

Question ID ef173fc1

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Problem-Solving and Data Analysis	Inference from sample statistics and margin of error	<div><div></div><div></div><div></div></div>

ID: ef173fc1

To estimate the proportion of a population that has a certain characteristic, a random sample was selected from the population. Based on the sample, it is estimated that the proportion of the population that has the characteristic is **0.49**, with an associated margin of error of **0.04**. Based on this estimate and margin of error, which of the following is the most appropriate conclusion about the proportion of the population that has the characteristic?

- A. It is plausible that the proportion is between **0.45** and **0.53**.
- B. It is plausible that the proportion is less than **0.45**.
- C. The proportion is exactly **0.49**.
- D. It is plausible that the proportion is greater than **0.53**.

ID: ef173fc1 Answer

Correct Answer: A

Rationale

Choice A is correct. It's given that the estimate for the proportion of the population that has the characteristic is 0.49 with an associated margin of error of 0.04. Subtracting the margin of error from the estimate and adding the margin of error to the estimate gives an interval of plausible values for the true proportion of the population that has the characteristic. Therefore, it's plausible that the proportion of the population that has this characteristic is between 0.45 and 0.53.

Choice B is incorrect. A value less than 0.45 is outside the interval of plausible values for the proportion of the population that has the characteristic.

Choice C is incorrect. The value 0.49 is an estimate for the proportion based on this sample. However, since the margin of error for this estimate is known, the most appropriate conclusion is not that the proportion is exactly one value but instead lies in an interval of plausible values.

Choice D is incorrect. A value greater than 0.53 is outside the interval of plausible values for the proportion of the population that has the characteristic.

Question Difficulty: Medium

Question ID 206e4916

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Problem-Solving and Data Analysis	Inference from sample statistics and margin of error	<div><div></div><div></div><div></div></div>

ID: 206e4916

A sample consisting of **720** adults who own televisions was selected at random for a study. Based on the sample, it is estimated that **32%** of all adults who own televisions use their televisions to watch nature shows, with an associated margin of error of **3.41%**. Which of the following is the most plausible conclusion about all adults who own televisions?

- A. More than **35.41%** of all adults who own televisions use their televisions to watch nature shows.
- B. Between **28.59%** and **35.41%** of all adults who own televisions use their televisions to watch nature shows.
- C. Since the sample included adults who own televisions and not just those who use their televisions to watch nature shows, no conclusion can be made.
- D. Since the sample did not include all the people who watch nature shows, no conclusion can be made.

ID: 206e4916 Answer

Correct Answer: B

Rationale

Choice B is correct. It's given that based on a sample selected at random, it's estimated that 32% of all adults who own televisions use their televisions to watch nature shows, with an associated margin of error of 3.41%. Subtracting the margin of error from the estimate and adding the margin of error to the estimate gives an interval of plausible values for the true percentage of adults who own televisions who use their televisions to watch nature shows. This means it's plausible that between $32\% - 3.41\%$, or 28.59%, and $32\% + 3.41\%$, or 35.41%, of all adults who own televisions use their televisions to watch nature shows. Therefore, of the given choices, the most plausible conclusion is that between 28.59% and 35.41% of all adults who own televisions use their televisions to watch nature shows.

Choice A is incorrect and may result from conceptual errors.

Choice C is incorrect. To make a plausible conclusion about all adults who own televisions, the sample must be selected at random from all adults who own televisions, not just those who use their televisions to watch nature shows.

Choice D is incorrect. Since the sample was selected at random from all adults who own televisions, a plausible conclusion can be made about all adults who own televisions.

Question Difficulty: Medium

Question ID e76d325a

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Problem-Solving and Data Analysis	Inference from sample statistics and margin of error	<div><div></div><div></div><div></div></div>

ID: e76d325a

A company that produces socks wants to estimate the percent of the socks produced in a typical week that are defective. A random sample of **310** socks produced in a certain week were inspected. Based on the sample, it is estimated that **12%** of all socks produced by the company in this week are defective, with an associated margin of error of **3.62%**. Based on the estimate and associated margin of error, which of the following is the most appropriate conclusion about all socks produced by the company during this week?

- A. **3.62%** of the socks are defective.
- B. It is plausible that between **8.38%** and **15.62%** of the socks are defective.
- C. **12%** of the socks are defective.
- D. It is plausible that more than **15.62%** of the socks are defective.

ID: e76d325a Answer

Correct Answer: B

Rationale

Choice B is correct. It’s given that, based on the sample, an estimate of 12% of all socks produced by the company in a certain week are defective, with an associated margin of error of 3.62%. This estimate, plus or minus the margin of error, gives an interval of plausible values for the actual percent of all socks produced by the company that week that are defective. Subtracting 3.62% from 12% yields 8.38%. Adding 3.62% to 12% yields 15.62%. Therefore, it is plausible that between 8.38% and 15.62% of all socks produced by the company are defective.

Choice A is incorrect and may result from conceptual errors.

Choice C is incorrect. 12% is the estimated percent of defective socks based on the sample. However, since the margin of error for this estimate is known, the most appropriate conclusion is not that the percent of defective socks is exactly 12% but instead that it lies in an interval of plausible percents.

Choice D is incorrect and may result from conceptual errors.

Question Difficulty: Medium

Question ID ab974dd3

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Problem-Solving and Data Analysis	Inference from sample statistics and margin of error	<div><div></div><div></div><div></div></div>

ID: ab974dd3

Based on a random sample from a population, a researcher estimated that the mean value of a certain variable for the population is **20.5**, with an associated margin of error of **1**. Which of the following is the most appropriate conclusion?

- A. It is plausible that the actual mean value of the variable for the population is between **19.5** and **21.5**.
- B. It is not possible that the mean value of the variable for the population is less than **19.5** or greater than **21.5**.
- C. Every value of the variable in the population is between **19.5** and **21.5**.
- D. The mean value of the variable for the population is **20.5**.

ID: ab974dd3 Answer

Correct Answer: A

Rationale

Choice A is correct. It's given that based on a random sample from a population, the estimated mean value for a certain variable for the population is 20.5, with an associated margin of error of 1. This means that it is plausible that the actual mean value of the variable for the population is between $20.5 - 1$ and $20.5 + 1$. Therefore, the most appropriate conclusion is that it is plausible that the actual mean value of the variable for the population is between 19.5 and 21.5.

Choice B is incorrect. The estimated mean value and associated margin of error describe only plausible values, not all the possible values, for the actual mean value of the variable, so this is not an appropriate conclusion.

Choice C is incorrect. The estimated mean value and associated margin of error describe only plausible values for the actual mean value of the variable, not all the possible values of the variable, so this is not an appropriate conclusion.

Choice D is incorrect. Since 20.5 is the estimated mean value of the variable based on a random sample, the actual mean value of the variable may not be exactly 20.5. Therefore, this is not an appropriate conclusion.

Question Difficulty: Medium