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Project Two Guidelines and Rubric

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MAT 240 Project Two Guidelines and Rubric

Competency

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

- Apply statistical techniques to address research problems
- Perform hypothesis testing to address an authentic problem

Overview

In this project, you will apply inference methods for means to test your hypotheses about the housing sales market for a region of th
statistical methods.

Scenario

You have been hired by your regional real estate company to determine if your region's housing prices and housing square footage a
market. The regional sales director has three questions that they want to see addressed in the report:

1. Are housing prices in your regional market lower than the national market average?
2. Is the square footage for homes in your region different than the average square footage for homes in the national market?
3. For your region, what is the range of values for the 95% confidence interval of square footage for homes in your market?

You are given a real estate data set that has houses listed for every county in the United States. In addition, you have been given nat
averages for housing prices and square footage. Your job is to analyze the data, complete the statistical analyses, and provide a repo
completing the Project Two Template located in the What to Submit area below.

Directions

Introduction

1. **Region:** Start by picking one region from the following list of regions:

   West South Central, West North Central, East South Central, East North Central, Mid Atlantic

2. **Purpose:** What is the purpose of your analysis?

3. **Sample:** Define your sample. Take a random sample of 500 house sales for your region.

a. Describe what is included in your sample (i.e., states, region, years or months).

4. **Questions and type of test:** For your selected sample, define two hypothesis questions (see the Scenario above) and the appro

   each hypothesis:

   a. Describe the population parameter for the variable you are analyzing.

   b. Describe your hypothesis in your own words.

   c. Identify the hypothesis test you will use (1-Tail or 2-Tail).

5. **Level of confidence:** Discuss how you will use estimation and confidence intervals to help you solve the problem.

1-Tail Test

1. **Hypothesis:** Define your hypothesis.

   a. Define the population parameter.

   b. Write null (Ho) and alternative (Ha) hypotheses. **Note:** For means, define a hypothesis that *is less than* the population par

   c. Specify your significance level.

2. **Data analysis:** Summarize your sample data using appropriate graphical displays and summary statistics and confirm assumptic

   test.

   a. Provide at least one histogram of your sample data.

   b. In a table, provide summary statistics including sample size, mean, median, and standard deviation. **Note:** For quartiles 1

      =QUARTILE([data range], [quartile number])

   c. Summarize your sample data, describing the center, spread, and shape in comparison to the national information (under S

      and Graphs House Listing Price by Region PDF). **Note:** For shape, think about the distribution: skewed or symmetric.

   d. Check the conditions.

      a. Determine if the normal condition has been met.

      b. Determine if there are any other conditions that you should check and whether they have been met. **Note:** Think al

3. **Hypothesis test calculations:** Complete hypothesis test calculations.

   a. Calculate the hypothesis statistics.

      a. Determine the appropriate test statistic (t). **Note:** This calculation is (mean – target)/standard error. In this case, the

         national mean.

      b. Calculate the probability (p value). **Note:** This calculation is done with the T.DIST function in Excel:

         =T.DIST([test statistic], [degree of freedom], True) The degree of freedom is calculated by subtracting 1 from your s

4. **Interpretation:** Interpret your hypothesis test results using the p value method to reject or not reject the null hypothesis.

   a. Relate the p value and significance level.

   b. Make the correct decision (reject or fail to reject).

   c. Provide a conclusion in the context of your hypothesis.

2-Tail Test

a. Hypotheses: Define your hypothesis.

a. **Hypotheses:** Define your hypothesis.

1. Define the population parameter.
2. Write null and alternative hypotheses. **Note:** For means, define a hypothesis that is *not equal to* the population paramete
3. State your significance level.

b. **Data analysis:** Summarize your sample data using appropriate graphical displays and summary statistics and confirm assumptic

test.

a. Provide at least one histogram of your sample data.

b. In a table, provide summary statistics including sample size, mean, median, and standard deviation. **Note:** For quartiles 1

=QUARTILE([data range], [quartile number])

c. Summarize your sample data, describing the center, spread, and shape in comparison to the national information. **Note:** F

symmetric.

d. Check the assumptions.

a. Determine if the normal condition has been met.

b. Determine if there are any other conditions that should be checked on and whether they have been met. **Note:** Thi

methods.

c. **Hypothesis test calculations:** Complete hypothesis test calculations.

a. Calculate the hypothesis statistics.

a. Determine the appropriate test statistic (t). **Note:** This calculation is (mean – target)/standard error. In this case, the

national mean.]

b. Determine the probability (p value). **Note:** This calculation is done with the TDIST.2T function in Excel:

=T.DIST.2T([test statistic], [degree of freedom]) The degree of freedom is calculated by subtracting 1 from your sam

d. **Interpretation:** Interpret your hypothesis test results using the p value method to reject or not reject the null hypothesis.

a. Compare the p value and significance level.

b. Make the correct decision (reject or fail to reject).

c. Provide a conclusion in the context of your hypothesis.

e. **Comparison of the test results:** Revisit Question 3 from the Scenario section: For your region, what is the range of values for tl

a. Calculate and report the 95% confidence interval. Show or describe your method of calculation.

Final Conclusions

1. **Summarize your findings:** In one paragraph, summarize your findings in clear and concise plain language.
2. **Discuss:** Discuss whether you were surprised by the findings. Why or why not?

You can use the following tutorial that is specifically about this assignment:

- MAT-240 Module 7 Project Two Video

What to Submit

To complete this project, you must submit the following:

[Project Two 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:

Data Set: [MAT 240 House Listing Price by Region Spreadsheet](#)

Use this data for input in your project report.

