

Practice Assignment: Confidence Intervals for Proportions (Continued)

1) True or false: A confidence level associated with a calculated confidence interval tells us the likelihood that the population proportion is contained within that individual interval.

2) True or false: A confidence level associated with a calculated confidence interval refers to the method used to construct confidence intervals. That is, if we repeatedly took samples of a given size and constructed a confidence interval for each sample, in the long run, we'd expect that the percentage of confidence intervals that contain the population proportion would be equal to our chosen confidence level.

A Harris poll of a random sample of 2,113 adults in the United States in October 2010 reported that 72% (i.e., 1,521) of those polled said they believe stem cell research has merit.

3) Before constructing a confidence interval to estimate the population proportion of adults in 2010 who said they believe stem cell research has merit, determine whether the following conditions have been met:

- Random sampling is used.
- The sample is less than 10% of the population.
- The sample is large enough that $n\hat{p} \geq 10$ and $n(1 - \hat{p}) \geq 10$.

4) The following picture shows a confidence interval constructed from the 2010 Harris survey result described previously. Which of the following is the correct interpretation of the confidence interval presented?

Confidence Interval:

Population Parameter	Lower Bound	Upper Bound	Confidence Level
Proportion p	0.6947	0.7450	99%



- a) There is a 95% chance that the population proportion of adults in 2010 who said they believe stem cell research has merit is between 0.6947 and 0.745, or 69.47% and 74.5%.
 - b) We can be 95% confident that the population proportion of adults in 2010 who said they believe stem cell research has merit is between 0.6947 and 0.745, or 69.47% and 74.5%.
 - c) There is a 99% chance that the population proportion of adults in 2010 who said they believe stem cell research has merit is between 0.6947 and 0.745, or 69.47% and 74.5%.
 - d) We can be 99% confident that the population proportion of adults in 2010 who said they believe stem cell research has merit is between 0.6947 and 0.745, or 69.47% and 74.5%.
- 5) Based on the previous confidence interval, is there evidence to support the claim that a majority (i.e., greater than 50%) of adults in the United States in 2010 said they believe stem cell research has merit? Explain.

A March 2021 *Morning Consult/Politico* poll of a random sample of U.S. adults asked participants about their preferred alcoholic beverages. Participants could select beer, wine, hard liquor, other, or “I do not drink alcoholic beverages.”

Out of the 1,922 participants, 450 said that they prefer beer.¹

- 6) Calculate the point-estimate, \hat{p} , for the proportion of adults who said they prefer beer over other alcoholic beverages.

Point Estimate, \hat{p}	
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- 7) Before constructing a confidence interval to estimate the population proportion of

adults who said they prefer beer over other alcoholic beverages, determine whether the necessary assumptions have been met.

- 8) Use the appropriate data analysis tool to calculate a 95% confidence interval to estimate the proportion of adults who said they prefer beer over other alcoholic beverages

¹ Morning Consult + Politico. (2021). *National tracking poll #2102136, February 26 - March 1, 2021 [Survey report]*. https://assets.morningconsult.com/wp/uploads/2021/03/03081114/2102136_crosstabs_POLITICO_RVs_v2.pdf

Lower Bound	
Upper Bound	

- 9) Interpret the confidence interval using full sentences.

- 10) In an online commercial, a beer manufacturer claims that 30% of adults identified beer as their favorite alcoholic beverage. Is this claim consistent with the previous confidence interval? Explain.

Adults are encouraged to visit the dentist at least once a year. In the 2019 National College Health Assessment, 28,021 out of a random sample of 38,433 college students said they had a dental exam in the last 12 months.²

- 11) Calculate the point-estimate for the population proportion of college students who said they had a dental exam in the last 12 months.

Point Estimate, \hat{p}	
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- 12) Before constructing a confidence interval to estimate the population proportion of college students who said they had a dental exam in the last 12 months, determine whether the necessary assumptions have been met. You can assume that the sample is less than 10% of the population.

- 13) Use the appropriate data analysis tool to construct a 99% confidence interval to estimate the population proportion of college students who said they had a dental

exam in the last 12 months.

Lower Bound	
Upper Bound	

² American College Health Association-National College Health Assessment. (2020). *Undergraduate student reference group data report, Fall 2019*. https://www.acha.org/NCHA/ACHA_NCHA_Data/Publications_and_Reports/NCHA/Data/Reports_ACHA-NCHAIII.aspx

14) Interpret your confidence interval using complete sentences.

15) True or false: If a confidence level of 95% is used instead of 99%, then the resulting confidence interval would be *wider* than the one calculated in Question 13.

