

AP Statistics - Sampling Methods and Bias in Surveys - Test Answer Key

Common Core AP STAT 3.1, AP STAT 3.2, AP STAT 3.3, HSS-IC.B.3 · maths-pdf.fr/en/

Each solution includes a scoring guide. Give credit for naming the correct method or bias and for explaining why it applies to the situation described.

AP Statistics · Common Core State Standards: **AP STAT 3.1, AP STAT 3.2, AP STAT 3.3, HSS-IC.B.3**

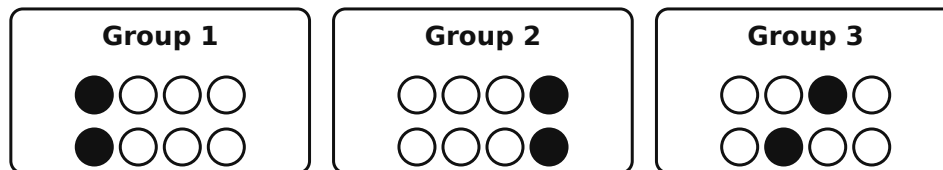
Question 1 - Population and statistic [2 pts]

Population: all 3,000 members. Sample: 150 members. Statistic: $\hat{p} = \frac{60}{150} = 0.40$.

3,000 members; 150 members; 40%.

Scoring: 1 point for population and sample, 1 point for the statistic 0.40.

Question 2 - Identify the method [3 pts]



Population in three groups.

(a) Stratified random sample: some individuals are chosen from every group.

(b) In a cluster sample, entire groups are randomly chosen and every member of a chosen group is included; the other groups are not sampled at all.

Stratified; clusters include whole groups only.

Scoring: 1 point for stratified; 2 points for a correct contrast.

Question 3 - Random digits [3 pts]

Random digits
42 17 88 63 17 05 29 71 36

Random digits.

42 selected, 17 selected, 88 skipped (out of range), 63 skipped (out of range), 17 skipped (repeat), 05 selected, 29 selected.

Members 42, 17, 05, 29.

Scoring: 1 point for reading pairs, 1 point for skipping out-of-range and repeats, 1 point for the correct list.

Question 4 - Bias in a poll [3 pts]

- (a) Voluntary response bias.
- (b) Only readers with strong opinions are likely to vote, and readers of the site may differ from other residents.
- (c) Take an SRS of city residents and follow up with nonresponders.

Voluntary response; unrepresentative; random sample.

Scoring: 1 point per part.

Question 5 - Stratified sizes [3 pts]

Fraction: $\frac{100}{1000} = 0.10$. Office: 50. Drivers: 30. Warehouse: 20.

SRS of 50 office staff, 30 drivers, and 20 warehouse workers.

Scoring: 1 point for strata, 1 point for the fraction, 1 point for the sizes.

Question 6 - Sample size and bias [2 pts]

Taking more people with the same flawed method still favors the same kinds of people.

No. A larger sample reduces variability, not bias.

Scoring: 1 point for no, 1 point for the explanation.

Question 7 - Sampling variability [2 pts]

Different students are in each sample.

Sampling variability: random samples give different statistics, but both estimate the same parameter.

Scoring: 1 point for different samples, 1 point for sampling variability.

Question 8 - Choose and justify [2 pts]

Neighborhoods differ from each other, so each should be represented.

A stratified sample (an SRS from each neighborhood) represents every neighborhood.

Scoring: 1 point for stratified, 1 point for the reason.

Total
20 points