Range, quartiles and interquartile range

6 questions | 14 marks

Equivalent correct methods earn the corresponding marks.

1. Find the range of 3,4,7,8,20. [2 marks]

$20 - 3 = 17$.

Answer: 17.

2. Find the five-number summary of 2,4,6,8,10,12,14. [2 marks]

The median is 8; half medians are 4 and 12.

Answer: $(2, 4, 8, 12, 14)$.

3. Find the IQR of 1,2,4,5,7,9,11,15. [2 marks]

$Q_1 = \frac{2+4}{2} = 3$; $Q_3 = \frac{9+11}{2} = 10$.

IQR $10 - 3 = 7$.

Answer: 7.

4. A box plot has summary $(5, 8, 11, 16, 25)$. State the median, IQR and range. [2 marks]

IQR $16 - 8 = 8$; range $25 - 5 = 20$.

Answer: Median 11; IQR 8; range 20.

5. Replace the largest observation 30 in 1,3,5,7,9,11,30 with 100. Compare range and IQR. [3 marks]

Median 7; $Q_1 = 3$ and $Q_3 = 11$ in both samples.

Changing only the extreme leaves the central-half summary unchanged.

Answer: Range rises from 29 to 99; IQR stays 8.

6. Two sets have the same five-number summary. Must their means be equal? Explain. [3 marks]

The summary fixes only selected positions and endpoints, not every intermediate observation.

Different intermediate values can change the total and mean.

Answer: No.