STAT 441/541 Statistical Methods II
Week 1
Review of Selected Statistical Methods and Concepts
Usually Covered in Introductory Statistics
Learning Guide

Selected Sections in Chapters 1-7

Numerical Measures of Location
Section 3.4 Describing Data on a Single Variable: Measures of Central Tendency

Central Tendency: describe the center of the distribution of numbers

Mean

Median

Compare and contrast the mean and median:

Numerical Measures of Dispersion
Section 3.5 Describing Data on a Single Variable: Measures of Variability

Variability: describe how the measurements vary about the center of the distribution

Variance and Standard Deviation

Range

Quartiles

Interquartile Range

Graphical Methods
Section 3.3 Describing Data on a Single Variable: Graphical Methods
Histograms

Section 3.6 The Boxplot
Boxplots

Compare and contrast histograms and boxplots:

Section 3.7 Summarizing Data from More Than One Variable: Graphs and Correlation
Scatterplots

Correlation

Normal Distribution
Section 4.10 A Continuous Probability Distribution: The Normal Distribution
Normal Distribution

Section 4.14 Evaluating Whether or Not a Population Distribution is Normal

Inferences about a Population Central Value

Hypothesis Testing (**Section 5.4** A Statistical Test for μ, page 243)

A statistical test is based on the concept of proof by contradiction and is composed of five parts:

1. Null Hypothesis, H_0
2. Research or Alternative Hypothesis, H_a
3. Test Statistic. T.S.
4. Rejection Region, R.R. or *p*-value method (We will only use the p-value method)
   Make a decision about the null hypothesis: reject or fail to reject
   If *p*-value is low, H_0 must go.
   If *p*-value is high, with H_0 we must comply.
5. Draw conclusion

Note: Always check assumptions for each statistical procedure

Type I Error:

Type II Error:

Specify α:

Review Example 5.5:

Section 5.6 Level of Significance (*p*-value)

Section 5.7 Inferences About μ for a Normal Population, σ Unknown

Student's t distribution

Confidence Interval

t test

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   Make a decision about the null hypothesis: reject or fail to reject
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   If p-value is high, with H_0 we must comply.
5. Draw conclusion

Review Example 5.17:

Inferences Comparing Two Population Central Values (Independent Samples)

NOTE: Only review the Approximate t Test for Independent Samples, Unequal Variance (starts on page 311)

Section 6.2 Inferences About $\mu_1 - \mu_2$: Independent Samples (Unequal Variances) Confidence Interval

Two sample t test

Review Example 6.4: