

6.3 Cumulative

Name: _____ Class: _____ Date: _____

KEY WORDS interquartile range

<!-- Session 2 native-skill companion -->

Objective

Practise cumulative within the labelled native lessons. Public original tasks; locally authored answer guidance.

1 Key knowledge and worked examples

■ Cumulative frequency and box plots · Higher

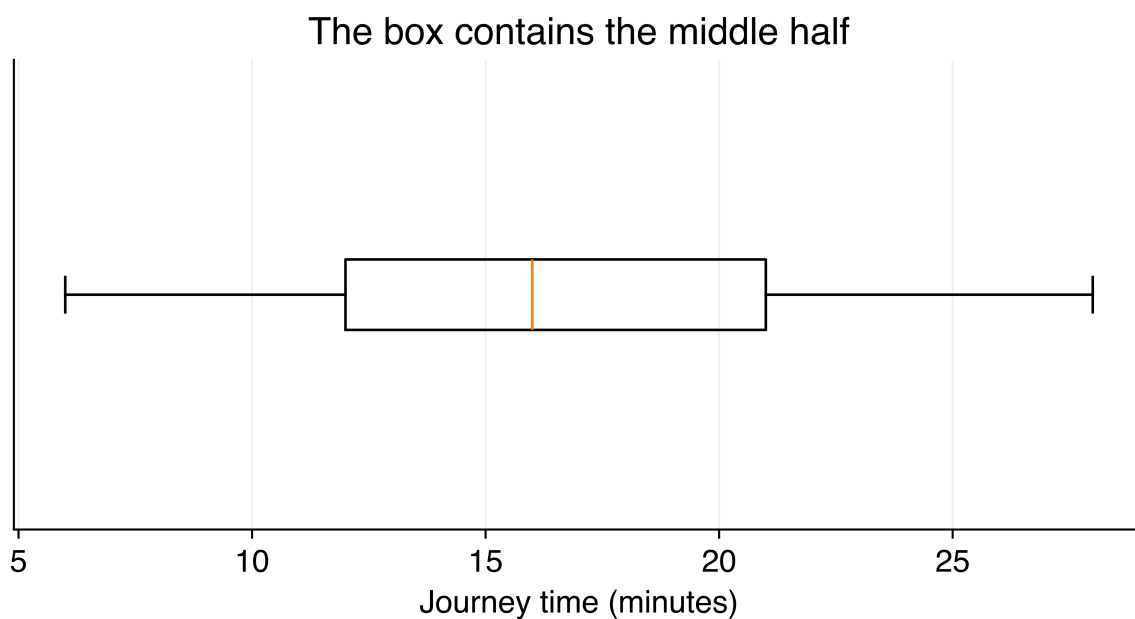
A cumulative frequency counts observations below successive class boundaries. Read quartiles at one quarter, one half and three quarters of the total frequency. A box plot represents minimum, lower quartile, median, upper quartile and maximum.

$$\text{IQR} = Q_3 - Q_1$$

For 80 observations, read Q_1 at cumulative frequency 20, median at 40 and Q_3 at 60. If $Q_1=12, Q_3=21$, then $\text{IQR}=9$. Compare the medians for typical journey time and the IQRs for consistency.

Plot against class boundaries rather than midpoints. Grouped quartiles are estimates. The range is sensitive to extremes; the IQR describes only the middle half.

Explain a comparison in the context of the measured quantity. An outlier rule may use $Q_1-1.5\text{IQR}$ and $Q_3+1.5\text{IQR}$; use the rule specified in the task rather than assuming every graph follows it.



Original native-lesson illustration; labels belong to its worked example.

2 Practice

2.1 (Higher) Find the IQR when $Q1=12, Q3=21$.

2.2 (Higher) For 80 observations, find the cumulative frequency used for the median.

2.3 (Higher) For $Q1=12, IQR=9$, find $Q1-1.5IQR$.

3 Exam-style questions

3.1 Decide whether this claim is true. Justify with a concrete calculation or counterexample: The interquartile range always equals the maximum minus the minimum.

Solutions

2.1 $\text{IQR} = Q_3 - Q_1 = 21 - 12 = 9$.

2.2 The median position is half the total cumulative frequency: $80/2 = 40$.

2.3 The lower outlier fence is $12 - 1.5 \times 9 = -1.5$.

3.1 False. A five-number summary 1, 3, 5, 8, 12 has IQR $8 - 3 = 5$ and range $12 - 1 = 11$.

Local review guidance: show the chosen method; give the checked result; explain the condition or failed shortcut. This is authored classroom guidance.