

Section 9.4 & 10.5 Putting It All Together

Objective: Which procedure or method do I use?

Requirements for Confidence Intervals and Hypothesis Testing

To construct a confidence interval (Z-interval or T-interval) about the population mean or to test hypotheses regarding the population mean (Z-test or T-test), two requirements must be satisfied.

- A simple random sample is obtained
- The population from which the sample is drawn must be approximately normal with no outliers or the sample size is large, $n \geq 30$

In order to construct a confidence interval for a population proportion or to test hypotheses about a population proportion, the following conditions must be met:

- $n\hat{p}\hat{q} \geq 10$ where $\hat{p} = \frac{x}{n}$ and $\hat{q} = 1 - \hat{p}$ and the sample size is no more than 5% of the population size.

Confidence Intervals

- If constructing a confidence interval about the mean, you must first determine whether the population standard deviation is known or not.
 - If the population standard deviation, σ , is known construct a Z-interval.
 - If the population standard deviation is not known use the sample standard deviation, s , and construct a T-interval.
- If constructing a confidence for a proportion, use the PropZInt interval program.

Hypothesis Tests

- If testing a hypothesis and the population standard deviation, σ , is known, use a Z-Test.
- If testing a hypothesis and the sample standard deviation, s , is known, use a T-test.
- If testing a hypothesis about a population proportion, use the PropZTest program.

When to reject the null hypothesis:

- If the test statistic (z -value or t -value) falls in the critical region (as determined by the critical value at the given level of significance, α , using `invNorm` or `invT`), we reject the null hypothesis.
- Reject the null hypothesis if the P -value is less than the level of significance, α .
- If the mean stated in the null hypothesis is not in the confidence interval, reject the null hypothesis.

Conclusion of your hypothesis test:

- When you reject the null hypothesis, there is sufficient evidence to support the alternative hypothesis.
- When you do not reject the null hypothesis, there is not sufficient evidence to support the alternative hypothesis.