



DATCB/565 Competency 1 Assessment and Rubric

Course Title: Data Analysis and Business Analytics

Assessment Title: Competency 1 Assessment

Points: 100

Assignment Directions

Read the scenario, part 1, part 2, and the rubric before beginning your assignment.

Scenario

Pastas R Us, Inc. is a fast-casual restaurant chain specializing in noodle-based dishes, soups, and salads. Since its inception, the business development team has favored opening new restaurants in areas (within a 3-mile radius) that satisfy the following demographic conditions:

- Median age between 25 and 45 years old
- Household median income above national average
- At least 15% college-educated adult population

Last year, the marketing department rolled out a loyalty card strategy to increase sales. Under this program, customers present their loyalty card when paying for their orders and receive some free food after making 10 purchases.

The company has collected data from its 74 restaurants to track important variables such as average sales per customer, year-on-year sales growth, sales per sq. ft., loyalty card usage as a percentage of sales, and others. A key metric of financial performance in the restaurant industry is annual sales per sq. ft. For example, if a 1,200 sq. ft. restaurant recorded \$2 million in sales last year, then it sold \$1,667 per sq. ft.

Executive management wants to know whether the current expansion criteria can be improved; evaluate the effectiveness of the loyalty card marketing strategy; and identify feasible, actionable opportunities for improvement. As a member of the analytics department, you've been assigned the responsibility of conducting a thorough statistical analysis of the company's available database to answer executive management's questions.

Part 1: Descriptive Statistics Analysis

Conduct the following descriptive statistics analyses using the [Pastas R Us, Inc. data set](#) in Microsoft Excel. Answer the questions in the spreadsheet or a separate Microsoft Word document.

Insert a new column in the database that corresponds to *AnnualSales*. *AnnualSales* is the result of multiplying a restaurant's *SqFt* by *Sales/SqFt*.

Calculate the following:

- mean
- standard deviation
- skew
- 5-number summary
- interquartile range (IQR) for each of the variables

Create a box-plot for the *AnnualSales* variable and answer the following questions:

- Does it look symmetric?
- Would you prefer the IQR instead of the standard deviation to describe this variable's dispersion? Why or why not?

Create a histogram for the *Sales/SqFt* variable and answer the following questions:

- Is the distribution symmetric? If not, what is the skew?
- Are there any outliers? If so, which one(s)?
- What is the *SqFt* area of the outlier(s)? Is the outlier(s) smaller or larger than the average restaurant in the database? What can you conclude from this observation?
- What measure of central tendency is more appropriate to describe *Sales/SqFt*? Why?

Cite references to support your assignment.

Part 2: Report

Write a 750- to 1,000-word statistical report with the following sections:

- Section 1: Scope and Descriptive Statistics
- Section 2: Analysis
- Section 3: Recommendations and Implementation

Section 1: Scope and Descriptive Statistics

- State the report's objective.
- Discuss the nature of the current database. What variables were analyzed?
- Summarize your descriptive statistics findings from Part 1. Use a table and insert appropriate graphs.

Section 2: Analysis

- Using Microsoft Excel, create scatter plots and display the regression equations for the following pairs of variables:
 - *BachDeg%* versus *Sales/SqFt*
 - *MedIncome* versus *Sales/SqFt*
 - *MedAge* versus *Sales/SqFt*
 - *LoyaltyCard(%)* versus *SalesGrowth(%)*
- In your report, include the scatter plots. For each scatter plot, designate the type of relationship observed (increasing/positive, decreasing/negative, or no relationship) and determine what can be concluded from these relationships.

Section 3: Recommendations and Implementation

- Based on your findings above, assess which expansion criteria seem to be more effective. Is there any expansion criterion that could be changed or eliminated? If so, which one and why?
- Based on your findings above, does it appear as if the loyalty card is positively correlated with sales growth? Would you recommend changing this marketing strategy?
- Based on your previous findings, recommend marketing positioning that targets a specific demographic. (Hint: Are younger people patronizing the restaurants more than older people?)
- Indicate what information should be collected to track and evaluate the effectiveness of your recommendations. How can this data be collected? (Hint: would you use survey/samples or census data?)

Cite references to support your assignment.

