

Exercise walk-through

6.1.1

Data

AQA · GCSE · Mathematics

20. Samples, populations and justified comparisons · Foundation

Samples, populations and justified comparisons · Foundation

Define the target population and variables before sampling. A sample is a subset; a census includes the whole population. Random selection reduces systematic selection bias but does not eliminate sampling variability or non-response. Primary data is collected for the present investigation; secondary data was collected by another source or purpose. Discrete data is counted; continuous data is measured.

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 the range of 2,4,4,6,9.

2.2 (Foundation) Find the mean of 2,4,4,6,9.

2.3 (Foundation) Find the median of 2,4,4,6,9.

Exercises 2.1·2.3

2.1 (Foundation) Find the range of 2,4,4,6,9.

2.1 Range=maximum-minimum=9-2=7.

2.2 (Foundation) Find the mean of 2,4,4,6,9.

2.2 The total is 25 across five observations: mean= $25/5=5$.

2.3 (Foundation) Find the median of 2,4,4,6,9.

2.3 The sorted list is 2,4,4,6,9. Its third observation is 4.

Exercises 2.4·3.1

2.4 (Higher) Find the density for frequency 30 and class width 10.

3.1 Decide whether this claim is true. Justify with a concrete calculation or counterexample: The mean of a list must always be one of its observed values.

Exercises 2.4·3.1

2.4 (Higher) Find the density for frequency 30 and class width 10.

2.4 $\text{Density} = \text{frequency} / \text{class width} = 30 / 10 = 3$.

3.1 Decide whether this claim is true. Justify with a concrete calculation or counterexample: The mean of a list must always be one of its observed values.

3.1 False. The values 1 and 2 have mean 1.5, which is not observed. A mean balances the sum; it need not be a member of the list.

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