Chapter 8: Estimating Single Population Parameters

Multiple Choice

This activity contains 11 questions.

1. A single number determined from a sample that is used to estimate the corresponding population parameter is called a
   - point estimate.
   - sample point.
   - sample space.
   - statistic.

2. The difference between a value (a statistic) computed from a sample and the corresponding value (a parameter) computed from the population is known as
   - point estimate.
   - confidence interval.
   - confidence level.
   - sampling error.

3. The average amount of cola in a sample of 80 bottles was 101.2 mL. An earlier study suggested that the standard deviation of the bottles is 1.4 mL. Determine the 95% confidence interval for the estimate of the population mean.
   - (100.943, 101.457)
   - (100.893, 101.507)
   - (100.836, 101.564)
   - (100.679, 101.721)
4. The percentage of all possible confidence intervals that will contain the true population parameter is known as
- margin of error.
- a point estimate.
- a confidence level.
- sampling error.

5. Which of the following is not a way to reduce the margin of error?
- Decrease the sample size.
- Increase the sample size.
- Reduce the confidence level.
- Reduce the standard deviation.

6. Develop a 95% confidence interval for the mean when the sample mean is 90.3, the sample standard deviation is 11.6, and the sample size is 25. Assume the population is normally distributed.
- (87.980, 92.620)
- (86.484, 94.116)
- (85.512, 95.088)
- (84.964, 95.636)
7. Which of the following is **not** one of the conditions necessary to use the confidence interval? 

\[ x \pm t \cdot \frac{s}{\sqrt{n}} \]

- \( \mu \) is known.
- the distribution is approximately normal.
- \( \sigma \) is not known.
- \( n < 30 \).

8. A consumer group wishes to estimate the average electric bills for the month of July for single-family homes in a large city. Based on studies conducted in other cities, the population standard deviation is $25. The group wants to estimate the average bill for July to within $5 of the true average with 90% confidence. What sample size is needed?

- 52
- 68
- 75
- 82

9. Which of the following is **not** an approach for determining a sample size when \( \sigma \) is not known?

- Use a value for \( \sigma \) which is at least as large as the true \( \sigma \).
- Use the value of \( \sigma \) associated with \( n = 30 \).
- Estimate \( \sigma \) from a pilot sample.
- Estimate \( \sigma \) by dividing the range by 6.

10. A researcher found that 62 of the 85 people randomly selected were in favor of reducing the sales tax. Compute the 90% confidence interval estimate for \( p \).
A researcher did a pilot sample of 25 individuals and found $p$ to be 0.20. How many more must he survey to develop a 95% confidence interval that has a 0.03 margin of error?

- 643
- 647
- 651
True or False

This activity contains 10 questions.

1. The margin of error is increased if the confidence level is increased.
   - [ ] True
   - [ ] False

2. All confidence interval estimations require that the population of interest follows the normal probability distribution.
   - [ ] True
   - [ ] False

3. The confidence interval estimate of the population mean is constructed around the sample mean.
   - [ ] True
   - [ ] False

4. For a sample size greater than 30, we can expect that 95% of all sample means will fall within the range
   \[
   \mu - 1.645 \frac{\sigma}{\sqrt{n}} \leq \bar{\mu} \leq \mu + 1.645 \frac{\sigma}{\sqrt{n}}.
   \]
   - [ ] True
   - [ ] False
5. As the degrees of freedom increase, t-values decrease and approach a limit of 0.
   [Hint]
   True
   False

6. If one needs to estimate the population mean with a sample size exceeding 30, a conventional option is to find the critical value in the z-table then use the equation \( \overline{x} \pm z \frac{s}{\sqrt{n}} \) to develop the interval estimate.
   [Hint]
   True
   False

7. If the population standard deviation is unknown when we are trying to determine the required sample size for estimating the population mean, we can collect a pilot sample from the population to estimate the population standard deviation.
   [Hint]
   True
   False

8. To determine the sample size required to estimate a proportion within a given margin of error, the value for \( p \) that will give the largest sample is 0.5.
   [Hint]
   True
   False
The confidence interval obtained might not correctly estimate the population parameter.

- True
- False

A 95% confidence interval was calculated from a sample of 100 commuters to estimate the average number of miles a person drives to work each day and was found to be 10.2----------16.5 miles. Based on this information, we can conclude that there is a 95% probability that the true population mean for people commuting to work is between 10.2 and 16.5 miles.

- True
- False