

Exercise walk-through

6.1.5

Boxplot Comparisons

AQA · GCSE · Mathematics

22. Samples, populations and justified comparisons · Foundation

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In a random sample of 80 students, 24 walk to school, so the observed proportion is $24/80=0.3$. Applied to a school of 600 it suggests about 180 walkers, with sampling uncertainty: it is an estimate rather than an exact count. A sports-club convenience sample may overrepresent active students. A voluntary online poll can miss people who do not respond; adding responses does not necessarily remove that bias. A study should record who could be selected, missing responses and the question wording.

53. Quartiles, box plots and distribution comparisons · Higher

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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.

55. Quartiles, box plots and distribution comparisons · Higher

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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 Q1 at $N/4$ and Q3 at $3N/4$, then subtract; small reading errors affect the estimated IQR.

Exercises 2.1·2.3

2.1 (Higher) Find IQR for $Q1=5, Q3=11$.

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

Exercises 2.1·2.3

2.1 (Higher) Find IQR for $Q1=5, Q3=11$.

2.1 $11-5=6$.

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

2.2 $18-2=16$.

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

3 Exam-style questions

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

Exercise 3.1

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.

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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.