Year 8 Statistics and sampling - Topic test

15 questions | 39 marks | 45 minutes

Progressive questions combine techniques, interpretation and reasoned applications. All practice data are supplied.

Equivalent correct methods earn the corresponding marks.

1. A school has 640 students and surveys 80 about lunch choices. Identify population and sample. [2 marks]

The intended whole group differs from the observed subset.

Answer: Population: 640 students; sample: the 80 surveyed.

2. Every member of a class of 28 replies. Census or sample of that class? [1 mark]

All units in the defined population are included.

Answer: Census.

3. A researcher records existing exercise habits without changing them. Which type of study? [1 mark]

No condition is assigned.

Answer: Observational.

4. Give a fair method for selecting 20 of 200 students. [2 marks]

Use a complete frame and a chance selection method.

Answer: Number all students and fairly draw 20 distinct numbers.

5. A systematic sample starts at 6 with interval 15. List its first four entries. [2 marks]

Add 15 each time.

Answer: 6,21,36,51.

6. Sections contain 300 and 450 students. Allocate a proportional sample of 50. [3 marks]

Total 750.

$50 \times \frac{300}{750} = 20;\ 50 \times \frac{450}{750} = 30.$

Answer: 20 and 30.

7. You reuse a published transport table. Classify the source and name one check. [2 marks]

Existing data still need suitability checks.

Answer: Secondary; check date, location, units or method.

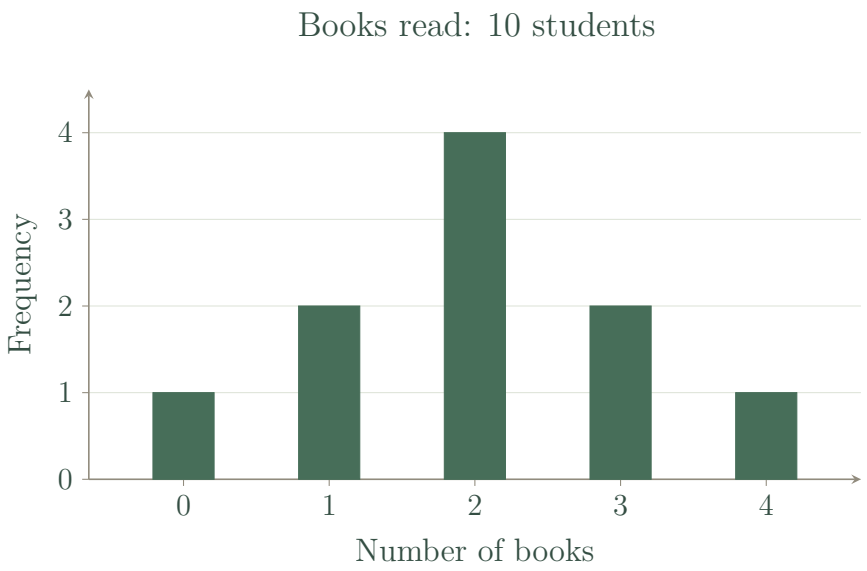
8. Find mean, median, mode and range for 4,5,5,6,10. [4 marks]

Total 30; mean $30 \div 5 = 6$.

Middle 5; 5 occurs twice; $10 - 4 = 6$.

Answer: Mean 6; median 5; mode 5; range 6.

9. Use the table to find student count and mean books read. [3 marks]



Example data: books read in one week

Books	Frequency
0	1
1	2
2	4
3	2
4	1

Frequency total 10; weighted total 20; $20 \div 10 = 2$.

Answer: 10 students; mean 2 books.

10. Columns for counts 24 and 30 begin their vertical scale at 20. Explain the distortion. [3 marks]

The baseline alters visual comparisons of column heights.

Answer: Heights 4 and 10 suggest a 2.5-to-1 ratio instead of the actual counts 24 and 30.

11. Compare 18 of 30 with 35 of 70 as percentages. [3 marks]

Use each sample’s own denominator.

Answer: 60% and 50%; the first proportion is larger.

12. Of 200 invitees, 120 reply and 72 say yes. State the observed percentage and a limitation. [3 marks]

$72 \div 120 \times 100 = 60\%$; the other 80 views are unknown.

Answer: 60% of respondents; non-response may make this unrepresentative.

13. Why might a chess-club survey misrepresent all students' favourite lunchtime activities? [2 marks]

The frame favours a relevant group.

Answer: Club members may prefer chess more than students generally.

14. Plan a fair comparison of two paper-plane designs: name the changed factor, two controls and why to repeat. [4 marks]

Separate design effects from other influences and avoid relying on one flight.

Answer: Change design; keep paper and launch similar; repeat to observe variation.

15. Use the journey table to describe centre, spread and one limitation. [4 marks]

Original practice data: one-way journey times for eight sampled students

Code	Minutes
A	5
B	10
C	10
D	15
E	15
F	15
G	20
H	30

$120 \div 8 = 15$, middle 15, range $30 - 5 = 25$. The result does not describe every student.

Answer: Mean and median 15 minutes; range 25; only eight sampled students.