

# E9.6 Cumulative frequency diagrams

Name: \_\_\_\_\_ Class: \_\_\_\_\_ Date: \_\_\_\_\_

Total: 9 marks

**KEY WORDS** cumulative frequency 累积频数 • cumulative frequency diagrams 累积频数图 • percentile 百分位数  
 • frequency 频数 • quartile 四分位数

## Objective

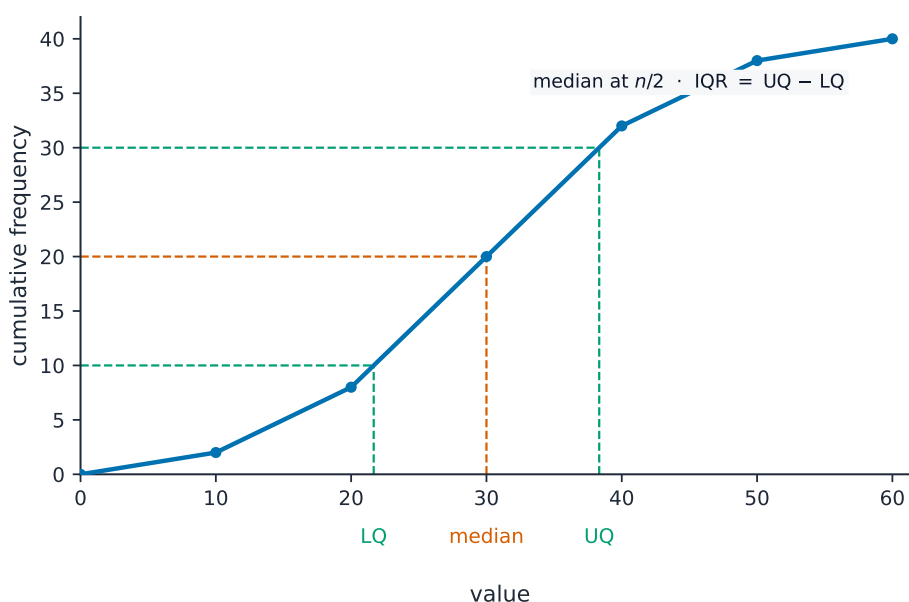
Build the skills to answer Extended exam questions on **cumulative frequency diagrams** 累积频数图 — the running total, and reading the **median, quartiles and percentiles** 中位数、四分位数、百分位数 from the curve.

You must be able to:

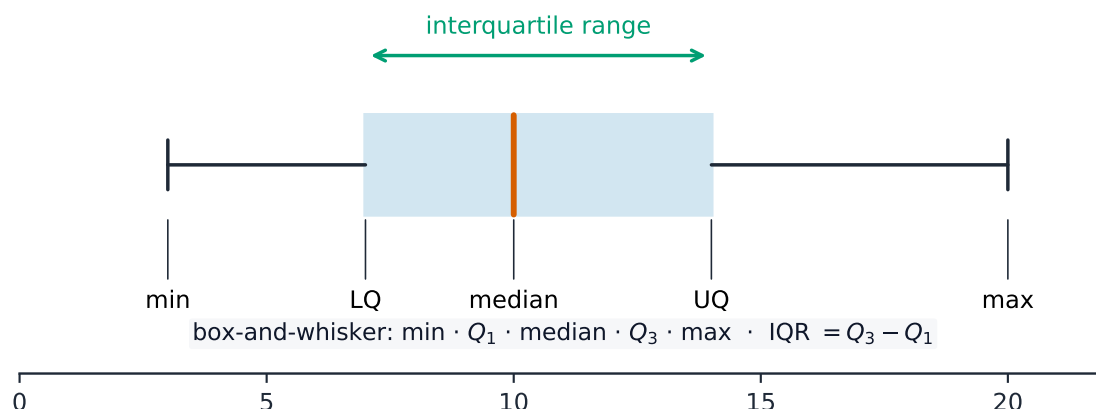
- complete a cumulative frequency table
- read the median and quartiles from a cumulative frequency curve
- find the interquartile range

## 1 Worked examples

### ■ Reading a cumulative frequency curve



*The cumulative frequency is a running total*



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

- **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.

## 2 Practice

**2.1** The frequencies of four classes are 5, 8, 10, 7. Write down the cumulative frequencies.[2]

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**2.2** A data set has a total cumulative frequency of 80. At what cumulative frequency do you read the median? [1]

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**2.3** At what cumulative frequency do you read the lower quartile if the total is 80? [1]

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### 3 Exam-style questions

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

(a) State the cumulative frequency at which you read the upper quartile. [1]

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(b) From the curve, the lower quartile is 42 and the upper quartile is 63. Find the interquartile range. [2]

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**3.2** 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. [2]

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## Solutions

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Marking: **M1** a correct method, **A1** the correct answer.

**2.1** 5, 13, 23, 30.

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

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

**3.1** (a) at  $\frac{3}{4} \times 200 = 150$ . (b)  $\text{IQR} = 63 - 42 = 21$ .

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