

SAT Sample Statistics and Margin of Error Worksheet

Name: _____ Date: _____

Circle one answer for each question. Use the blank space for calculations. A calculator is allowed.

1.	Number of siblings	Number of students
	0	18
	1	30
	2	22
	3 or more	10

A school has 1,200 students. The table shows the number of siblings for a random sample of 80 of them. Based on the sample, about how many students at the school have exactly 2 siblings?

- A. 22
- B. 264
- C. 275
- D. 330

2. A survey of a random sample of a city's voters estimates that 62% of the city's voters support a new park, with an associated margin of error of 4%. Which range of values is most plausible for the percent of all the city's voters who support the park?

- A. 58% to 62%
- B. 58% to 66%
- C. 60% to 64%
- D. 62% to 66%

- 3. A researcher plans to survey a random sample of residents to estimate the mean commute time in a town. Which change would most likely reduce the margin of error of the estimate?**
- A. Surveying a larger random sample of residents
 - B. Surveying a smaller random sample of residents
 - C. Surveying only residents who volunteer to respond
 - D. Surveying the same number of residents in a different month
- 4. A principal wants to estimate the percent of the school's 2,400 students who walk to school. Which method will give an estimate that can be applied to all 2,400 students?**
- A. Survey 150 students chosen at random from the school's list of all students.
 - B. Survey the first 150 students who arrive at school one morning.
 - C. Survey all 150 students in the school's chess club.
 - D. Post a survey online and use the first 150 responses.
- 5. A polling group surveyed a random sample of 300 adults who live in Ohio. Of those surveyed, 41% said they read the news every day. To which group can this result be applied?**
- A. All adults in the United States
 - B. All adults who live in Ohio
 - C. Only the 300 adults surveyed
 - D. All people who live in Ohio, including children

6. A mill selected 60 bags of flour at random and found a mean weight of 5.02 pounds, with an associated margin of error of 0.03 pound. Which value is a plausible mean weight, in pounds, of all bags of flour from the mill?
- A. 4.95
 - B. 4.98
 - C. 5.00
 - D. 5.06
7. For a random sample of 50 apartments in a city, the mean monthly water use was 4,200 gallons, with an associated margin of error of 250 gallons. Which conclusion is best supported?
- A. Every apartment in the sample used between 3,950 and 4,450 gallons per month.
 - B. The mean monthly water use of all apartments in the city is plausibly between 3,950 and 4,450 gallons.
 - C. Most apartments in the city use between 3,950 and 4,450 gallons per month.
 - D. The mean monthly water use of all apartments in the city is exactly 4,200 gallons.
8. A town has 8,000 households. A survey of a random sample of 250 households found that 20% own an electric car, with an associated margin of error of 3%. Which range is most plausible for the number of households in the town that own an electric car?
- A. 1,360 to 1,840
 - B. 1,570 to 1,630
 - C. 1,597 to 1,603
 - D. 1,600 to 1,840

9. A random sample of 1,000 voters in a state found that 55% support a ballot measure, with an associated margin of error of 3%. A news report says that a majority of the state's voters support the measure. Is this claim supported by the survey?
- A. No, because a margin of error means the survey could be wrong.
 - B. No, because only 1,000 voters were surveyed.
 - C. Yes, because exactly 55% of the state's voters support the measure.
 - D. Yes, because every plausible value, from 52% to 58%, is greater than 50%.
10. Two towns each surveyed a random sample of residents. In Town A, 48% supported a new library, with an associated margin of error of 4%. In Town B, 53% supported it, with an associated margin of error of 4%. Which conclusion is best supported?
- A. A greater percent of Town B residents support the library than Town A residents.
 - B. A greater percent of Town A residents support the library than Town B residents.
 - C. Exactly 5% more residents support the library in Town B than in Town A.
 - D. The surveys don't show which town has a greater percent of residents who support the library.
11. An orchard has 900 apple trees. For a random sample of 40 of the trees, the mean number of apples per tree was 210, with an associated margin of error of 15 apples. Which of the following is a plausible value for the total number of apples on all 900 trees?
- A. 8,400
 - B. 13,500
 - C. 189,000
 - D. 210,000

12. Researchers caught, tagged, and released 150 fish in a lake. Later, they caught a random sample of 200 fish from the lake, and 12 of them were tagged. If the tagged fish mixed evenly with the others, about how many fish are in the lake?
- A. 338
 - B. 1,800
 - C. 2,500
 - D. 30,000

Answer key

1 D · 2 B · 3 A · 4 A · 5 B · 6 C · 7 B · 8 A · 9 D · 10 D · 11 C · 12 C

1. D: 330

In the sample, 22 of 80 students, or 27.5%, have exactly 2 siblings. For the whole school, that is $0.275(1,200) = 330$ students. Choice A is the count in the sample only.

2. B: 58% to 66%

Subtract and add the margin of error: $62\% - 4\% = 58\%$ and $62\% + 4\% = 66\%$. Choice C uses half the margin on each side.

3. A: Surveying a larger random sample of residents

With random sampling, a larger sample gives an estimate with a smaller margin of error. Choice C gives up random sampling, which can bias the estimate.

4. A: Survey 150 students chosen at random from the school's list of all students.

Only choice A gives every student the same chance of being chosen, so the sample should represent the whole school. The other methods pick groups whose ways of getting to school may differ from the rest of the students.

5. B: All adults who live in Ohio

The sample was chosen at random from adults who live in Ohio, so the estimate applies to that group. It says nothing reliable about adults in other states or about children.

6. C: 5.00

The plausible values run from $5.02 - 0.03 = 4.99$ to $5.02 + 0.03 = 5.05$ pounds. Only 5.00 is in that range.

7. B: The mean monthly water use of all apartments in the city is plausibly between 3,950 and 4,450 gallons.

The margin of error describes the estimate of the mean, not individual apartments. Plausible values for the city's mean are $4,200 - 250 = 3,950$ to $4,200 + 250 = 4,450$ gallons. Choices A and C are about individual apartments, and choice D ignores the margin of error.

8. A: 1,360 to 1,840

The plausible percents are $20\% - 3\% = 17\%$ to $20\% + 3\% = 23\%$. Of 8,000 households, that is $0.17(8,000) = 1,360$ to $0.23(8,000) = 1,840$. Choice C treats the 3% as 3 households.

9. D: Yes, because every plausible value, from 52% to 58%, is greater than 50%.

The plausible range is $55\% - 3\% = 52\%$ to $55\% + 3\% = 58\%$. All of it is above 50%, so the survey supports the claim. Choice C claims more precision than a sample can give.

10. D: The surveys don't show which town has a greater percent of residents who support the library.

Town A's plausible range is 44% to 52%, and Town B's is 49% to 57%. The ranges overlap from 49% to 52%, so the towns' support could be equal, or Town A's could even be higher.

11. C: 189,000

Plausible values for the mean are 195 to 225 apples per tree. For 900 trees, the total is plausibly between $195(900) = 175,500$ and $225(900) = 202,500$. The estimate $210(900) = 189,000$ is in that range, and 210,000 is not. Choice A counts only the 40 sampled trees.

12. C: 2,500

In the sample, $\frac{12}{200} = 6\%$ of the fish were tagged. If the 150 tagged fish are also 6% of the lake's fish, the lake has $\frac{150}{0.06} = 2,500$ fish. Choice A counts only the fish the researchers handled.