Math 140 Power-Point Project Instructions and Grading Rubric
Hypothesis Testing and Confidence Intervals

Find a question regarding one population proportion, two population proportions, one population mean, two population means, independence, homogeneity, goodness of fit, ANOVA, or correlation tests. It should be something that interests you. Find some sample data on this question. Then perform a hypothesis test to answer the question and make Power Point slides to explain your results. Do <u>not</u> write a separate report. Everything should be on your Power Point slides. <u>Note: There are separate directions for each type of test below. One or Two population proportions and means are on page 1. Chi Squared Independence, Goodness of Fit or Homogeneity Tests are on page 2.</u>
<u>*ANOVA Tests are on page 3 and Correlation and Nonlinear Relationship Tests are on page 4.*</u>

<u>Directions For 1 or 2 population Proportions or Means</u>

Grading Rubric: Each slide or part shown below will be worth 10% of your project grade.

Slide 1: You should have an introduction slide giving your question and explaining why this topic was interesting or important to you.

Slide 2: Write the null and alternative hypothesis. Your original question should be one of these. Choose a significance level that you will use to perform the hypothesis test that answers your original question. Also include what type of test you will be doing and why this particular test should be used.

Slide 3: Discuss how the data was collected and if the sample data will apply to the population and why. This should include a look at the assumptions necessary to make an inference about the population.   It is OK to proceed to slides 4-7 even if your data does not meet all the assumptions, but you do need to discuss the ramifications of not meeting the assumptions.

Slide 4: If you are exploring 1 or 2 population proportions or means, then pick a confidence level (90%, 95% or 99%) and create a confidence interval. If you are comparing two populations, then make a confidence interval for the difference. Write a sentence explaining the meaning behind the confidence interval and what the interval tells you about your original question in step 1.

Slide 5: Calculate the z or t test statistic. Write a sentence explaining the meaning of the test statistic.

Slide 6: Calculate the P-value and write a sentence explaining the meaning of the P-value.

Slide 7: State whether you rejected the null hypothesis or failed to reject the null hypothesis and the reason why.

Slide 8: Write a detailed conclusion explaining and answering your initial question in step 1.

Part 9: Decorate your slides so that they reflect your topic and makes it interesting to look at.

Part 10: Present your Power Point slides to the class. Your poster must have all of the information above and should take about 5 minutes to present. You will be graded on the accuracy of your statistics and explanations and your presentation to the class. Remember, eye contact and speaking loudly counts!

Directions For Independence, Goodness of Fit or Homogeneity Tests

Grading Rubric: Each slide or part shown below will be worth 10% of your project grade.

Slide 1: You should have an introduction slide giving your question and explaining why this topic was interesting or important to you.

Slide 2: Write the null and alternative hypothesis. Your original question should be one of these. Choose a significance level that you will use to perform the hypothesis test that answers your original question. Also include what type of test you will be doing and why this particular test should be used.

Slide 3: Give the expected and observed values for the test. Explain how the expected values fit with the null hypothesis.

Slide 4: Discuss how the data was collected and if the sample data will apply to the population and why. This should include a look at the assumptions necessary to make an inference about the population. It is OK to proceed to slides 5-8 even if your data does not meet all the assumptions, but you do need to discuss the ramifications of not meeting the assumptions.

Slide 5: Calculate the chi squared test statistic. Which categories had the biggest discrepancy between the observed and expected values? Explain how you know and why?

Slide 6: Calculate the P-value and write a sentence explaining the meaning of the P-value.

Slide 7: State whether you rejected the null hypothesis or failed to reject the null hypothesis and the reason why.

Slide 8: Write a detailed conclusion explaining and answering your initial question in step 1.

Part 9: Decorate your slides so that they reflect your topic and makes it interesting to look at.

Part 10: Present your Power Point slides to the class. Your poster must have all of the information above and should take about 5 minutes to present. You will be graded on the accuracy of your statistics and explanations and your presentation to the class. Remember, eye contact and speaking loudly counts!

Directions For ANOVA Tests

Grading Rubric: Each slide or part shown below will be worth 10% of your project grade.

Slide 1: You should have an introduction slide giving your question and explaining why this topic was interesting or important to you.

Slide 2: Write the null and alternative hypothesis. Your original question should be one of these. Choose a significance level that you will use to perform your hypothesis test and how you knew your data question required ANOVA.

Slide 3: Make a side by side boxplot for your data sets and describe the graph to the class.

Slide 4: Discuss how the data was collected and if the sample data will apply to the population and why. This should include a look at the assumptions necessary to make an inference about the population.   It is OK to proceed to slides 5-8 even if your data does not meet all the assumptions, but you do need to discuss the ramifications of not meeting the assumptions.

Slide 5: Calculate the F - test statistic. Write a sentence explaining the meaning of the F-test statistic.

Slide 6: Calculate the P-value and write a sentence explaining the meaning of the P-value.

Slide 7: State whether you rejected the null hypothesis or failed to reject the null hypothesis and the reason why.

Slide 8: Write a detailed conclusion explaining and answering your initial question in step 1.

Part 9: Decorate your slides so that they reflect your topic and makes it interesting to look at.

Part 10: Present your Power Point slides to the class. Your poster must have all of the information above and should take about 5 minutes to present. You will be graded on the accuracy of your statistics and explanations and your presentation to the class. Remember, eye contact and speaking loudly counts!

Directions For Correlation and Nonlinear Relationship Tests

Grading Rubric: Each slide or part shown below will be worth 10% of your project grade.

Slide 1: You should have an introduction slide giving your question and explaining why this topic was interesting or important to you.

Slide 2: Write the null and alternative hypothesis. Your original question should be one of these. Choose a significance level that you will use to perform your hypothesis test and how you knew your data question required a correlation test.

Slide 3: Discuss how you decided which variable to be the explanatory and which to be the response. Make a scatterplot with the regression line or curve included for your data sets and describe the graph to the class including what type of relationship test you decided to do.

Slide 4: Discuss how the data was collected and if the sample data will apply to the population and why. This should include a look at the assumptions necessary to make an inference about the population. It is OK to proceed to slides 5-8 even if your data does not meet all the assumptions, but you do need to discuss the ramifications of not meeting the assumptions.

Slide 5: Calculate the correlation coefficient R (if linear) or R-squared (if nonlinear) and the test statistic. If you are testing a linear relationship (correlation) then you will be using a t-test statistic. If you are testing a nonlinear relationship then you will be using a F-test statistic. Write a sentence explaining the meaning of the t or F test statistic.

Slide 6: Calculate the P-value and write a sentence explaining the meaning of the P-value.

Slide 7: State whether you rejected the null hypothesis or failed to reject the null hypothesis and the reason why.

Slide 8: Write a detailed conclusion explaining and answering your initial question in step 1.

Part 9: Decorate your slides so that they reflect your topic and makes it interesting to look at.

Part 10: Present your Power Point slides to the class. Your poster must have all of the information above and should take about 5 minutes to present. You will be graded on the accuracy of your statistics and explanations and your presentation to the class. Remember, eye contact and speaking loudly counts!