# WELCOME

# Proportions and Variances of Test

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**Introduction to Statistical Testing**

- What is statistical testing?
- Why are proportions and variances important in testing?
- Key concepts:
  - Proportion: Part of a whole
  - Variance: Measure of spread or variability in data

**What are Proportions?**

**Definition:** Ratio of part to whole

**Example:**
    If 60 out of 100 students passed a test, the proportion = 60/100 = 0.60

**Uses in Tests:**
    Proportion tests (one-sample, two-sample z-tests)
    Confidence intervals for proportions

**What is Variance?**

•**Definition:** The average of the squared differences from the mean

•**Formula:**

•$\sigma^2 = \sum (x_i - \mu) 2N$ \sigma^2 = \frac{\sum (x_i - \mu)^2}{N}$\sigma^2 = N \sum (x_i - \mu)^2$

•**Importance:**

- Tells us how spread out the data is
- Affects test results and reliability

**Tests for Proportions**

**Types of Tests:**

    **One-sample proportion test** (compare to a known value)

    **Two-sample proportion test** (compare two groups)

**Example:**

    Is the proportion of defective products from two factories different?

**Test Statistic:**

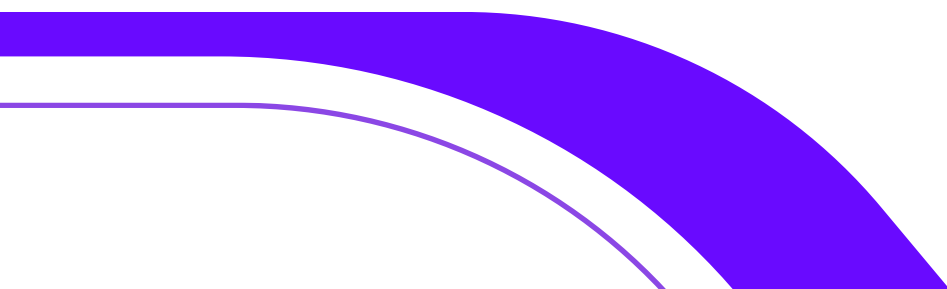    z-test for proportions

**Tests for Variances**

- **Types of Tests:**
  - **Chi-square test** (for one population variance)
  - **F-test** (comparing two variances)
- **Example:**
  - Do two machines produce parts with the same consistency?
- **Key Assumptions:**
  - Normal distribution
  - Independent samples

**Relationship & Importance**

- Proportions and variances influence test outcomes
- Large variance → less reliable proportion estimates
- Small variance → more precise estimates
- Both are crucial for designing fair, reliable tests in business, healthcare, education, etc.

## Conclusion

- Summary of key points
- Importance of choosing the right test
- Proportions help describe data
- Variance tells us how much the data varies

# Thanks