

Project 1: Chapter 4 and 9
70 points

This project must be typed, and you may work in groups for this project (a maximum of three people). Answer the questions with complete sentences and use all the appropriate terms given in the notes or in the book. Include all the graphs and state what software, calculator, or any other website you are using to do your calculation and graphs. If you use the excel, list the functions you use to get your results. The project will be due by 02/13/21 before 10:00 pm.

A popular U.S. automobile manufacturer has 10,000 dealerships located throughout the country. The automobile manufacturer has multiple brands within its portfolio: a value brand that caters to younger clientele, a moderate brand that caters to middle class customers and finally, a premium brand which is marketed to wealthy clientele. The company's leadership, located at corporate headquarters, is very interested in the relationship between the median salary of potential customers and the company's revenue. Specifically, the company is concerned that if potential customers' salaries continue to not increase in the future, the company's revenue will remain stagnant, which will in turn steer away potential investors and shareholders. The company's research department recently collected data for analysis in order to support leadership's upcoming discussion with shareholders and investors about the company's future revenue forecast. Sales figures from a random sample of 1000 dealerships were collected. The research division also conducted statistical analysis, using data provided by the Bureau of Labor and Statistics, to calculate the median salary of people living in the vicinity of these 1,000 dealerships. The Dealership Number, State, Median Salary, Annual Sales, Number of Vehicles Sold, Square Footage and Quality Award Winner data were collected for these 1000 dealerships.

For the raw data, use the excel file given on Canvas from project 1.

- A. Corporate headquarters wants to create a simple linear regression model to predict a dealership's sales using the median salary of people living in the vicinity of their dealerships.
 1. First create a scatterplot using Median Salary as the independent variable and Annual Sales as the dependent variable. After performing a visual analysis of the scatterplot, if appropriate, describe the trend, strength and shape of the relationship between these two variables. What is the correlation coefficient between Median Salary and Annual Sales?
 2. Construct a simple linear regression model using the median salary to predict a dealership's annual sales. What is the value for the slope for this regression model? What is the value for the y-intercept for this regression model?
 3. Using your simple linear regression model, for every one-dollar increase in a potential customer's median salary, how much would one predict the dealership's annual sales to increase?
 4. Using your simple linear regression model, what is the predicted Annual Sales of a dealership when the Median Salary is \$44,000 (round the slope and y-intercept to 2 decimal places)?
 5. Based upon your simple linear regression, should the automobile manufacturer be concerned if the median salary of potential customers remains stagnant or decreases?
- B. Corporate headquarters decides to run a One-Sample T-test to determine if the mean of the median salary of people living in the vicinity for all of its 10,000 dealerships is significantly different from \$39,000. Assume that all necessary Central Limit Theorem conditions for a One-Sample T-test have been met. Test the claim using the significance level of 0.05.