Fact Sheet – Confidence Interval for an Unknown Population Mean μ (9.2)

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

Example: A random sample of 200 COS 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 COS 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.)*

Margin of Error	**Lower Bound**	**Upper Bound**
$E = t \cdot \dfrac{s}{\sqrt{n}}$	$\overline{x} - E$	$\overline{x} + E$

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.