

1. A 90% confidence interval for the proportion of all restaurants that fail in their first year of operation is (0.57, 0.63).
 - a. Interpret the confidence interval.

 - b. Interpret the confidence level.

2. Jamie randomly selected 20 types of cereal at a local grocery store and recorded their sugar content. She then calculated the sample proportion that contained less than 22 grams of sugar, which is the recommended daily amount. Using the sample proportion, she constructed a 95% confidence interval of (0.025, 0.375).
 - a. What proportion of cereals in Jamie's sample contained less than 22 grams of sugar? Explain how you determined this value.

 - b. Find the margin of error for this confidence interval. Show your method

 - c. Explain why the margin of error is unusually large for Jamie's interval.

 - d. Suggest one specific way Jamie could obtain a more precise estimate of the proportion of cereals that meet the sugar content recommendation. Explain your reasoning.

3. A car dealership surveyed 500 of their randomly selected customers who had purchased vehicles in the past 24 months about future service plans. Of those surveyed, 85% said they would consider returning for future car services. Using this sample proportion, they constructed a 95% confidence interval of (0.777, 0.923).
- Interpret the confidence level.
 - Explain what would happen to the width of the interval if the confidence level increased to 99%.
 - Explain what would happen to the width of the interval if 1,000 customers had been surveyed, at the original 95% confidence level?
 - An employee claimed that the margin of error of 0.073 accounts for potential nonresponse bias in the survey. Is this claim correct? Explain your reasoning.
4. Paul surveyed 50 randomly selected students at his school about entertainment preferences. Of those surveyed, 36% reported preferring video games over watching TV. He then calculated three different margins of error using 80%, 90%, and 95% confidence levels, but forgot to record which confidence level produced each margin of error: 0.133, 0.112, and 0.087. Match each margin of error with its corresponding confidence level and explain your reasoning.

5. Ten students each threw 50 pieces of cooked spaghetti at a wall and recorded the proportion of the pieces that stuck. Each student then constructed a 90% confidence interval for the true proportion of spaghetti noodles that would stick to the wall. Their intervals are shown below:

$$0.44 \pm 0.12$$

$$0.36 \pm 0.11$$

$$0.34 \pm 0.11$$

$$0.32 \pm 0.11$$

$$0.18 \pm 0.09$$

$$0.36 \pm 0.11$$

$$0.28 \pm 0.10$$

$$0.32 \pm 0.11$$

$$0.34 \pm 0.11$$

$$0.32 \pm 0.11$$

Based on these confidence intervals, determine whether each proposed value is a plausible value for p , the true proportion of cooked spaghetti noodles that would stick to the wall. Explain your reasoning.

a. $p = 0.20$

b. $p = 0.35$

6. An 85% confidence interval for the true proportion of sixth graders who own a cellphone is (0.540, 0.640). Which of the following could be a 95% confidence interval constructed from the same sample?

A) (0.522, 0.658)

B) (0.545, 0.635)

C) (0.492, 0.628)

D) (0.510, 0.610)

7. A polling agency surveyed randomly selected likely voters in their state about an early voter registration proposal on the upcoming ballot. They constructed a 95% confidence interval of 0.53 ± 0.06 for the true proportion who approve of the proposal. In order for the proposal to pass, at least 50% of voters must approve it. Which of the following is a valid claim about whether the early voter registration proposal will pass?
- A) The proposal is guaranteed to pass.
 - B) There is a 95% chance that the proposal will pass.
 - C) We cannot make a definitive claim about whether the proposal will pass.
 - D) 53% of voters will vote for the proposal on election day.