Inference from Sample Statistics

CollegeBoard Question Bank

Abstract

This exercise sheet contains

- an **Easy** category with 5 questions;
- a **Medium** category with 6 questions;
- a **Hard** category with 4 questions

for you to attempt. A digital copy of this sheet is available for you on moodle. Feel free to utilize the **Question Space** on Teams to ask for guidance.

Best,
Omar :)

Inference from Sample Statistics

Easy

(1) **90eed2e5** | MULTIPLE CHOICE | | One answer only |

A city has 50 city council members. A reporter polled a random sample of 20 city council members and found that 6 of those polled supported a specific bill. Based on the sample, which of the following is the best estimate of the number of city council members in the city who support the bill?

   a. 15
   b. 9
   c. 30
   d. 6

(2) **e7d9649f** MULTIPLE CHOICE   One answer only

A random sample of 50 people from a town with a population of 14,878 were asked to name their favorite flavor of ice cream. If 7 people in the sample named chocolate as their favorite ice-cream flavor, about how many people in the town would be expected to name chocolate?

    a. 7,500
    b. 350
    c. 10,500
    d. 2,100

(3) **f4b3672a** $\boxed{\text{MULTIPLE CHOICE}}$ $\boxed{\text{One answer only}}$

A certain forest is 253 acres. To estimate the number of trees in the forest, a ranger randomly selects 5 different 1-acre parcels in the forest and determines the number of trees in each parcel. The numbers of trees in the sample acres are $51, 59, 45, 52$, and 73. Based on the mean of the sample, which of the following ranges contains the best estimate for the number of trees in the entire forest?

    a. 13,500 to 14,500
    b. 11,000 to 12,000
    c. 12,500 to 13,500
    d. 18,000 to 19,000

(4) **0108ac2d** MULTIPLE CHOICE One answer only

At a large high school, 300 students were selected at random and were asked in a survey about a menu change in the school cafeteria. All 300 students completed the survey. It was estimated that 38% of the students were in support of a menu change, with a margin of error of 5.5%. Which of the following is the best interpretation of the survey results?

 a. 43.5%.
 b. Plausible values of the number of the students at the school who support a menu change are between 295 and 305.
 c. The percent of the students at the school who support a menu change is 38%.
 d. The percent of the students at the school who support a menu change is greater than 38%. Plausible values of the percent of the students at the school who support a menu change are between 32.5% and

(5) **6a305cd0** $\boxed{\text{MULTIPLE CHOICE}}$ $\boxed{\text{One answer only}}$

In a study, the data from a random sample of a population had a mean of 37, with an associated margin of error of 3. Which of the following is the most appropriate conclusion that can be made about the population mean?

    a. It is between 34 and 40 .
    b. It is less than 37.
    c. It is greater than 37.
    d. It is less than 34 or greater than 40.

Medium

(1) **53d97af5** | MULTIPLE CHOICE | | One answer only |

A study was done on the weights of different types of fish in a pond. A random sample of fish were caught and marked in order to ensure that none were weighed more than once. The sample contained 150 largemouth bass, of which 30% weighed more than 2 pounds. Which of the following conclusions is best supported by the sample data?

    a. Approximately 30% of all largemouth bass in the pond weigh more than 2 pounds.
    b. Approximately 30% of all fish in the pond weigh more than 2 pounds.
    c. The majority of all fish in the pond weigh less than 2 pounds.
    d. The average weight of all fish in the pond is approximately 2 pounds.

(2) **f8f79e11** MULTIPLE CHOICE   One answer only

A park ranger asked a random sample of visitors how far they hiked during their visit. Based on the responses, the estimated mean was found to be 4.5 miles, with an associated margin of error of 0.5 miles. Which of the following is the best conclusion from these data?

    a. It is plausible that the mean distance hiked for all visitors is between 4 and 5 miles.
    b. It is not possible that any visitor hiked less than 3 miles.
    c. It is likely that most visitors hiked exactly 4.5 miles.
    d. It is likely that all visitors hiked between 4 and 5 miles.

