Steps in Hypothesis testing

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Steps to perform Hypothesis testing

- If population mean and SD are given go for z-test else go for t-test
- If sample is less than 30 it's a t-test else z-test
  - Find mean (applies to t-test)
  - Find z,t
  - Find probability corresponding to z,t
  - If p<alpha : reject Null Hypothesis
  - If p>alpha : fail to reject Null Hypothesis

Calculating means for Z- test

1. **One-Sample Z-Test** $$\left[z = \frac{\bar{x} - \mu}{\frac{s}{\sqrt{n}}}\right]$$

Where:

- $\bar{x}$ = sample mean
- μ = population mean
- σ = population standard deviation
- n = sample size

2. **Two-Sample Z-Test** $$Z = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{\sigma_1^2}{n_1} + \frac{\sigma_2^2}{n_2}}}$$

Where:

- $\bar{x}_1$ = mean of sample 1
- $\bar{x}_2$ = mean of sample 2
- σ_1 and σ_2 = population standard deviations for sample 1 and sample 2, respectively
- n_1 and n_2 = sample sizes for sample 1 and sample 2

3. **Paired Z-Test** $$Z = \frac{\bar{d}}{\frac{\sigma_d}{\sqrt{n}}}$$

Where:

- $\bar{d}$ = mean of the differences between paired observations
- σ_d = standard deviation of the differences
- n = number of pairs

T-test

1. Calculate mean
2. Calculate t

$$s = \sqrt{\frac{\sum_{i=1}^{n}(x_i - \bar{x})^2}{n-1}}$$

$$t = \frac{\bar{x} - \mu}{\frac{s}{\sqrt{n}}}$$