

Instructions: This exam is in two parts: Part I is to be completed partly at home using the materials posted on Blackboard for Part I and you will answer questions about that work in class below; 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.

Part I: At home, open the data file entitled **310final_part1_data.xlsx** posted in Blackboard. 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. Bring the file with you on a flash drive, or upload to Final Exam, Part I (Take-Home) in Blackboard (this submission will not be graded: the file will need to be reuploaded to Blackboard as part of the complete exam; it's just for you to have access to your calculations during the test).

1. The data on the Sheet #1 Data includes information on Labor Hours needed to produce units on a particular production line over time. Perform a thorough regression analysis of the data. Determine if the model is linear or nonlinear, and select an appropriate equation to model the data. Calculate an appropriate goodness of fit test and analyze the resulting p-values. Be prepared to interpret all values in context. Perform a residual analysis.
2. Perform a multi-stage linear regression analysis of the selling price of homes on the Sheet #2 Data. Be sure to remove any variables from the model that do not produce a significant p-value for the variable, or if, when added to the data, produce a negligible change in R^2 value. Be prepared to defend the final model you chose and interpret the results in context.
3. The data on Sheet #3 Data records the property taxes paid on 170 homeowners in 6 different neighborhoods. Perform an ANOVA test on the data to determine if neighborhood has an effect on the amount of tax paid. Be sure to test all the assumptions of the hypothesis test and be prepared to defend your analysis in context.

4.

Treetops Hammocks produces lightweight nylon hammocks designed for campers, scouts, and hikers. The hammocks come in two styles: double and single. The double hammocks sell for \$225 each. They incur a direct labor cost of \$101.25 and a production cost of \$38.75, and they are packed with hanging apparatus and storage bags, which cost \$20. The single hammocks sell for \$175 each. Their direct labor costs are \$70 and production costs are \$30, and they too are packed with the same hanging apparatus and storage bags, which cost \$20. Each double hammock uses 3.2 hours of production time; each single hammock uses 2.4 hours of production time. Treetops plans for no more than 960 labor hours per production cycle. Treetops wants to maximize its profit while making no more than 200 single hammocks and no more than 400 total hammocks per production cycle.

- a. How many of each hammock should Treetops make?
- b. If the restriction on single hammocks were removed, what would be the optimal production plan?