Business Statistics (Donnelly)  
Chapter 2  Displaying Descriptive Statistics

1) A frequency distribution is a table that shows the number of data observations that fall into specific intervals.
Answer: TRUE  
Diff: 1  
Keywords: frequency distribution  
Objective: 2.2.1

2) Continuous data are values based on observations that can be counted and are typically represented by whole numbers.
Answer: FALSE  
Diff: 1  
Keywords: discrete data  
Objective: 2.2.1

3) Continuous data is often the result of measuring observations rather than counting them.
Answer: TRUE  
Diff: 1  
Keywords: continuous data  
Objective: 2.2.1

4) Discrete data can have an infinite number of values within a specific interval.
Answer: FALSE  
Diff: 2  
Keywords: discrete data  
Objective: 2.2.1

5) The only limitation in the number of continuous values within an interval is the level of precision of the measuring instrument.
Answer: TRUE  
Diff: 1  
Keywords: continuous data  
Objective: 2.2.1

6) The sum of the relative frequencies for the relative frequency distribution should be equal to or very close to 1.0 due to rounding.
Answer: TRUE  
Diff: 1  
Keywords: relative frequency distributions  
Objective: 2.2.1
7) The sum of the cumulative relative frequencies for the cumulative relative frequency distribution should be equal to or very close to 1.0 due to rounding.
Answer: FALSE
Diff: 2
Keywords: cumulative relative frequency distributions
Objective: 2.2.1

8) A symmetrical distribution is one in which the right side of the distribution looks like the mirror image of the left side of the distribution.
Answer: TRUE
Diff: 1
Keywords: symmetrical distributions
Objective: 2.2.1

9) The goal of constructing a frequency distribution is to identify a useful pattern in the data and often there is more than one acceptable way to accomplish this with grouped quantitative data.
Answer: TRUE
Diff: 1
Keywords: frequency distribution, grouped quantitative data
Objective: 2.2.1

10) When creating a frequency distribution with grouped qualitative data and 45 data points, five classes should be set up using the $2^k \geq n$ rule.
Answer: FALSE
Diff: 1
Keywords: frequency distribution, grouped quantitative data
Objective: 2.2.1

11) When constructing a frequency distribution with grouped qualitative data, occasionally you will end up with $k + 1$ or $k - 1$ classes to cover the entire data set.
Answer: TRUE
Diff: 1
Keywords: frequency distribution, grouped quantitative data
Objective: 2.2.1

12) Fifty employees at CSC Corporation responded to a survey asking for the number of minutes they commute to work in the morning. Eighteen employees indicated that their commutes are 15 to less than 20 minutes. The relative frequency for this class in a frequency distribution would be 0.18.
Answer: FALSE
Diff: 1
Keywords: frequency distribution, grouped quantitative data
Objective: 2.2.1
13) Fifty employees at CSC Corporation responded to a survey asking for the number of minutes they commute to work in the morning. Management would like to know the proportion of employees whose commute is less than 30 minutes. A cumulative relative frequency distribution using grouped data would provide the information to answer this question.
Answer: TRUE
Diff: 1
Keywords: cumulative relative frequency distributions
Objective: 2.2.1

14) A fast food restaurant would like to examine the wait time for customers who use the drive-thru window. The following class boundaries are appropriate to construct a frequency distribution for this data.

<table>
<thead>
<tr>
<th>Number of Minutes</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-2</td>
</tr>
<tr>
<td>2-4</td>
</tr>
<tr>
<td>4-6</td>
</tr>
<tr>
<td>6-8</td>
</tr>
</tbody>
</table>

Answer: FALSE
Diff: 2
Keywords: frequency distribution, grouped quantitative data
Objective: 2.2.1

15) Equal-size classes refer to classes for a frequency distribution using grouped quantitative data that do not overlap.
Answer: FALSE
Diff: 1
Keywords: frequency distribution, grouped quantitative data
Objective: 2.2.1

16) Empty classes for a frequency distribution using grouped quantitative data result from class widths that are too wide.
Answer: FALSE
Diff: 1
Keywords: frequency distribution, grouped quantitative data
Objective: 2.2.1

17) If the class sizes are not equal for a frequency distribution using grouped quantitative data, patterns in the distribution could be misleading.
Answer: TRUE
Diff: 1
Keywords: frequency distribution, grouped quantitative data
Objective: 2.2.1
18) Under no circumstances should open-ended classes be used for a frequency distribution using grouped quantitative data. 
Answer: FALSE 
Diff: 1 
Keywords: frequency distribution, grouped quantitative data 
Objective: 2.2.1

19) The estimated class width for a frequency distribution using grouped quantitative data should be rounded to an integer value to make the class boundaries more readable. 
Answer: TRUE 
Diff: 1 
Keywords: frequency distribution, grouped quantitative data 
Objective: 2.2.1

20) Histograms displaying continuous data have gaps between their bars. 
Answer: FALSE 
Diff: 1 
Keywords: histograms, continuous data 
Objective: 2.2.2

21) Histograms displaying discrete data usually have gaps between their bars. 
Answer: TRUE 
Diff: 1 
Keywords: histograms, continuous data 
Objective: 2.2.2

22) Income and age are examples of data that are technically discrete but are normally displayed in a continuous format. 
Answer: TRUE 
Diff: 1 
Keywords: discrete data, continuous data 
Objective: 2.2.2

23) The cumulative percentage polygon is a line graph that plots the cumulative relative frequency distribution. 
Answer: TRUE 
Diff: 1 
Keywords: cumulative percentage polygon 
Objective: 2.2.2

