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Project One Guidelines and Rubric

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MAT 240 Project One Guidelines and Rubric

Competencies

In this project, you will demonstrate your mastery of the following competencies:

- Apply statistical techniques to address research problems
- Perform regression analysis to address an authentic problem

Overview

The purpose of this project is to have you complete all of the steps of a real-world linear regression research project starting with de comprehensive statistical analysis, and ending with summarizing your research conclusions.

Scenario

You have been hired by the D. M. Pan National Real Estate Company to develop a model to predict housing prices for homes sold in information to help their real estate agents better determine the use of square footage as a benchmark for listing prices on homes. Y prices based square footage. To complete this task, use the provided real estate data set for all U.S. home sales as well as national de

Directions

Using the Project One Template located in the What to Submit section, generate a report including your tables and graphs to determ for what the listing price should be. Reference the National Statistics and Graphs document for national comparisons and the Real E Supporting Materials section) for your statistical analysis.

Note: Present your data in a clearly labeled table and using clearly labeled graphs.

Specifically, include the following in your report:

Introduction

A. **Describe the report:** Give a brief description of the purpose of your report.
   a. Define the question your report is trying to answer.
   b. Explain when using linear regression is most appropriate.

i. When using linear regression, what would you expect the scatterplot to look like?

c. Explain the difference between predictor (x) and response (y) variables in a linear regression to justify the selection of var

Data Collection

A. **Sampling the data:** Select a random sample of 50 houses. Describe how you obtained your sample data (provide Excel formula

  a. Identify your predictor and response variables.

B. **Scatterplot:** Create a scatterplot of your predictor and response variables to ensure they are appropriate for developing a linea

Data Analysis

A. **Histogram:** Create a histogram for each of the two variables.

B. **Summary statistics:** For your two variables, create a table to show the mean, median, and standard deviation.

C. **Interpret the graphs and statistics:**

  a. Based on your graphs and sample statistics, interpret the center, spread, shape, and any unusual characteristic (outliers, g

  b. Compare and contrast the center, shape, spread, and any unusual characteristic for your sample of house sales with the r

    National Summary Statistics and Graphs House Listing Price by Region PDF). Determine whether your sample is represer

Develop Your Regression Model

A. **Scatterplot:** Provide a scatterplot of the variables with a line of best fit and regression equation.

  a. Based on your scatterplot, explain if a regression model is appropriate.

B. **Discuss associations:** Based on the scatterplot, discuss the association (direction, strength, form) in the context of your model.

  a. Identify any possible outliers or influential points and discuss their effect on the correlation.

  b. Discuss keeping or removing outlier data points and what impact your decision would have on your model.

C. **Calculate *r*:** Calculate the correlation coefficient (*r*).

  a. Explain how the *r* value you calculated supports what you noticed in your scatterplot.

Determine the Line of Best Fit. Clearly define your variables. Find and interpret the regression equation. Assess the strength of the r

A. **Regression equation:** Write the regression equation (i.e., line of best fit) and clearly define your variables.

B. **Interpret regression equation:** Interpret the slope and intercept in context. For example, answer the questions: what does the

  represent? Revisit the Scenario above.

C. **Strength of the equation:** Provide and interpret *R*-squared.

  a. Determine the strength of the linear regression equation you developed.

D. **Use regression equation to make predictions:** Use your regression equation to predict how much you should list your home fo

  1500 square feet.

Conclusions

A. **Summarize findings:** In one paragraph, summarize your findings in clear and concise plain language for the CEO to understand.

    a. Did you see the results you expected, or was anything different from your expectations or experiences?

    b. What changes could support different results, or help to solve a different problem?

    c. Provide at least one question that would be interesting for follow-up research.

You can use the following tutorial that is specifically about this assignment. Make sure to check the assignment prompt for specific different national statistics. You should use the national statistics posted with this assignment.

- MAT-240 Module 4 Project One Video

What to Submit

To complete this project, you must submit the following:

Project One Template Word Document: Use this template to structure your report, and submit the finished version as a Word docum

Supporting Materials

The following resources may help support your work on the project:

Document: National Summary Statistics and Graphs Real Estate Data PDF

Use this data for input in your project report.

Spreadsheet: Real Estate Data Spreadsheet

Use this data for input in your project report.

Tutorial: Downloading Office 365 Programs PDF

Use this tutorial for support with Office 365 programs.

