Statistics - Practice test 2

16 questions | 46 marks | 55 minutes

Use different representations and missing-value questions, then evaluate an investigation.

Equivalent correct methods earn the corresponding marks.

1. Twenty names are drawn randomly from a complete roll of 200 students. What makes selection random? [2 marks]

The frame includes all 200.

Names are not selected for convenience or their expected answers.

Answer: Chance determines the names, with each student given the same chance under this method.

2. A survey records favourite sport and training sessions per week. Identify the categorical variable. [2 marks]

Sport is a label.

The number of sessions is numerical count data.

Answer: Favourite sport.

3. The values 5,7,9 and x have mean 8. Find x. [3 marks]

Required total $4 \times 8 = 32$.

Known total 21, so $x = 32 - 21 = 11$.

Answer: $x = 11$.

4. Ten observations have mean 6 and another 20 have mean 9. Find the mean of all 30. [3 marks]

Group totals $10 \times 6 = 60$ and $20 \times 9 = 180$.

Combined mean $(60 + 180)/30 = 8$, not 7.5.

Answer: 8.

5. Use the supplied stem-and-leaf plot. Find median and range. [3 marks]

Key: 1|2 means 1.2 kg.

Stem	Leaves
1	2 5 9
2	0 1

Data: 1.2,1.5,1.9,2.0,2.1 kg.

Middle 1.9; range $2.1 - 1.2 = 0.9$.

Answer: Median 1.9 kg; range 0.9 kg.

6. A representative sample finds 84 of 120 households recycle food scraps. Estimate the count among 1,500 households. [3 marks]

$84/120 = 0.7$.

$0.7 \times 1500 = 1050$.

Answer: About 1,050 households.

7. Why does a fair sample of 1,000 usually give a steadier estimate than a fair sample of 10? [2 marks]

One response changes a sample of 10 by 10 percentage points.

One response changes a sample of 1,000 by 0.1 percentage point.

Answer: Individual responses have less influence, so chance sample-to-sample variation is usually smaller.

8. Year-group populations are 240,180,180. Allocate a proportional sample of 60. [3 marks]

Total 600; sampling fraction $60/600 = 0.1$.

Take 10% from each group.

Answer: 24,18,18 students.

9. From the frequency table, calculate mean and median. [4 marks]

Value	Frequency
0	1
1	3
2	4
3	2

(a) Calculate the mean. [2 marks]

Weighted total 17; frequency 10.

Answer: 1.7.

(b) Find the median. [2 marks]

The fifth and sixth ordered values are 2.

Answer: 2.

10. A: 6,7,8,9,10. B: 4,8,8,8,12. Explain why equal means do not give the full comparison. [3 marks]

Both totals 40.

Spread and frequencies differ.

Answer: Both means 8; A range 4 and B range 8. B has three values at 8 and more extreme endpoints.

11. Rewrite fairly: Surely everyone prefers the wonderful new timetable, don't they? [2 marks]

Remove praise and the suggested universal answer.

Offer balanced choices and unsure.

Answer: How do you rate the new timetable compared with the previous timetable?

12. A graph places times 0,1,2,10 hours at equal horizontal intervals. Explain why its slopes could mislead. [3 marks]

Time(h)	Reading
0	5
1	6
2	7
10	8

Horizontal distance should represent actual elapsed time.

Redraw with proportional time spacing before comparing slopes visually.

Answer: The final eight-hour interval is drawn like a one-hour interval.

13. Choose a display for the distribution of 30 measured student heights. Explain. [2 marks]

Height is numerical.

Use units and a consistent scale revealing clusters and spread.

Answer: A dot plot or stem-and-leaf plot preserves values; sensible grouped intervals can show overall shape.

14. A confirmed typo changes the last value in 0,1,1,2,11 to 1. Find the mean before and after correction. [3 marks]

Original total 15, mean $15/5 = 3$.

Corrected total 5, mean $5/5 = 1$. Document the confirmed correction.

Answer: Before 3; after 1.

15. A has 80 supporters out of 100; B has 45 out of 50. Which support rate is higher? [3 marks]

$45/50 = 0.9 = 90\%$.

Compare proportions, not the raw counts.

Answer: B: 90%, compared with A: 80%.

16. Compare the reading-time samples in the table. Find medians and ranges, then give one limitation of a conclusion. [5 marks]

A(h)	B(h)
2	1
2	3
3	3
4	4
9	4

(a) Calculate each median and range. [4 marks]

Third values 3; ranges $9-2$ and $4-1$.

Answer: Both medians 3; ranges A 7 and B 3.

(b) State one limitation. [1 mark]

Only five observations per group.

Answer: Small or unrepresentative samples limit generalisation.