

Sampling, Inference & Experimental Design

Foundation to Challenge

Practice should make the test feel easier, not merely familiar.

Work without the answer key first. When you finish, use the QR code on the final page to check your answers online.

FOUNDATION

- 1** A library wants to estimate how satisfied its cardholders are. It randomly selects 250 people from the complete list of current cardholders. To which population can the results most reasonably be generalized?

 - A. All residents of the city
 - B. All current library cardholders
 - C. Only the 250 selected cardholders
 - D. All people who have ever visited the library
- 2** In a well-designed experiment, participants are randomly assigned to treatment groups primarily so that researchers can

 - A. guarantee a larger sample
 - B. support a cause-and-effect conclusion
 - C. eliminate all measurement error
 - D. make every participant receive the same treatment
- 3** A website asks visitors to click a link if they want to rate a new design. What is the main concern with using those ratings to represent all visitors?

 - A. The sample is too large.
 - B. The responses are voluntary and may be biased.
 - C. The ratings cannot contain numbers.
 - D. Random assignment was used.

- 4 Two random samples are drawn from the same population using the same method. All else equal, which sample would usually be expected to have the smaller margin of error?
- A. The sample of 80
 - B. The sample of 200
 - C. The sample of 800
 - D. The margin of error is unrelated to sample size.

STANDARD

- 5 A poll estimates that 54% of residents favor a proposal, with a margin of error of 4 percentage points. Which interval contains plausible values for the true percentage?
- A. 46% to 50%
 - B. 50% to 58%
 - C. 54% to 62%
 - D. 58% to 62%

- 6 A random survey estimates that 62% of voters support a measure, with a margin of error of 3 percentage points. Which percentage lies within the reported interval?
- A. 56%
 - B. 58%
 - C. 60%
 - D. 67%

- 7 A company randomly surveys 150 of its 900 employees about a new scheduling policy. Assuming a good response rate, the results can most reasonably be generalized to
- A. all workers in the country
 - B. the company's 900 employees
 - C. only managers at the company
 - D. only the 150 employees selected

- 8** A 95% confidence interval for the average number of weekly study hours is 71 to 75. Which interpretation is most appropriate?
- A. Every student studies between 71 and 75 hours.
 - B. 95% of students study between 71 and 75 hours.
 - C. It is plausible that the true population mean is between 71 and 75 hours.
 - D. The population mean is exactly 73 hours.
- 9** A researcher compares two teaching methods. Which assignment procedure best supports a reliable cause-and-effect conclusion?
- A. Let students choose their preferred method.
 - B. Assign the higher-scoring students to Method A.
 - C. Assign every other student on an alphabetized list to Method A.
 - D. Assign each student a random number and use the number to determine the method.
- 10** A university wants to estimate the meal preferences of its freshman class. Which sampling method is best?
- A. Randomly sample 400 students from the entire university.
 - B. Randomly sample 400 students from the freshman class.
 - C. Survey 400 freshmen who visit one dining hall at breakfast.
 - D. Survey every student in one freshman seminar.

ADVANCED

- 11** A study finds that students who report more weekly exercise also tend to report higher grade averages. Which conclusion is justified from this association alone?
- A. Exercise causes higher grades.
 - B. Higher grades cause students to exercise.
 - C. There is an association, but causation is not established.
 - D. The relationship must hold for every student.

- 12** Two polls use random samples from the same population. Poll A samples 250 people, while Poll B samples 1,000 people. Which statement is most reasonable?
- A. Poll A should have the smaller margin of error.
 - B. Poll B should have the smaller margin of error.
 - C. Both must have exactly the same margin of error.
 - D. Neither poll can estimate a population proportion.
- 13** A town has 40,000 eligible voters. A random sample estimates that 28% support a bond measure, with a margin of error of 2 percentage points. Which number of supporters in the town is plausible?
- A. 9,500
 - B. 10,800
 - C. 12,600
 - D. 30,000
- 14** Poll A reports 48% support with a margin of error of 5 points. Poll B reports 51% support with a margin of error of 2 points. Which statement is true?
- A. Poll A is more precise because its estimate is smaller.
 - B. Poll B is more precise because its margin of error is smaller.
 - C. The polls cannot both have 50% as a plausible true value.
 - D. A margin of error can be compared only when the sample sizes are identical.
- 15** A school wants to estimate the average homework time of all students, but it surveys only students enrolled in honors courses. What is the main problem?
- A. The sample may not represent all students.
 - B. The sample is random because honors enrollment is recorded.
 - C. The sample is too large.
 - D. The study should use random assignment instead of random sampling.

- 16** A district wants a sample that reflects students in grades 9, 10, 11, and 12, whose enrollments differ substantially. Which method is strongest?
- A. Choose the same number of volunteers from each grade.
 - B. Randomly sample students from only the largest grade.
 - C. Randomly sample within each grade in proportion to that grade's enrollment.
 - D. Survey students who attend an after-school event.
- 17** A company randomly selects 600 customers from its entire customer base and then randomly assigns the selected customers to two versions of a service. If Version A produces a statistically meaningful improvement, what conclusion is best supported?
- A. Version A caused the improvement for the sampled customers, and the result can reasonably be generalized to the customer base.
 - B. Version A caused the improvement only for volunteers, but the result cannot be generalized.
 - C. The study supports generalization but not causation.
 - D. The study supports neither generalization nor causation.
- 18** A random sample of 2,000 households receives a survey, but only 18% respond. Why should the researcher be cautious?
- A. The sample is automatically too small because fewer than half responded.
 - B. Nonresponse could make the respondents systematically different from those who did not respond.
 - C. Random sampling makes nonresponse irrelevant.
 - D. A margin of error cannot be calculated for any survey with missing responses.

Check your answers online.

The public practice PDF contains questions only. The answer check lives on the website so you can review your score, identify the kind of mistake you made, and move to the next resource.



ANSWER CHECK

Inference & Sampling

Scan the QR code or visit:

<https://aryalanupme.github.io/sat-inference-sampling.html>

If you are stuck on one question, note the question number and the approach you tried before checking another solution.

Independent resource

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