

Exercise walk-through

6.1.3

Statistical Samples

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.

22. Samples, populations and justified comparisons · Foundation

Samples, populations and justified comparisons · Foundation

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.

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 sample walker proportion for 24 of 80.

2.2 (Foundation) Estimate walkers in a population of 600 from this proportion.

2.3 (Foundation) Find non-walkers in the sample.

3 Exam-style questions

Exercises 2.1·2.3

2.1 (Foundation) Find the sample walker proportion for 24 of 80.

2.1 $24/80=0.3$.

2.2 (Foundation) Estimate walkers in a population of 600 from this proportion.

2.2 $600 \times 0.3 = 180$.

2.3 (Foundation) Find non-walkers in the sample.

3 Exam-style questions

2.3 $80-24=56$.

Exercise 3.1

3.1 Decide whether this claim is true. Justify with a concrete calculation or counterexample: A sample result gives an exact population count whenever the arithmetic is correct.

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3.1 False. A sample with 24 walkers out of 80 estimates 30%; applying it to 600 estimates 180 walkers. The unobserved people may have a different proportion, so arithmetic correctness does not remove sampling uncertainty.

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