

Exercise walk-through

Cumulative frequency diagrams ■ E9.6

eXercise

You must be able to

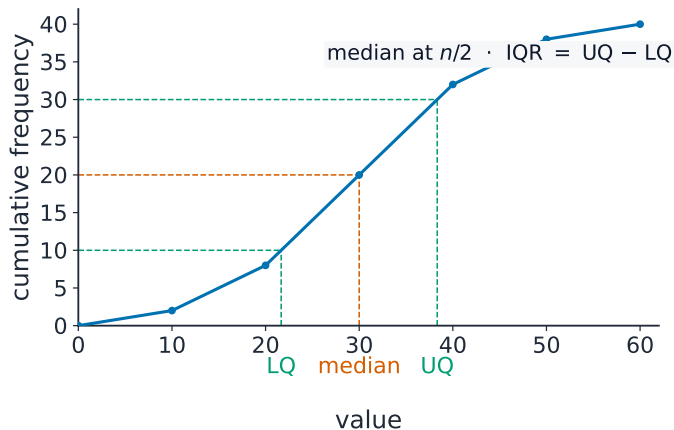
- complete a cumulative frequency table
- read the median and quartiles from a cumulative frequency curve
- find the interquartile range

Method — Reading a cumulative frequency curve

- **Cumulative frequency** 累积频数: add each frequency to the running total; plot at the **upper** end of each class.
- **Median** at $\frac{1}{2}$ of the total; **LQ** at $\frac{1}{4}$; **UQ** at $\frac{3}{4}$.
- **IQR** = $UQ - LQ$.

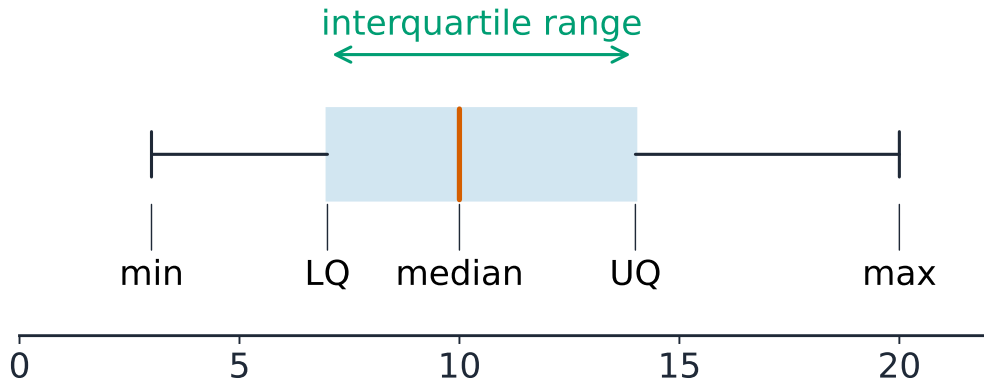
Answer shapes: **M1** a correct method, **A1** the correct answer.

Method — Reading a cumulative frequency curve



Read the median at half the total, quartiles at one quarter and three quarters

Method — Reading a cumulative frequency curve



Quartiles from the curve feed a box-and-whisker plot

Practice 2.1 ■ 2 marks

The frequencies of four classes are 5, 8, 10, 7. Write down the cumulative frequencies.

Solution 2.1

Worked steps

5, 13, 23, 30 **M1** **A1** *for a running total; for the full set.*

Practice 2.2 ■ 1 mark

A data set has a total cumulative frequency of 80. At what cumulative frequency do you read the median?

Solution 2.2

Method: Reading a cumulative frequency curve

Worked steps

at $\frac{80}{2} = 40$ **B1**.

Practice 2.3 ■ 1 mark

At what cumulative frequency do you read the lower quartile if the total is 80?

Solution 2.3

Method: Reading a cumulative frequency curve

Worked steps

at $\frac{80}{4} = 20$ **B1**.

Exam-style 3.1 ■ 1 mark

A cumulative frequency curve is drawn for 200 students' test marks.

- (a) State the cumulative frequency at which you read the upper quartile.
- (b) From the curve, the lower quartile is 42 and the upper quartile is 63. Find the interquartile range.

Solution 3.1

Method: Reading a cumulative frequency curve

Worked steps

(a) at $\frac{3}{4} \times 200 = 150$ **B1**. (b) $\text{IQR} = 63 - 42 = 21$ **M1** **A1** for $UQ - LQ$; for 21.

Exam-style 3.2 ■ 2 marks

The cumulative frequencies 0, 6, 20, 45, 60 are given for five class boundaries. Find the total frequency, and the cumulative frequency used to read the median.

Solution 3.2

Method: Reading a cumulative frequency curve

Worked steps

total frequency = 60; the median is read at $\frac{60}{2} = 30$ **M1** **A1** *for total = 60; for 30.*