

Individual Assignment 8:

- 8.1.3 Interpret a confidence interval for a population mean in context.
- 8.1.4 Explain how the margin of error changes when changing the confidence level or sample size.
- 8.1.5 Given a confidence interval for a population mean, find the sample mean and error bound.

Confidence Intervals

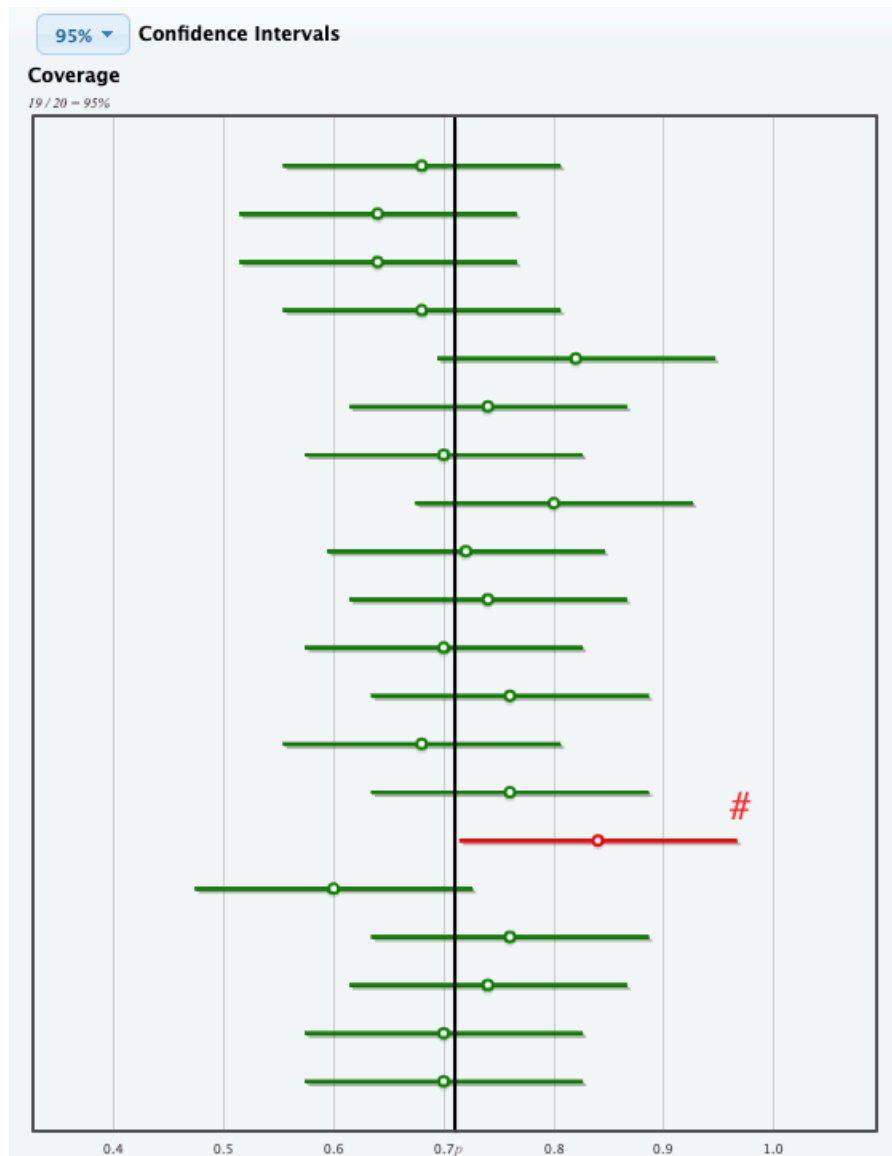
1. When constructing a confidence interval for the true proportion of the earth's surface covered with water, $n = 50$ random points were used to construct a 95% confidence interval. The interval had a lower bound of 0.53 and an upper bound of 0.79. What is the error bound of this estimate and what could be done to make the error bound smaller?
2. When is a student t-distribution used to create a confidence interval?
3. Settle a debate: Erika says that if data was used to construct a confidence interval for a mean that a 95% confidence interval would be wider than a 99% confidence interval. Ashan says it is the reverse — the 99% confidence interval would be wider. Who is correct? Defend your choice.
4. A grocer measures the diameter of a random selection of 25 apples in centimeters and uses the sample mean diameter to construct a confidence interval. The 95% confidence interval for the mean diameter in centimeters is (7.3, 7.9). Explain what is wrong with each of the following interpretations of this confidence interval.
 - a) 95% of the sample of apples had a diameter between 7.3 cm and 7.9 cm.
 - b) 95% of all apples have a diameter between 7.3 cm and 7.9 cm.
 - c) There is a 95% chance the population mean diameter of all apples is between 7.3 cm and 7.9 cm.
 - d) If the procedure were repeated many times, 95% of the sample means would be between 7.3 cm and 7.9 cm.
 - e) There is a 95% chance that the sample mean diameter is between 7.3 cm and 7.9 cm.

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5. Settle a debate: Juan says that larger sample sizes produce narrower confidence intervals. Kareem says smaller sample sizes produce narrower confidence intervals. Who is correct? Defend your choice.
6. The diagram below shows twenty different 95% confidence intervals that were constructed based on random samples of size $n = 50$.



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- a) Based on this diagram, what is the value of p ?
 - b) The interval with the hashtag is different from all of the other intervals. What makes this interval different? HINT: Think about the location of the vertical line at the value of the population parameter.
 - c) Each of the intervals has an open circle dot. What is the meaning of the open circle dot?
7. On April 5, 2021 Gallup reported, "[Global Warming Attitudes Frozen Since 2016](#)."
- a) One of its main points was "6 in 10 U.S. adults think effects of global warming are already happening." What is the 6 in 10 called in statistics?
 - b) In addition, they reported a "margin of sampling error" of ± 4 percentage points. What does this mean?
 - c) Combine the values of "6 in 10" and ± 4 percentage points to create and interpret a 95% confidence interval.
 - d) Based on your interval, is it safe to say that the majority of U.S. adults think the effects of global warming are already happening? Explain.
8. A confidence interval for the mean systolic blood pressure of employees was created using a random sample of 50 employees. The confidence interval was reported as (125, 135).
- a) What is the sample mean for this interval?
 - b) What is the error bound for this interval?
 - c) If a normal systolic blood pressure is 120, what might we conclude about the employees based on this interval?

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