

Learning Goals

- Explain what a confidence interval represents and how it relates to sampling variability.
- Distinguish between confidence intervals constructed using the z -distribution and the t -distribution.
- Calculate and interpret confidence intervals for population means when σ is known and unknown.
- Describe how confidence level, sample size, and standard deviation affect the width of a confidence interval.

Key Terms

Define each term in your own words and include an example when possible.

- Confidence Interval (CI):
- Standard Error (SE):
- z -score (relating to CI):
- t -score (relating to CI):
- Degrees of Freedom (df):
- Level of Confidence:
- Formula for CI when σ is known:
- Formula for CI when σ is not known:
- Formula for CI when dealing with proportions:

Key Concepts

1. What does a confidence interval represent in the context of estimating a population parameter?
2. How does increasing the confidence level affect the width of a confidence interval?
3. What role does the Central Limit Theorem play in constructing confidence intervals?
4. When should a z -distribution be used instead of a t -distribution when building a confidence interval?
5. How do sample size and variability influence the margin of error?
6. If the mean of a sample of size 20 is $\bar{x} = 30$ with a population standard deviation of 5, what will a 90% confidence interval be?
7. If the mean of a sample of size 20 is $\bar{x} = 30$ with a sample standard deviation of 5, what will a 90% confidence interval be?