# Customers Count Scoring Guide



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## winma+h Customers COUNT Scoring Guide

### Rubric for Computing Statistics

1 point for each correct statistic (range, median, mean, MAD; possible total of 4 points)

2 points for each explanation (possible total of 8 points)

Score	Description
2	Explanation is clear, thorough, and completely correct.
1	Explanation is mostly correct and/or lacks some details.
0	Explanation is unclear, mostly incorrect, or missing.

value of the deviations and add them together. Divide

# Sample Responses<br/>for Computing<br/>StatisticsTo find the range, subtract the lowest value in the data<br/>set from the highest value in the set.The median is the middle number in a data set that is<br/>sorted in value order. If the data set has an even<br/>number of entries, the median is half way between the<br/>two middle numbers.To find the mean, find the sum of the all numbers in the<br/>data set and divide by the number of entries in the set.To find the MAD, subtract every number in the data set<br/>from the mean to find the deviations. Take the absolute

by the total number of deviations.

### Rubric for Graphs

NOTE: Use the same rubric to score each graph separately.

NOTE: No sample response provided. Response will be specific to the student's data set.

Score	Description
4	<ul> <li>Response demonstrates thorough understanding of summarizing numerical data using a box plot (or histogram/dot plot).</li> <li>All data points are plotted accurately.</li> <li>The graph includes appropriate interval scales.</li> <li>The axes are concisely labeled with precision.</li> <li>The title is exceptionally clear and precise.</li> </ul>
3	<ul> <li>Response demonstrates general understanding of summarizing numerical data using a box plot (or histogram/dot plot).</li> <li>Most data points are accurately plotted.</li> <li>The graph includes interval scales.</li> <li>The axes are correctly labeled.</li> <li>The title tells what the data show.</li> <li>Errors do not interfere with drawing accurate conclusions from the graph.</li> </ul>
2	<ul> <li>Response demonstrates partial understanding of summarizing numerical data using a box plot (or histogram/dot plot).</li> <li>Some data points are accurately plotted.</li> <li>The graph may not include interval scales.</li> <li>The axes are labeled.</li> <li>The title tells part of what the data show.</li> </ul>
1	<ul> <li>Response demonstrates limited understanding of summarizing numerical data using a box plot (or histogram/dot plot).</li> <li>Data points are plotted inaccurately.</li> <li>The graph may not include interval scales.</li> <li>The axes may be incorrectly labeled.</li> <li>The title is vague.</li> </ul>
0	The student's response is mostly or all incorrect.

### 4 points for each graph

### Rubric for Box Plot

Score	Description
4	<ul> <li>Response demonstrates thorough understanding of box plots.</li> <li>Student thoroughly explains each part of the graph.</li> <li>Student thoroughly explains what the graph shows about the variability in the data set.</li> </ul>
3	<ul> <li>Response demonstrates general understanding of box plots.</li> <li>Student explains most or all parts of the graph.</li> <li>Student generally explains what the graph shows about the variability in the data set.</li> </ul>
2	Response demonstrates partial understanding of box plots.
1	Response demonstrates limited understanding of box plots.
0	The student's response is mostly or all incorrect.

### Sample Response for Box Plot

NOTE: Response should include a statement about the variability of the student's data set. A box plot shows the distribution of the data. The data points used to make the box plot are the minimum value, the first quartile, the median, the third quartile, and the maximum. The box represents the IQR the likely variation and the line in the middle of the box is the median, the typical value.

# Rubric for Histogram

Score	Description
4	<ul> <li>Response demonstrates thorough understanding of histograms.</li> <li>Student thoroughly explains what the graph communicates about the data.</li> <li>Student thoroughly explains what the shape of the graph communicates about the data.</li> </ul>
3	<ul> <li>Response demonstrates general understanding of histograms.</li> <li>Student generally explains what the graph communicates about the data.</li> <li>Student generally explains what the shape of the graph communicates about the data.</li> </ul>
2	Response demonstrates partial understanding of histograms.
1	Response demonstrates limited understanding of histograms.
0	The student's response is mostly or all incorrect.

Sample Response for Histogram	A histogram uses bars to display data. It is like a bar graph but, in a histogram, the numbers are grouped
lor mislogram	into ranges, called classes or bins. The bars are in
	order from the smallest range to the largest range. The
	shape of the histogram tells about the distribution and
	probability of a finding a certain value. If the histogram
	is flat, every value appears about the same number of
	times in the data set. In symmetrical (normal)
	distributions, most of the values are clustered in the
	middle. If the distribution is skewed to one side, most
	values are on the lower or higher end of the distribution.

Rubric for Measures	Score	Description
of Variability and Center NOTE: Use the same rubric to score each explanation separately.	5	<ul> <li>Response demonstrates thorough understanding of measures of variability (or center).</li> <li>Student thoroughly explains what each measure of variability (or center) tells about the data. (2 points)</li> <li>Student thoroughly explains a situation where one measure would be preferable over the other. (2 points)</li> <li>Student thoroughly explains why it does or does not matter which measure is used to describe this particular data set. (1 point)</li> </ul>

### Sample Responses for Measures of Variability and Center

NOTE: Student might also discuss IQR Mean and median are measures of center for numerical data sets. The median is the middle number in a data set, and it represents the most typical value in the data. The mean is the arithmetic average. Mean is affected by outliers and can be misleading for skewed data sets. For skewed data sets, the median is a better measure of center. (Student should relate this to the distribution of his/her data set.)

Range and MAD are measures of variability. For both measures, larger numbers indicate more variability. Variability is used to estimate the accuracy of predictions based on the data. With lots of variability, predictions may not be very accurate. The range is affected by outliers and should not be used when the data set includes extreme numbers at one end of the distribution. (Student should relate this to the variability of his/her data set.)

### Rubric for Categorical Data

NOTE: For categorical data, a bar graph (or possibly a pie chart) is most appropriate. When interpreting the graph, students should refer to the mode.

Score	Description
4	<ul> <li>Response demonstrates thorough understanding of graphing categorical data.</li> <li>The student choses an appropriate format for graphing categorical data.</li> <li>All data points are plotted accurately.</li> <li>The graph includes appropriate interval scales.</li> <li>The axes are concisely and precisely labeled.</li> <li>The title is exceptionally clear and precise.</li> <li>The explanation of how to read and interpret the graph is exceptionally clear.</li> </ul>
3	<ul> <li>Response demonstrates general understanding of graphing categorical data.</li> <li>The student choses an appropriate format for graphing categorical data.</li> <li>Most data points are accurately plotted.</li> <li>The graph includes interval scales.</li> <li>The axes are correctly labeled.</li> <li>The title tells what the data show.</li> <li>The explanation of how to read and interpret the graph is accurate.</li> <li>Errors do not interfere with drawing accurate conclusions from the graph.</li> </ul>
2	<ul> <li>Response demonstrates partial understanding of graphing categorical data.</li> <li>The student chooses an appropriate format for graphing categorical data.</li> <li>Some data points are accurately plotted.</li> <li>The graph may not include interval scales.</li> <li>The axes are labeled.</li> <li>The title tells part of what the data show.</li> <li>The explanation of how to read and interpret the graph is weak.</li> </ul>

(continued)

### Rubric for Score Description **Categorical Data** 1 Response demonstrates limited understanding (continued) of what is being assessed. NOTE: No sample • Data points are plotted inaccurately. response provided. • The graph may not include interval scales. Response will be specific • The axes may be incorrectly labeled. to the student's data set. • The title is vague. • The explanation of how to read and interpret the graph is unclear.

The student's response is mostly or all incorrect.

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