

Pointers 9.2 - Confidence Interval for an Unknown Population Mean μ

In this section, we learn to construct a confidence interval for an unknown population mean (μ) based upon the sample mean, \bar{x} .

Example: A random sample of 200 ARC students had a mean age of 23.4 years old with a standard deviation of 6.7 years. Construct a 95% confidence interval for the mean age of all ARC students.

Conditions

To construct a confidence interval for an unknown population proportion, p , the following three conditions must be met.

- The sample is independently obtained using simple random sampling or through a randomized experiment.
- $20n \leq N$
- The data comes from a population that is normally distributed (QQ Plot) and has no outliers (Boxplot).
(*You only have to check the third condition if you have the data, otherwise we assume it is true.*)

Point Estimate \bar{x}	Margin of Error $E = t \cdot \frac{s}{\sqrt{n}}$	Lower Bound $\bar{x} - E$	Upper Bound $\bar{x} + E$
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Interpretation

We are ____% sure that the true population mean μ is between Lower Bound & Upper Bound.

StatCrunch Steps

Conditions

- Normally Distributed? Graphics > QQ Plot - Compare correlation statistic to table of critical values.
- Outliers? Graphics > Boxplot – Be sure to select option that shows outliers.

Confidence Interval

- If you have the sample mean & standard deviation:
Stat > T Statistics > One Sample > with summary
Enter the mean, standard deviation, and size.
- If you have the data set:
Construct QQ Plot & Boxplot to check conditions.
Stat > T Statistics > One Sample > with data
Select the column.
- Select the Confidence Level radio button and enter the level of confidence. Calculate.
- Round the lower bound and upper bound to 2 decimal places.