

Exercise walk-through

6.1.4

Grouped Summaries

AQA · GCSE · Mathematics

27. Choosing displays, pie charts and time series · Foundation

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Use separate bars for categories, vertical line charts for discrete numerical values and time-ordered lines for a time series. Pie-chart sector angle is $\text{frequency}/\text{total} \times 360^\circ$. A pictogram needs a stated key and honest fractional symbols. Label axes/units and choose a scale that does not conceal the relevant variation. Continuous grouped distributions need histograms rather than categorical bars.

33. Frequency summaries and grouped estimates · Foundation

Frequency summaries and grouped estimates · Foundation

For exact value frequencies, mean is $\text{sum}(\text{value} \times \text{frequency}) / \text{total frequency}$. Locate the median using cumulative counts. For interval data, use class midpoints to estimate a mean; the exact values are unknown. The modal class has greatest frequency, which need not be the tallest unequal-width histogram bar. Compare a suitable average and spread, in context, and state the limitations of grouping or outliers.

35. Frequency summaries and grouped estimates · Foundation

Frequency summaries and grouped estimates · Foundation

Values 1,2,3 with frequencies 2,5,3 give total 10 and weighted sum $2+10+9=21$, so mean is 2.1. The fifth and sixth observations are both 2, giving median 2 and mode 2. For continuous classes $0 \leq x < 10, 10 \leq x < 20, 20 \leq x < 30$ with frequencies 2,5,3, midpoints 5,15,25 give estimated sum $10+75+75=160$ and estimated mean 16. The modal class is $10 \leq x < 20$. The range of individual observations cannot be recovered exactly from these intervals. For values 2,4,4,6,24, mean is 8 and median 4; the unusually large value raises the mean.

Exercises 2.1·2.3

2.1 (Foundation) Find mean of values 1,2,3 with frequencies 2,5,3.

2.2 (Foundation) Find midpoint-estimated mean for classes 0–10,10–20,20–30 with frequencies 2,5,3.

2.3 (Foundation) Find median of 2,4,4,6,24.

3 Exam-style questions

Exercises 2.1·2.3

2.1 (Foundation) Find mean of values 1,2,3 with frequencies 2,5,3.

2.1 Weighted total 21 divided by count 10.

2.2 (Foundation) Find midpoint-estimated mean for classes 0–10,10–20,20–30 with frequencies 2,5,3.

2.2 Weighted midpoint sum 160 divided by 10.

2.3 (Foundation) Find median of 2,4,4,6,24.

3 Exam-style questions

2.3 Sort and select the central third observation.

Exercise 3.1

3.1 Decide whether this claim is true. Justify with a concrete calculation or counterexample: A grouped midpoint mean is always the exact mean of the original measurements.

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3.1 False. In the class $[0,10)$, the observations 1 and 2 have mean 1.5, while using midpoint 5 estimates mean 5. Midpoints replace unknown individual values.

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