KEY TAKEAWAYS

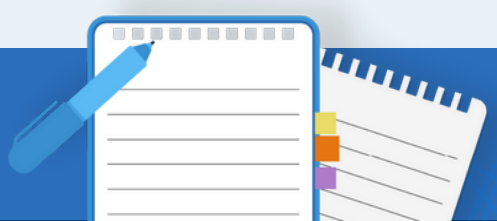
CHAPTER TITLE | **Hypothesis Testing**

LECTURE TITLE | **Null vs Alternate Hypothesis**

1. **Hypothesis testing** is a statistical technique for **decision-making or inferring** population characteristics.

2. **Null Hypothesis (H0):** Represents a statement of **no effect or no difference**, serving as the benchmark in hypothesis testing.

3. **Alternative Hypothesis (Ha):** Proposes a **new effect or difference,** challenging the null hypothesis.



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KEY TAKEAWAYS

CHAPTER TITLE | **Hypothesis Testing**

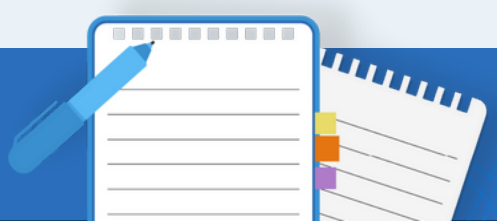
LECTURE TITLE | **Z Test, Rejection Region**

1. **Z-Test:** A statistical test used to determine if there's a significant difference between **sample and population means.**

2. **Significance Level (Alpha):** Defines **the threshold for rejecting the null hypothesis**, commonly set at **0.05 or 5%.**
   Formula: (1–confidence interval)

3. **Critical Z-Value (Z(crit))**: The cut-off point in a **Z-test** distinguishing the **rejection region for the null hypothesis.**

4. **Rejection Region:** The area beyond the **critical Z-value (Z(crit))** where, if the Z-score falls, the **null hypothesis is rejected** due to significant evidence.



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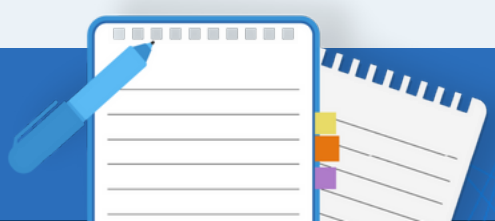
KEY TAKEAWAYS

CHAPTER TITLE | **Hypothesis Testing**

LECTURE TITLE | **p-Value**

1. **P-Value:** Assuming the **null hypothesis** is correct, what is the probability of obtaining **results as extreme as observed** in a statistical test.

2. If the **p-value is less** than the chosen **significance level (e.g., 0.05),** it suggests strong evidence **against the null hypothesis,** leading to its rejection.



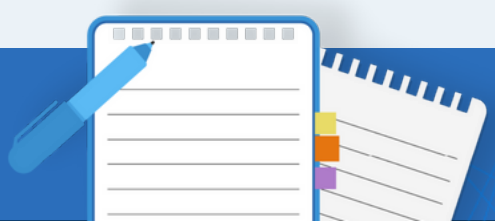
KEY TAKEAWAYS

CHAPTER TITLE | **Hypothesis Testing**

LECTURE TITLE | **One-Tailed vs Two-Tailed Test**

1. **One-Tail Test**: Checks if a parameter is significantly different in **one direction (greater or less).**

2. **Two-Tail Test**: Evaluates if a parameter is significantly different in **any direction (greater or less).**



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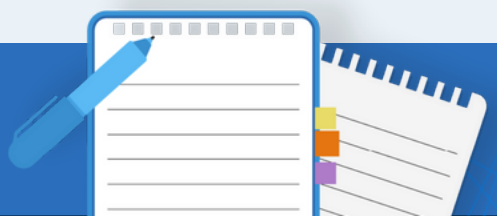
KEY TAKEAWAYS

CHAPTER TITLE | **Hypothesis Testing**

LECTURE TITLE | **Type 1 and Type 2 Errors**

1. **Type 1 Error:** Occurs when we **incorrectly reject** a true null hypothesis.
2. **Type 2 Error:** Occurs when we **fail to reject** a false null hypothesis.
3. **Type 1 error** is also known as a "**false positive**" while **Type 2** error is a "**false negative**".
4. **Beta (β)**: The probability of making a **Type 2 error (false negative).**
5. **Statistical Power**: The probability of correctly rejecting a **false null hypothesis**, equal to **1–β.**
6. **Balancing** Type 1 and Type 2 errors is crucial in **statistical analysis.**



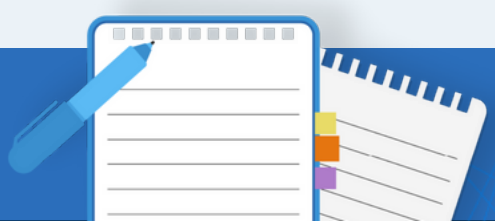
KEY TAKEAWAYS

CHAPTER TITLE | **Hypothesis Testing**

LECTURE TITLE | **Statistical Power & Effect Size**

1. **Statistical power**, denoted as **1−β**, represents the probability of **correctly rejecting a false null hypothesis** in a hypothesis test.

2. **Effect size** quantifies the **magnitude of the difference or relationship** between two groups or variables in a study.



KEY TAKEAWAYS

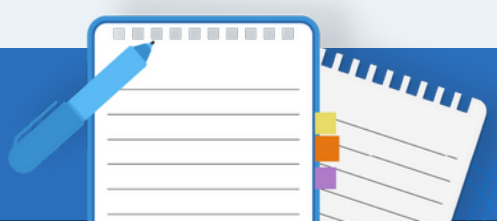
CHAPTER TITLE | **Hypothesis Testing**

LECTURE TITLE | **A/B Testing**

1. **A/B testing** compares two versions (A and B) to find which performs better based on **user engagement and relevant metrics.**

2. **One-Sample Test:** Used to check if a sample significantly differs from a **known population parameters.**

3. **Two-Sample Test:** Compares **two independent** sample data sets to **identify significant differences** between their means or proportions.



KEY TAKEAWAYS

CHAPTER TITLE | **Hypothesis Testing**

LECTURE TITLE | **A/B Testing Using Z Test**

1. **Control group:** Baseline for comparing experimental effects.

2. **Test group:** Subjects exposed to experimental treatment for evaluation.

3. Use the **Z-test** when the sample size is **>30** and the **T-test** when the sample size is **≤30** to make statistical inferences.