Hypothesis Testing Methods

Traditional and P-Value

Traditional Method:

Step 1
Identify the **Null Hypothesis** $H_0$ and the **Alternative Hypothesis** $H_a$

Step 2
Identify $\alpha$ (Level of Significance)

Step 3
Find the critical value(s)

Step 4
Find the test statistic

- For a Proportion: Hand calculation
  $$ z = \frac{\hat{p} - p}{\sqrt{pq/n}} $$

  TI 83/84 – Use **1PropZTest** *(See Handout H-404)*

- For a population mean (with $\alpha$ known):
  $$ z = \frac{x - \mu_s}{\sigma} $$

  TI 83/84 - Use **Z-Test** *(See Handout H 404)*

- For a population mean (with $\alpha$ Not known):
  $$ t = \frac{x - \mu_s}{s} $$

  TI 83/84 - Use **T-Test** *(See Handout H-404)*

Step 5
Draw a graph and label the test statistic and critical value(s)

Step 6
Make a decision to reject or fail to reject the null hypothesis

- **Reject** $H_0$ - The test statistic falls within the critical region.
- **Fail to Reject** $H_0$ - Test statistic does not fall within the critical region.

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P-Value Method:

P-value is the area determined as follows:

- Left Tail Test: p-value is the area to the left of the test statistic.
- Right Tail Test: p-value is the area to the right of the test statistic.
- Two Tailed Test: p-value is twice the area bounded by the test statistic

Make a decision to reject or fail to reject the null hypothesis:

- **Reject** $H_0$ if p-value ≤ $\alpha$
- **Fail to reject** $H_0$ if p-value > $\alpha$