Comparing samples and sample sizes

6 questions | 15 marks

Equivalent correct methods earn the corresponding marks.

1. Compare 12 of 20 with 42 of 100 as percentages. [3 marks]

$12 \div 20 \times 100 = 60$; $42 \div 100 \times 100 = 42$.

Answer: 60% and 42%; the first proportion is larger.

2. A random sample of 25 from 500 students includes 10 cyclists. Estimate the population count and state a limitation. [3 marks]

$\frac{10}{25} = 0.4$.

$0.4 \times 500 = 200$.

Answer: About 200; sampling variation may affect the estimate.

3. Why might 1000 responses from sports-club members still misrepresent all students' exercise? [2 marks]

Large size cannot remove systematic under-coverage.

Answer: The frame excludes non-members.

4. An unusual value is included in samples of 10 and 100, with otherwise similar observations. In which does it influence the mean more? [2 marks]

Each observation has weight $\frac{1}{10}$ rather than $\frac{1}{100}$ in the mean.

Answer: The sample of 10.

5. Name two details to match when comparing samples as evidence of a change over time. [2 marks]

A changed group or question could explain the result instead of time.

Answer: For example, the target population and measurement definition.

6. Which usually produces more stable proportions: random samples of 20 or 200? Is exact agreement guaranteed? [3 marks]

Larger random samples usually reduce variation, but chance differences remain.

Answer: 200; exact agreement is not guaranteed.