

Question ID 1ea09200

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Evaluating statistical claims: Observational studies and experiments	■ ■ ■

ID: 1ea09200

3.1

A sample of 40 fourth-grade students was selected at random from a certain school. The 40 students completed a survey about the morning announcements, and 32 thought the announcements were helpful. Which of the following is the largest population to which the results of the survey can be applied?

- A. The 40 students who were surveyed
- B. All fourth-grade students at the school
- C. All students at the school
- D. All fourth-grade students in the county in which the school is located

ID: 1ea09200 Answer

Correct Answer: B

Rationale

Choice B is correct. Selecting a sample of a reasonable size at random to use for a survey allows the results from that survey to be applied to the population from which the sample was selected, but not beyond this population. In this case, the population from which the sample was selected is all fourth-grade students at a certain school. Therefore, the results of the survey can be applied to all fourth-grade students at the school.

Choice A is incorrect. The results of the survey can be applied to the 40 students who were surveyed. However, this isn't the largest group to which the results of the survey can be applied. Choices C and D are incorrect. Since the sample was selected at random from among the fourth-grade students at a certain school, the results of the survey can't be applied to other students at the school or to other fourth-grade students who weren't represented in the survey results. Students in other grades in the school or other fourth-grade students in the country may feel differently about announcements than the fourth-grade students at the school.

Question Difficulty: Hard

Question ID 7d68096f

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ID: 7d68096f

3.2

A trivia tournament organizer wanted to study the relationship between the number of points a team scores in a trivia round and the number of hours that a team practices each week. For the study, the organizer selected **55** teams at random from all trivia teams in a certain tournament. The table displays the information for the **40** teams in the sample that practiced for at least **3** hours per week.

Hours practiced	Number of points per round		
	6 to 13 points	14 or more points	Total
3 to 5 hours	6	4	10
More than 5 hours	4	26	30
Total	10	30	40

Which of the following is the largest population to which the results of the study can be generalized?

- A. All trivia teams in the tournament that scored **14** or more points in the round
- B. The **55** trivia teams in the sample
- C. The **40** trivia teams in the sample that practiced for at least **3** hours per week
- D. All trivia teams in the tournament

ID: 7d68096f Answer

Correct Answer: D

Rationale

Choice D is correct. It's given that the organizer selected **55** teams at random from all trivia teams in the tournament. A table is also given displaying the information for the **40** teams in the sample that practiced for at least **3** hours per week. Selecting a sample of a reasonable size at random to use for a survey allows the results from that survey to be applied to the population from which the sample was selected, but not beyond this population. Thus, only the sampling method information is necessary to determine the largest population to which the results of the study can be generalized. Since the organizer selected the sample at random from all trivia teams in the tournament, the largest population to which the results of the study can be generalized is all trivia teams in the tournament.

Choice A is incorrect. The sample was selected at random from all trivia teams in the tournament, not just from the teams that scored an average of **14** or more points per round.

Choice B is incorrect. If a study uses a sample selected at random from a population, the results of the study can be generalized to the population, not just the sample.

Choice C is incorrect. If a study uses a sample selected at random from a population, the results of the study can be generalized to the population, not just a subset of the sample.

Question Difficulty: Hard

Question ID 7ce2830a

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ID: 7ce2830a

3.3

A psychologist designed and conducted a study to determine whether playing a certain educational game increases middle school students' accuracy in adding fractions. For the study, the psychologist chose a random sample of 35 students from all of the students at one of the middle schools in a large city. The psychologist found that students who played the game showed significant improvement in accuracy when adding fractions. What is the largest group to which the results of the study can be generalized?

- A. The 35 students in the sample
- B. All students at the school
- C. All middle school students in the city
- D. All students in the city

ID: 7ce2830a Answer

Correct Answer: B

Rationale

Choice B is correct. The largest group to which the results of a study can be generalized is the population from which the random sample was chosen. In this case, the psychologist chose a random sample from all students at one particular middle school. Therefore, the largest group to which the results can be generalized is all the students at the school.

Choice A is incorrect because this isn't the largest group the results can be generalized to. Choices C and D are incorrect because these groups are larger than the population from which the random sample was chosen. Therefore, the sample isn't representative of these groups.

Question Difficulty: Hard

Question ID aa43b41f

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ID: aa43b41f

3.4

Near the end of a US cable news show, the host invited viewers to respond to a poll on the show's website that asked, "Do you support the new federal policy discussed during the show?" At the end of the show, the host reported that 28% responded "Yes," and 70% responded "No." Which of the following best explains why the results are unlikely to represent the sentiments of the population of the United States?

- A. The percentages do not add up to 100%, so any possible conclusions from the poll are invalid.
- B. Those who responded to the poll were not a random sample of the population of the United States.
- C. There were not 50% "Yes" responses and 50% "No" responses.
- D. The show did not allow viewers enough time to respond to the poll.

ID: aa43b41f Answer

Correct Answer: B

Rationale

Choice B is correct. In order for the poll results from a sample of a population to represent the entire population, the sample must be representative of the population. A sample that is randomly selected from a population is more likely than a sample of the type described to represent the population. In this case, the people who responded were people with access to cable television and websites, which aren't accessible to the entire population. Moreover, the people who responded also chose to watch the show and respond to the poll. The people who made these choices aren't representative of the entire population of the United States because they were not a random sample of the population of the United States.

Choices A, C, and D are incorrect because they present reasons unrelated to whether the sample is representative of the population of the United States.

Question Difficulty: Hard

Question ID 4a422e3e

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ID: 4a422e3e

3.5

To determine the mean number of children per household in a community, Tabitha surveyed 20 families at a playground. For the 20 families surveyed, the mean number of children per household was 2.4. Which of the following statements must be true?

- A. The mean number of children per household in the community is 2.4.
- B. A determination about the mean number of children per household in the community should not be made because the sample size is too small.
- C. The sampling method is flawed and may produce a biased estimate of the mean number of children per household in the community.
- D. The sampling method is not flawed and is likely to produce an unbiased estimate of the mean number of children per household in the community.

ID: 4a422e3e Answer

Correct Answer: C

Rationale

Choice C is correct. In order to use a sample mean to estimate the mean for a population, the sample must be representative of the population (for example, a simple random sample). In this case, Tabitha surveyed 20 families in a playground. Families in the playground are more likely to have children than other households in the community. Therefore, the sample isn't representative of the population. Hence, the sampling method is flawed and may produce a biased estimate.

Choices A and D are incorrect because they incorrectly assume the sampling method is unbiased. Choice B is incorrect because a sample of size 20 could be large enough to make an estimate if the sample had been representative of all the families in the community.

Question Difficulty: Hard