1 = 20$ minutes and $Q_3 = 28$ minutes.

A value is an outlier if it is more than 1.5 × IQR below Q_1 or more than 1.5 × IQR above Q_3.

(a) Find the IQR.

(b) Find the lower and upper limits (fences) for outliers.

(c) Which of these waiting times would be outliers: 5, 10, 38, 42?

Answer: _____

Question 9

The ages of 16 people at a community gardening session are shown in this stem-and-leaf plot. The stem is the tens digit and the leaf is the units digit, so 1 mid 5 means 15.

Stem	Leaf
1	5 8 9
2	0 3 4 7
3	1 2 6 8
4	0 5 9
5	2 6

(a) Find the five-number summary.

(b) Find the interquartile range.

(c) Are there any outliers? Show how you decided.

Answer: _____

Question 10

Twenty households were asked how many pets they have.

Number of pets	**0**	**1**	**2**	**3**	**4**
Frequency	3	6	5	4	2

(a) Find the median.

(b) Find Q_1 and Q_3.

(c) Find the interquartile range.

Answer: _____

Year 10 mean, median and mode: answers and worked solutions

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Question 1

Key idea: Sort the data, find the median, then find Q1 and Q3 as the medians of the lower and upper halves.

1. Sort the data: 3, 5, 7, 9, 11, 12, 14, 15, 18 (9 values). 2. The median (Q2) is the 5th value: Q2 = 11. 3. Lower half (values below the median): 3, 5, 7, 9. Q1 is the median of these four values: Q1 = (5 + 7)/(2) = 6. 4. Upper half (values above the median): 12, 14, 15, 18. Q3 is the median of these four values: Q3 = (14 + 15)/(2) = 14.5. 5. Calculate the IQR: IQR = Q3 - Q1 = 14.5 - 6 = 8.5.

Answer: Q2 = 11, Q1 = 6, Q3 = 14.5, IQR = 8.5.

Question 2

Key idea: A value is an outlier if it lies below Q1 - 1.5 × IQR or above Q3 + 1.5 × IQR.

1. Calculate the lower fence: Q1 - 1.5 × IQR = 245 - 1.5 × 45 = 245 - 67.5 = 177.5. 2. Calculate the upper fence: Q3 + 1.5 × IQR = 290 + 1.5 × 45 = 290 + 67.5 = 357.5. 3. Any value below 177.5 or above 357.5 is an outlier. Check the extremes: the minimum is 210 > 177.5 (not an outlier), and the maximum is 480 > 357.5 (outlier).

Answer: 480 ms is an outlier. No values fall below the lower fence.

Question 3

Key idea: For an even-numbered dataset, split the ordered values into two equal halves. Q1 is the median of the lower half and Q3 is the median of the upper half. IQR = Q3 − Q1.

1. The data is already ordered: 3, 7, 9, 12, 14, 16, 18, 21, 24, 27, 31, 35. There are n = 12 values. 2. **Median (Q2):** Average of the 6th and 7th values = (16 + 18)/(2) = 17. 3. **Lower half** (first 6 values): 3, 7, 9, 12, 14, 16. Q1 = (9 + 12)/(2) = 10.5. 4. **Upper half** (last 6 values): 18, 21, 24, 27, 31, 35. Q3 = (24 + 27)/(2) = 25.5. 5. **IQR** = Q3 - Q1 = 25.5 - 10.5 = 15.

Answer: 15 °C

Question 4

Key idea: For an even-numbered dataset, split into two equal halves to find Q1 and Q3, then apply the outlier fences.

1. The data is already sorted: 4, 9, 13, 17, 22, 26, 31, 58 (n = 8). 2. Lower half: 4, 9, 13, 17. Q1 = (9 + 13)/(2) = 11. 3. Upper half: 22, 26, 31, 58. Q3 = (26 + 31)/(2) = 28.5. 4. IQR = 28.5 - 11 = 17.5. 5. Calculate the fences: Lower fence = 11 - 1.5 × 17.5 = 11 - 26.25 = -15.25. Upper fence = 28.5 + 1.5 × 17.5 = 28.5 + 26.25 = 54.75. Since 58 > 54.75, the value 58 is an outlier. No values fall below -15.25.

Answer: Q1 = 11, Q3 = 28.5, IQR = 17.5; 58 is an outlier (upper fence is 54.75).

Question 5

Answer: (a) 10 ((9 + 11)/(2)) (b) 15 (18 - 3)

Question 6

Answer: (a) 28 (b) 13 (31 - 18)

Question 7

Answer: (a) 5.5 ((4 + 7)/(2)) (b) 15 ((13 + 17)/(2)) (c) 9.5

Question 8

Answer: (a) 8 minutes (b) lower limit 8, upper limit 40 (20 - 12 and 28 + 12) (c) 5 and 42

Question 9

Answer: (a) 15, 21.5, 31.5, 42.5, 56 (b) 21 (c) No. Limits are 21.5 - 31.5 = -10 and 42.5 + 31.5 = 74; every age lies between them.

Question 10

Answer: (a) 2 (10th and 11th values are both 2) (b) $Q_1 = 1$, $Q_3 = 3$ (c) 2