

6.1.5 Boxplot Comparisons

Name: _____ Class: _____ Date: _____

KEY WORDS interquartile range

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

Objective

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

1 Key knowledge and worked examples

■ Quartiles, box plots and distribution comparisons · Higher

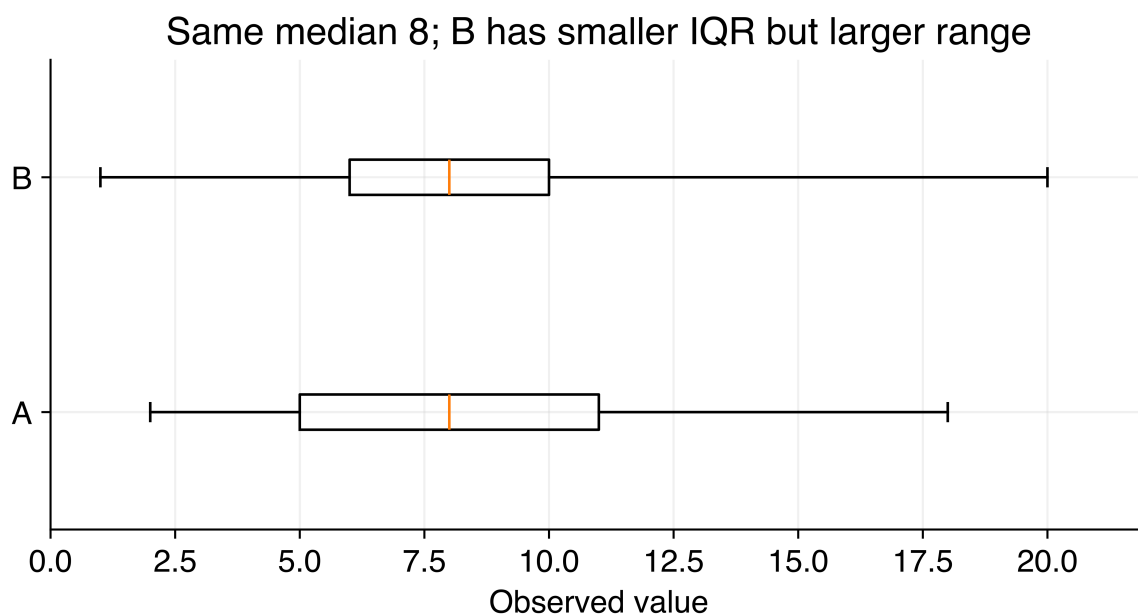
A box plot marks minimum, lower quartile Q_1 , median, upper quartile Q_3 and maximum, or identifies separately shown outliers according to the stated convention. $IQR = Q_3 - Q_1$ describes the middle half. Compare median and IQR in context; a smaller IQR suggests less middle-half variation, not necessarily a smaller full range. Quartile conventions vary for a finite raw list, so follow the task or supplied summaries.

$$IQR = Q_3 - Q_1$$

Group A has summary 2,5,8,11,18 and group B has 1,6,8,10,20. Both medians are 8. A has $IQR=6$ and $range=16$; B has $IQR=4$ and $range=19$. B's middle half is more consistent although its full range is larger. Under a stated $1.5 \times IQR$ outlier rule, A's fences are $5-9=-4$ and $11+9=20$; a new value 23 lies above the upper fence. This rule is a specified convention, not a compulsory rule for every box plot. When using cumulative frequency, read Q_1 at $N/4$ and Q_3 at $3N/4$, then subtract; small reading errors affect the estimated IQR.

The median line need not be halfway along the box. Equal medians do not mean identical distributions. Whisker meanings depend on whether outliers are drawn separately; read the stated convention.

AQA S4 Higher adds box plots, quartiles and IQR to distribution comparisons. Name both centre and spread, with units and context, and avoid claims about all observations from just the box.



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

2 Practice

2.1 (Higher) Find IQR for $Q_1=5, Q_3=11$.

2.2 (Higher) Find range for minimum 2, maximum 18.

2.3 (Higher) Under the stated 1.5 IQR rule, find the upper fence for those quartiles.

3 Exam-style questions

3.1 Decide whether this claim is true. Justify with a concrete calculation or counterexample: Equal medians prove that two groups have the same spread.

Solutions

2.1 $11-5=6$.

2.2 $18-2=16$.

2.3 $11+1.5\times 6=20$.

3.1 False. Groups $\{0,5,10\}$ and $\{4,5,6\}$ both have median 5 but ranges 10 and 2. Compare an appropriate spread measure as well as the centre.

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