MTH 324, Exam #2, At Home, Fall 2022   Name _____

Instructions: This exam is in two parts: Part I is to be completed partly at home using the materials posted in the course for the at-home portion and you will answer questions about that work during the in-class portion of the exam; Part II is to be completed entirely in class. You may not use cell phones, and you may only access internet resources you are specifically directed to use.

At home, prepare for questions in Part I using R. Open the data file entitled **324exam2data.xlsx** posted in Blackboard. (Note: this file has multiple sheets of data. You may want to separate the data into separate files to upload to R, or look up how to access multiple sheets in R from a single upload.) Complete the calculations noted below. You will be asked for additional analysis and interpretation of this data in the in-class portion of the test. Print out the results of your analysis and code, and bring the pages with you to the exam. You will submit all this work along with the in-class exam.

From Sheet 1:

1. Husbands and wives go into a car dealership separately and look at purchasing the same vehicle. The data here records the offer of selling price received by each member of the couple. Conduct an appropriate hypothesis test of the data to determine if the selling price offered to men and women is different. Test your assumptions with normal probability plots.

From Sheet 2:
2. Conduct a one-way ANOVA test on whether the five different filling machines output different amounts of the product. Apply Tukey's method to determine how the machines group together. Which machine(s) are most in need of recalibration? Be sure to check your data for normality. Create a comparative boxplot to confirm your analysis.

From Sheet 3:
3. Use the data to determine if men and women in the dataset (of graduate business school students) is married at the same rate. You'll need to count the number of men and women in the data, and within each group, count the number of men that are married, and the number of women that are married. Conduct a two-sample proportion test to determine if the difference statistically significant. Check the assumptions of your test.

4. Using Gender, Marital Status (Married) and Number of Children, conduct a three-way ANOVA of school debt. Test main and interaction effects where possible. Test for the normality of school debt. Apply Tukey's method.

5. Conduct a one-sample hypothesis test of school debt to see if there is significant reason to believe school debt is less than $30,000 per student.

6. Build a sampling distribution of Previous Salary. Collect 1000 samples of 50 students each. Calculate the mean of the sample. Build a histogram of your sample mean data. Find the mean (of the means) and the standard deviation of your sample means (the standard error). Find the mean and standard deviation of the original data. Compare the results.