

INTRODUCTION TO Z-TESTS

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INTRODUCTION

- : Welcome to the presentation on Z-tests.
- Z-tests are statistical tests used to compare a sample mean to a known population mean and determine if they are significantly different.
- In this presentation, we will cover the basics of Z-tests, their assumptions, calculations, and interpretation of results.

Z-TEST BASICS

- ❑ Z-tests are parametric tests that assume data are normally distributed.
- ❑ They are commonly used when the population standard deviation is known.
- ❑ Z-tests involve comparing a sample mean to a known population mean to assess if the difference is significant.

ASSUMPTIONS OF Z-TESTS

- ❑ Independence: Observations in the sample are independent of each other.
- ❑ Normality: The data in the sample are normally distributed.
- ❑ Known Population Standard Deviation: The standard deviation of the population is known.

STEPS IN CONDUCTING A Z-TEST

- ❑ **Formulate hypotheses:** H_0 assumes no significant difference between the sample mean and population mean, H_1 assumes a significant difference.
- ❑ **Collect data:** Obtain a representative sample from the population of interest.
- ❑ **Calculate the test statistic:** Z-value is calculated using the sample mean, population mean, known population standard deviation, and sample size.
- ❑ **Determine the critical value:** Determine the critical value based on the chosen significance level (α) and the desired level of confidence.
- ❑ **Compare the test statistic to the critical value:** If the test statistic falls within the critical region, reject the null hypothesis; otherwise, fail to reject the null hypothesis.
- ❑ **Interpret the results:** If the null hypothesis is rejected, it suggests a significant difference between the sample mean and the population mean.

EXAMPLE CALCULATION OF Z-TEST

- ❑ Present an example calculation step-by-step to illustrate how to perform a Z-test.
- ❑ Include the formula for the Z-value calculation using the sample mean, population mean, known population standard deviation, and sample size.

INTERPRETING RESULTS

- ❑ When the test statistic falls within the critical region, we reject the null hypothesis.
- ❑ The difference between the sample mean and the population mean is considered statistically significant.
- ❑ Conversely, when the test statistic falls outside the critical region, we fail to reject the null hypothesis.
- ❑ The difference is not considered statistically significant.

ADVANTAGES OF Z TESTs

- Advantages: Z-tests are straightforward to calculate, suitable when the population standard deviation is known, and provide precise results.
- Limitations: They require normality assumptions, the population standard deviation must be known, and they are not suitable for small sample sizes.

LIMITATIONS OF Z-TESTS

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- Limitations: They require normality assumptions, the population standard deviation must be known, and they are not suitable for small sample sizes.

CONCLUSION

- ❑ Z-tests are useful statistical tests for comparing a sample mean to a known population mean.
- ❑ They help determine if observed differences are statistically significant.
- ❑ Remember to check assumptions and ensure that the population standard deviation is known before using a Z-test.

THANK YOU