(3) **fc46af57** MULTIPLE CHOICE | One answer only

A bag containing 10,000 beads of assorted colors is purchased from a craft store. To estimate the percent of red beads in the bag, a sample of beads is selected at random. The percent of red beads in the bag was estimated to be 15%, with an associated margin of error of 2%. If r is the actual number of red beads in the bag, which of the following is most plausible?

    a. $1,300 < r < 1,700$
    b. $200 < r < 1,500$
    c. $r > 1,700$
    d. $r < 1,300$

(4) **e03f3477** MULTIPLE CHOICE   One answer only

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

(5) **89f8d08a** $\boxed{\text{MULTIPLE CHOICE}}$ $\boxed{\text{One answer only}}$

A store manager reviewed the receipts from 80 customers who were selected at random from all the customers who made purchases last Thursday. Of those selected, 20 receipts showed that the customer had purchased fruit. If 1,500 customers made purchases last Thursday, which of the following is the most appropriate conclusion?

    a. Exactly 75 customers must have purchased fruit last Thursday.
    b. The best estimate for the number of customers who purchased fruit last Thursday is 375 .
    c. The best estimate for the number of customers who purchased fruit last Thursday is 75.
    d. Exactly 375 customers must have purchased fruit last Thursday.

(6) **9ee22c16** $\boxed{\text{SHORT ANSWER}}$ $\boxed{\text{Case-Insensitive}}$

A random sample of 400 town voters were asked if they plan to vote for Candidate A or Candidate B for mayor. The results were sorted by gender and are shown in the table below.

	Plan to vote for Candidate A	Plan to vote for Candidate B
Female	202	20
Male	34	144

The town has a total of 6,000 voters. Based on the table, what is the best estimate of the number of voters who plan to vote for Candidate A?

Hard

(1) **85939da5** MULTIPLE CHOICE | One answer only

Texting behavior	Talks on cell phone daily	Does not talk on cell phone daily	Total
Light	110	146	256
Medium	139	164	303
Heavy	166	74	240
Total	415	384	799

In a study of cell phone use, 799 randomly selected US teens were asked how often they talked on a cell phone and about their texting behavior. The data are summarized in the table above. Based on the data from the study, an estimate of the percent of US teens who are heavy texters is 30% and the associated margin of error is 3%. Which of the following is a correct statement based on the given margin of error?

   a. Approximately 3% of the teens in the study who are classified as heavy texters are not really heavy texters.

   b. The percent of all US teens who are heavy texters is 33%.

   c. It is not possible that the percent of all US teens who are heavy texters is less than 27%.

   d. It is doubtful that the percent of all US teens who are heavy texters is 35%.

(2) **c7e73ece** SHORT ANSWER   Case-Insensitive

Views on Nuclear Energy Use	
Response	Frequency
Somewhat favor	214
Somewhat oppose	104
Strongly oppose	37

A researcher interviewed 411 randomly selected US residents and asked about their views on the use of nuclear energy. The table above summarizes the responses of the interviewees. If the population of the United States was 300 million when the survey was given, based on the sample data for the 411 US residents, what is the best estimate, in millions, of the difference between the number of US residents who somewhat favor or strongly favor the use of nuclear energy and the number of those who somewhat oppose or strongly oppose it? (Round your answer to the nearest whole number.)

(3) **308084c5** MULTIPLE CHOICE   One answer only

Sample	Percent in favor	Margin of error
A	52%	4.2%
B	48%	1.6%

The results of two random samples of votes for a proposition are shown above. The samples were selected from the same population, and the margins of error were calculated using the same method. Which of the following is the most appropriate reason that the margin of error for sample A is greater than the margin of error for sample B?

   a. Sample A had a higher percent of favorable responses.
   b. Sample A had a smaller number of votes that could not be recorded.
   c. Sample A had a larger sample size.
   d. Sample A had a smaller sample size.

(4) **9ba3e283** MULTIPLE CHOICE   One answer only

In State X, Mr. Camp's eighth-grade class consisting of 26 students was surveyed and 34.6 percent of the students reported that they had at least two siblings. The average eighth-grade class size in the state is 26 . If the students in Mr. Camp's class are representative of students in the state's eighth-grade classes and there are 1,800 eighth-grade classes in the state, which of the following best estimates the number of eighth-grade students in the state who have fewer than two siblings?

a. 46,800
b. 16,200
c. 23,400
d. 30,600

Total of marks: 15