Exercise walk-through

Interpreting statistical data ▪ E9.2

eXercise

You must be able to

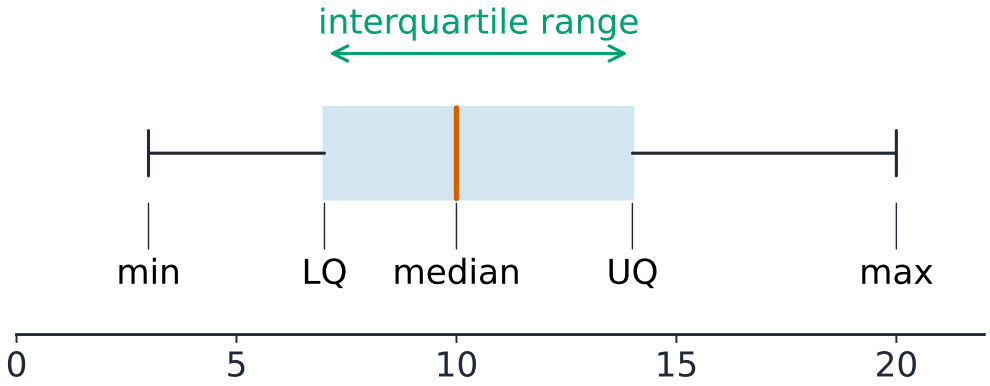
- find the mean, median, mode and range of a data set
- find the mean from a frequency table
- find the median, quartiles and interquartile range

Method — Averages and spread

- **Mean** $= \frac{\text{sum}}{\text{count}}$; **median** = middle (in order); **mode** = most common; **range** = max − min.
- **Mean from a frequency table:** $\frac{\sum(\text{value}\times\text{frequency})}{\sum\text{frequency}}$.
- **Interquartile range 四分位距** = UQ − LQ (ignores extreme values).

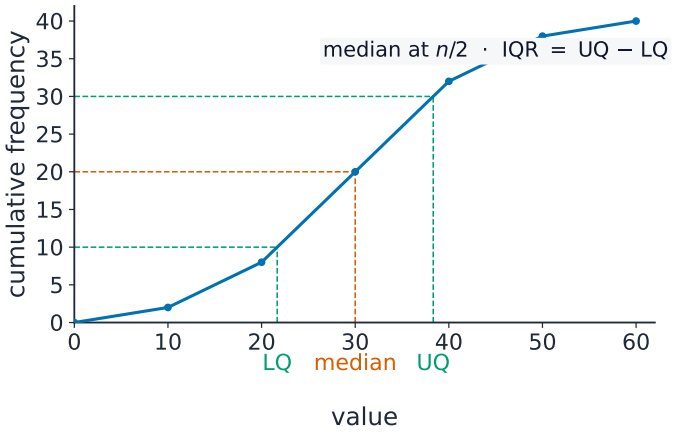
Answer shapes: **M1** a correct method, **A1** the correct answer.

Method — Averages and spread



A box-and-whisker plot shows the five-number summary

Method — Averages and spread



A cumulative frequency curve gives the median and quartiles

Practice 2.1 ▪ 2 marks

Find the median and range of $4, 7, 7, 2, 5$.

Solution 2.1

Method: Averages and spread

Worked steps

ordered: $2, 4, 5, 7, 7 \to$ median $= 5$; range $= 7 - 2 = 5$ M1 A1 *for ordering; for median* 5 *and range* 5.

Practice 2.2 ▪ 1 mark

Find the mode of $3, 5, 5, 5, 8, 9$.

Solution 2.2

Worked steps

mode $= 5$ B1.

Practice 2.3 ▪ 2 marks

Find the mean of $6, 8, 10, 12$.

Solution 2.3

Worked steps

$\frac{6+8+10+12}{4} = \frac{36}{4} = 9$ M1 A1 *for the sum ÷ 4; for* 9.

Exam-style 3.1 ▪ 3 marks

The values $1, 2, 3$ occur with frequencies $4, 5, 1$. Calculate the mean.

Solution 3.1

Method: Averages and spread

Worked steps

$\frac{1(4)+2(5)+3(1)}{4+5+1} = \frac{4+10+3}{10} = \frac{17}{10} = 1.7$ **M1** **M1** **A1** *for* $\sum(\textit{value} \times \textit{freq})$*; for* $\div$ *total* 10*; for* 1.7.

Exam-style 3.2 ▪ 2 marks

Here is a data set in order: $4, 6, 7, 9, 10, 12, 13, 15$.
(a) Find the median.
(b) Find the interquartile range.

Solution 3.2

Method: Averages and spread

Worked steps

(a) median $= \frac{9+10}{2} = 9.5$ M1 A1 *for the middle pair; for* 9.5. (b) lower quartile $= \frac{6+7}{2} = 6.5$; upper quartile $= \frac{12+13}{2} = 12.5$; IQR $= 12.5 - 6.5 = 6$ M1 M1 A1 *for LQ; for UQ; for* 6.