Document: [National Summary Statistics and Graphs House Listing Price by Region PDF](#)

Use this data for input in your project report.

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 Two Rubric

Criteria	Exemplary	Proficient	Needs Improvement
Introduction: Purpose	Exceeds proficiency in an exceptionally clear manner (100%)	Provides the purpose of the report (85%)	Shows progress toward proficiency, but with errors or omissions; areas for improvement may include missing or inaccurate samples or hypotheses (55%)
Introduction: Sample	N/A	Describes what is included in the defined random sample (i.e., states, regions, or the period of time used) (100%)	Shows progress toward proficiency, but with errors or omissions; areas for improvement may include inaccurate or very limited descriptions of what is included in the random sample (55%)
Introduction: Questions and Type of Test	Exceeds proficiency in an exceptionally clear and insightful manner (100%)	Describes the population parameter, two hypothesis questions, and identifies the type of test for each for the defined random samples (85%)	Shows progress toward proficiency, but with errors or omissions; areas for improvement may include missing or inaccurate descriptions, definitions, or questions (55%)
Introduction: Level of Confidence	Exceeds proficiency in an exceptionally clear, insightful, or sophisticated manner (100%)	Discusses how estimation and confidence intervals will be used to help solve the problem (85%)	Shows progress toward proficiency, but with errors or omissions; areas for improvement may include

			missing or inaccurate example of how estimation and confidence intervals will be used to help solve the proble (55%)
1-Tail Test: Hypothesis	N/A	Defines the hypothesis by defining the population parameter, writing null and alternative hypotheses, and specifying the significance level (100%)	Shows progress toward proficiency, but with errors o omissions; areas for improvement may include missing or inaccurate definitions and specifications (55%)
1-Tail Test: Data Analysis	Exceeds proficiency in an exceptionally clear, insightful, or sophisticated manner (100%)	Summarizes sample data using appropriate graphical displays and summary statistics, and checks the assumptions by determining if the normal condition has been met, along with other conditions, and compares with national information (85%)	Shows progress toward proficiency, but with errors o omissions; areas for improvement may include inaccurate or insufficient analyses, summaries, or condition checks (55%)
1-Tail Test: Complete Hypothesis Test Calculations	N/A	Completes the hypothesis test calculation (100%)	Shows progress toward proficiency, but with errors o omissions; areas for improvement may include inaccurate or inappropriate calculations, statistics, and/or graphs (55%)
1-Tail Test: Interpretation	Exceeds proficiency in an exceptionally clear, insightful manner (100%)	Interprets hypothesis test results using the p value method to reject or not reject the null hypothesis by relating the p value and significance level, making the correct decision to reject or fail to reject, and providing a contextualized conclusion (85%)	Shows progress toward proficiency, but with errors o omissions; areas for improvement may include inaccurate or insufficient interpretations or conclusion: (55%)
2-Tail Test: Hypotheses	N/A	Defines the hypothesis by defining the population parameter, writing null and alternative hypotheses, and stating the significance level (100%)	Shows progress toward proficiency, but with errors o omissions; areas for improvement may include missing or inaccurate definitions and specifications (55%)
2-Tail Test: Data Analysis	Exceeds proficiency in an	Summarizes sample data using	Shows progress toward

	exceptionally clear, insightful, or sophisticated manner (100%)	appropriate graphical displays and summary statistics, and checks the assumptions by determining if the normal condition has been met, along with other conditions (85%)	proficiency, but with errors o omissions; areas for improvement may include inaccurate or insufficient analysis, summaries, or condition checks (55%)
2-Tail Test: Hypothesis Test Calculations	N/A	Completes the hypothesis test calculation (100%)	Shows progress toward proficiency, but with errors o omissions; areas for improvement may include inaccurate or inappropriate calculations, statistics, and/o graphs (55%)
2-Tail Test: Interpretation	Exceeds proficiency in an exceptionally clear, insightful manner (100%)	Interprets hypothesis test results using the p value method to reject or not reject the null hypothesis by relating the p value and significance level, making the correct decision to reject or fail to reject, and providing a contextualized conclusion (85%)	Shows progress toward proficiency, but with errors o omissions; areas for improvement may include inaccurate or insufficient interpretations or conclusion (55%)
2-Tail Test: Comparison of the Test Results	N/A	Calculates the 95% confidence interval and describes method of calculation (100%)	Shows progress toward proficiency, but with errors o omissions; areas for improvement may include inaccurate calculations or interpretations (55%)
Final Conclusions: Summarize Your Findings	Exceeds proficiency in an exceptionally clear, insightful, sophisticated manner (100%)	Summarizes findings in clear and concise plain language (85%)	Shows progress toward proficiency, but with errors o omissions; areas for improvement may include inaccurate or insufficient interpretations and/or conclusions (55%)
Final Conclusions: Discuss	Exceeds proficiency in an exceptionally clear, insightful, or sophisticated, manner (100%)	Discusses whether the findings were surprising and why (85%)	Shows progress toward proficiency, but with errors o omissions; areas for improvement may include providing more details and evidence to support the response (55%)
Articulation of Response	Exceeds proficiency in an exceptionally clear, insightful, sophisticated, or creative	Clearly conveys meaning with correct grammar, sentence structure, and spelling,	Shows progress toward proficiency, but with errors ir grammar, sentence structure,

	manner (100%)	demonstrating an understanding of audience and purpose (85%)	and spelling, negatively impacting readability (55%)

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Activity Details

Task: View this topic