**BUS 173: Applied Statistics**

**Sample Midterm 2 Exam**

*This sample exam does not cover all the materials you are responsible to know for your midterm 2 exam. This sample is designed to give you an idea of the question pattern and the level of difficulty you are likely to face in the exam. You are advised to peruse the textbook chapters, class notes, slides and worksheets to be fully prepared for this exam.*

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**Hypothesis test for population variance**

Problem 1: The makers of Flippin’ Out Pancake Mix claim that one cup of their mix contains 11 grams of sugar. However, the mix is not uniform, so the amount of sugar varies from cup to cup. One cup of mix was taken from each of 24 randomly selected boxes. The sample variance of the sugar measurements from these 24 cups was 1.47 grams. Assume that the distribution of sugar content is approximately normal.

1. Test at 2.5% significance level whether the variance of the particle diameter of all particles in 220-rated sandpaper is greater than 2.0 micrometers.

Problem 2: An auto manufacturing company wants to estimate the variance of miles per gallon for its auto model AST727. A random sample of 22 cars of this model showed that the variance of miles per gallon for these cars is 0.62. Construct the 95% confidence intervals for the population variance and standard deviation. Assume the miles per gallon for all such cars are (approximately) normally distributed.

**Goodness-of-Fit Tests**





**Test for Independence**





**Test for Homogeneity**





**ANOVA**

**Problem 4:** The National Transportation Safety Board (NTSB) wants to examine the safety of compact cars, midsize cars, and full-size cars. It collects a sample on the pressure applied to the driver’s head during a crash test for each of the three treatments (cars types). Using the hypothetical data provided below, test using ANOVA whether the mean pressure applied to the driver’s head during a crash test is equal for each types of car. Use α = 5%.



Present the data in an ANOVA table.



**Sign Test: Test for Preference using Categorical Data**



**Sign Test: Test for Median (Single Population)**



**Sign Test: Test for Paired Median**



The last topic of Midterm II Exam is Spearman Correlation Coefficient Test. I will post sample problems of that next week.