Use these tutorials for support with the Excel functions you will use in the project:

- **Tutorial:** Random Sampling in Excel PDF
- **Tutorial:** Scatterplots in Excel PDF
- **Tutorial:** Descriptive Statistics in Excel PDF
- **Tutorial:** Creating Histograms in Excel PDF

Project One Rubric

Criteria	Exemplary	Proficient	Needs Improvement
Introduction: Describe the Report	Exceeds proficiency in an exceptionally clear manner (100%)	Defines the question the report is trying to answer, and explains when using linear regression is most appropriate, what the scatterplot will look like, and the difference between response and predictor variables in a linear	Shows progress toward proficiency, but with errors o omissions; areas for improvement may include inaccurately defining the question, the appropriateness and justification of the linear regression model or the

		regression to justify the selection of variables (85%)	selection of variables, or introduction lacking essential detail and clarity (55%)
Data Collection: Sampling the Data	N/A	Selects a random sample of 50 houses and describes how the data was obtained. Identifies the response and predictor variables (100%)	Shows progress toward proficiency, but with errors o omissions; areas for improvement may include inaccurate selection of rando sample or inaccurate or uncle selection of response and predictor values (55%)
Data Collection: Scatterplot	N/A	Creates a scatterplot of the predictor and response variables to ensure they are appropriate for developing a linear model (100%)	Shows progress toward proficiency, but with errors o omissions; areas for improvement may include inaccurate scatterplot representation of the information or inaccurate or unclear determination of response and predictor variables (55%)
Data Analysis: Histogram	N/A	Creates histograms for the two variables (100%)	Shows progress toward proficiency, but with errors o omissions; areas for improvement may include histograms that are created incorrectly or are inaccurate (55%)
Data Analysis: Summary Statistics	N/A	Creates a table to show the mean, median, and standard deviation for two variables (100%)	Shows progress toward proficiency, but with errors o omissions; areas for improvement may include tak showing mean, median and standard deviation that are inaccurate or created incorrectly (55%)
Data Analysis: Interpret Graphs and Statistics	N/A	Interprets the graphs and statistics center, spread, shape, and any unusual characteristic (outliers, gaps, etc.) for the two variables based on the graphs and sample statistics, and compares and contrasts with national housing market sales and determines if their sample	Shows progress toward proficiency, but with errors o omissions; areas for improvement may include inaccurate or cursory interpretation of the characteristics of the graph a statistics or inaccurate or cursory comparison or contra

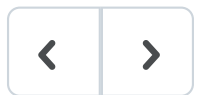|		is representative (100%)	with the national market (55%
Develop Regression Model: Scatterplot	N/A	Provides a scatterplot with a line of best fit; explains if a regression model is appropriate based on the scatterplot (100%)	Shows progress toward proficiency, but with errors o omissions; areas for improvement may include Inaccurate scatterplot or line best fit or explanation of regression model appropriateness that is inaccurate or cursory (55%)
Develop Regression Model: Discuss Associations	Exceeds proficiency in an exceptionally clear manner (100%)	Discusses the association in the context of the model based on scatterplot (direction, strength, form), includes possible outliers or influential points, discusses effect on correlation, and discusses impact of keeping or removing outliers (85%)	Shows progress toward proficiency, but with errors o omissions; areas for improvement may include discussion of association in th context of the scatterplot, possible outliers, influential points and impact on correlation, or impacts of keeping or removing outliers that is inaccurate or cursory (55%)
Develop Regression Model: Calculate *r*	Exceeds proficiency in an exceptionally clear manner (100%)	Calculates the correlation coefficient (r) and explains how the calculated r value supports what was noticed in the scatterplot (85%)	Shows progress toward proficiency, but with errors o omissions; areas for improvement may include inaccurate calculation for r or explanation of how the r valu supports the scatterplot that inaccurate or cursory (55%)
Determine Line of Best Fit: Regression Equation	N/A	Writes the regression equation and clearly defines variables (100%)	Shows progress toward proficiency, but with errors o omissions; areas for improvement may include regression equation that is written inaccurately or variables that are not clearly defined (55%)
Determine Line of Best Fit: Interpret Regression Equation	Exceeds proficiency in an exceptionally clear manner (100%)	Interprets the slope and intercept in context (85%)	Shows progress toward proficiency, but with errors o omissions; areas for improvement may include inaccurate interpretation of t slope and intercept (55%)
Determine Line of Best Fit:	N/A	Provides and interprets R-	Shows progress toward

Strength of the Equation		squared, determining the strength of the linear regression equation (100%)	proficiency, but with errors o omissions; areas for improvement may include inaccuracies in interpretation *R-squared* or the determined strength of the regression equation (55%)
Determine Line of Best Fit: Use Regression Equation to Make Predictions	N/A	Uses a regression equation to predict how much you should list your home for based on the square footage of your home (100%)	Shows progress toward proficiency, but with errors o omissions; areas for improvement may include misuse of regression equation or inaccurate prediction base on provided information (55%
Conclusion: Summarize Findings	Exceeds proficiency in an exceptionally clear manner (100%)	Summarizes findings and results in clear and concise plain language, includes whether the results were expected, changes that could support different results or that would help to solve a different problem; Includes a question for follow-up research (85%)	Shows progress toward proficiency, but with errors o omissions; areas for improvement may include inaccurately summarizing findings or results or summar that is cursory or missing required elements (55%)
Articulation of Response	Exceeds proficiency in an exceptionally clear, insightful, sophisticated, or creative manner (100%)	Clearly conveys meaning with correct grammar, sentence structure, and spelling, demonstrating an understanding of audience and purpose (85%)	Shows progress toward proficiency, but with errors ir grammar, sentence structure, and spelling, negatively impacting readability (55%)

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Activity Details

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