Competency Assessment Rubric

Assignment/Performance Criteria	<i>Mastery</i> 100%	<i>Meets Expectations</i> 85%	<i>Not Met</i> 0%
<p>1. Part 1: “AnnualSales” mean, standard deviation, skew, 5-number summary, and interquartile range (IQR) for each of the variables</p> <p>(weight 5%)</p>	<p>Accurately inserted new column in the database titled “AnnualSales” and correctly calculated all of the following: the mean, standard deviation, skew, 5-number summary, and interquartile range (IQR) for each of the variables</p>	<p>Accurately inserted new column in the database titled “AnnualSales”; correctly calculated 2-3 of the following: the mean, standard deviation, skew, 5-number summary, and interquartile range (IQR) for each of the variables</p>	<p>Inserted new column in the database titled “AnnualSales”; correctly calculated 1 of the following: the mean, standard deviation, skew, 5-number summary, and interquartile range (IQR) for each of the variables; did not insert new column in the database titled Annual Sales; did not calculate any of the following: the mean, standard deviation, skew, 5-number summary, and interquartile range (IQR) for each of the variables</p>
<p>2. Part 1: “AnnualSales” box-plot</p> <p>(weight 5%)</p>	<p>Accurately created a box-plot for the “AnnualSales” variable; clearly and correctly answered all of the given questions</p>	<p>Accurately created a box-plot for the “AnnualSales” variable; correctly answered all of the given questions</p>	<p>Accurately created a box-plot for the “AnnualSales” variable and partially answered some of the given questions; or did not create an accurate box plot; did not answer any of the questions</p>
<p>3. Part 1: “Sales/SqFt” histogram</p> <p>(weight 5%)</p>	<p>Accurately created a histogram for the “Sales/SqFt” variable; clearly and correctly answered all of the given questions</p>	<p>Accurately created a histogram for the “Sales/SqFt” variable; correctly answered all of the given questions</p>	<p>Accurately created a histogram for the “Sales/SqFt” variable; correctly answered some of the given questions; or did not accurately creates a histogram for the “Sales/SqFt” variable; did not answer any of the questions</p>
<p>4. Part 1: “Sales/SqFt” central tendency</p> <p>(weight 5%)</p>	<p>Thoroughly analyzed what measure of central tendency is more appropriate to describe “Sales/SqFt” and clearly explained why</p>	<p>Partially analyzed what measure of central tendency is more appropriate to describe “Sales/SqFt” and clearly explained why</p>	<p>Narrowly analyzed what measure of central tendency is more appropriate to describe “Sales/SqFt” and explained why; or did not analyze what measure of central tendency is more appropriate to describe “Sales/SqFt”</p>
<p>5. Part 2: Scope</p> <p>(weight 10%)</p>	<p>Thoroughly stated the report’s objective and thoroughly discussed the nature of the current database</p>	<p>Partially stated the report’s objective and partially discussed the nature of the current database</p>	<p>Narrowly stated the report’s objective and narrowly discussed the nature of the current database or did not submit the report’s objective and did not discuss the nature of the current database</p>

Assignment/Performance Criteria	<i>Mastery</i> 100%	<i>Meets Expectations</i> 85%	<i>Not Met</i> 0%
6. Part 2: Descriptive statistics (weight 10%)	Thoroughly summarized descriptive statistics findings using a table and graphs	Partially summarized descriptive statistics findings using a table and graphs	Narrowly summarized descriptive statistics findings using a table and graphs or did not submit a summary of descriptive statistics findings
7. Part 2: Scatter plots (weight 10%)	Accurately created scatter plots and regression equations for given variables	Created mostly accurate scatter plots and regression equations for given variables	Created scatter plots and regression equations for given variables but with errors that impacted analysis or did not submit scatter plots and regression equations for given variables
8. Part 2: Analysis of scatter plots (weight 10%)	Thoroughly designated the type of relationship observed from scatter plots and thoroughly determined what to conclude from these relationships	Partially designated the type of relationship observed from scatter plots and partially determined what to conclude from these relationships	Narrowly designated the type of relationship observed from scatter plots and narrowly determined what to conclude from these relationships or did not submit type of relationship observed from scatter plots and did not submit conclusions from these relationships
9. Part 2: Recommendation (weight 20%)	Thoroughly assessed which expansion criteria seem to be more effective in order to recommend marketing positioning that targets a specific demographic	Partially assessed which expansion criteria seem to be more effective in order to recommend marketing positioning that targets a specific demographic	Narrowly assessed which expansion criteria seem to be more effective in order to recommend marketing positioning that targets a specific demographic or did not submit an assessment of expansion criteria
10. Part 2: Implementation (weight 20%)	Thoroughly outlined what information should be collected to track and evaluate the effectiveness of the recommendations	Partially outlined what information should be collected to track and evaluate the effectiveness of the recommendations	Narrowly outlined what information should be collected to track and evaluate the effectiveness of the recommendations or did not submit an outline of information