24) Quantitative data are values that are categorical, describing a characteristic such as gender or level of education. 
Answer: FALSE 
Diff: 1 
Keywords: cumulative percentage polygon 
Objective: 2.2.2

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25) A histogram is the appropriate type of graph to display both quantitative and qualitative data.
   Answer: FALSE
   Diff: 1
   Keywords: qualitative data
   Objective: 2.3.1

26) Bar charts can display data either horizontally or vertically.
   Answer: TRUE
   Diff: 1
   Keywords: bar charts
   Objective: 2.3.1

27) Clumped bar charts are preferred over stacked bar charts when you are comparing data within categories, such as which team scored more points in 2009 when compared to 2010.
   Answer: TRUE
   Diff: 1
   Keywords: clustered bar charts
   Objective: 2.3.1

28) Clumped bar charts are preferred over stacked bar charts when you are displaying totals in each category, such as what team scored the most points over the two-year period.
   Answer: FALSE
   Diff: 1
   Keywords: stacked bar charts
   Objective: 2.3.1

29) Pareto charts are a specific type of bar chart used in quality control programs by businesses to graphically display the causes of problems.
   Answer: TRUE
   Diff: 1
   Keywords: Pareto charts
   Objective: 2.3.1

30) Pareto charts display the categories in an increasing order with the least problematic categories shown first.
   Answer: FALSE
   Diff: 2
   Keywords: Pareto charts
   Objective: 2.3.1

31) Pie charts are an excellent tool for comparing proportions for qualitative (categorical) data.
   Answer: TRUE
   Diff: 1
   Keywords: pie charts
   Objective: 2.3.1
32) Each category of a pie chart occupies a segment of the pie that represents the cumulative relative frequency of that category.
Answer: FALSE
Diff: 1
Keywords: pie charts
Objective: 2.3.1

33) When constructing a pie chart, all categories in the data set must be included in the pie.
Answer: TRUE
Diff: 1
Keywords: pie charts
Objective: 2.3.1

34) Choose a pie chart rather than a bar chart if you want to compare the relative sizes of the classes to one another and together they comprise all possible categories.
Answer: TRUE
Diff: 1
Keywords: pie charts
Objective: 2.3.1

35) Choose a pie chart rather than a bar chart if you want to highlight the actual data values and when the classes combined don't form a whole.
Answer: FALSE
Diff: 1
Keywords: pie charts
Objective: 2.3.1

36) Contingency tables help us identify relationships between two or more variables.
Answer: TRUE
Diff: 1
Keywords: contingency tables
Objective: 2.4.1

37) The stem and leaf display is a graphical technique that can used to display qualitative data.
Answer: FALSE
Diff: 1
Keywords: stem and leaf display
Objective: 2.5.1

38) A stem and leaf display allows you to observe individual data values while a histogram groups data values together.
Answer: TRUE
Diff: 1
Keywords: stem and leaf display
Objective: 2.5.1
39) The dependent variable on scatter plots is placed on the horizontal axis on the graph.
Answer: FALSE
Diff: 2
Keywords: scatter plot, independent variable
Objective: 2.6.1

40) The independent variable on scatter plots is placed on the vertical axis on the graph.
Answer: FALSE
Diff: 2
Keywords: scatter plot, independent variable
Objective: 2.6.1

41) The dependent variable in a scatter plot is influenced by changes in the independent variable.
Answer: TRUE
Diff: 2
Keywords: scatter plot, independent variable, dependent variable
Objective: 2.6.1

42) A data set is known as a time series when each data point is associated with a specific point in time.
Answer: TRUE
Diff: 1
Keywords: time series
Objective: 2.6.1

43) When graphing a time series, the convention is to place the time data on the vertical axis of the graph.
Answer: FALSE
Diff: 2
Keywords: time series
Objective: 2.6.1

44) A ________ is a table that shows the number of data observations that fall into specific intervals.
A) histogram
B) frequency distribution
C) percent polygon
D) Pareto chart
Answer: B
Diff: 1
Keywords: frequency distribution
Objective: 2.2.1
45) ________ data are values based on observations that can be counted and are typically represented by whole numbers.
   A) Discrete
   B) Continuous
   C) Nominal
   D) Time series
   Answer: A
   Diff: 1
   Keywords: frequency distribution
   Objective: 2.2.1

46) ________ are values that can take on any real numbers, including numbers that contain decimal points. This data is often the result of measuring observations rather than counting them.
   A) Discrete
   B) Cross-sectional
   C) Ordinal
   D) Continuous
   Answer: D
   Diff: 1
   Keywords: continuous data
   Objective: 2.2.1

47) A(n) ________ is a category in a frequency distribution.
   A) polygon
   B) ogive
   C) class
   D) histogram
   Answer: C
   Diff: 1
   Keywords: class
   Objective: 2.2.1

48) ________ display the proportion of observations of each class relative to the total number of observations.
   A) Frequency distributions
   B) Cumulative relative frequency distributions
   C) Relative frequency distributions
   D) Histograms
   Answer: C
   Diff: 1
   Keywords: relative frequency distributions
   Objective: 2.2.1
49) ________ totals the proportion of observations that are less than or equal to the class at which you are looking.
   A) Frequency distributions
   B) Cumulative relative frequency distributions
   C) Relative frequency distributions
   D) Histograms
   Answer:  B
   Diff: 1
   Keywords:  cumulative relative frequency distributions
   Objective:  2.2.1

50) A ________ is a graph showing the number of observations in each class of a frequency distribution.
   A) frequency distribution
   B) polygon
   C) relative frequency distribution
   D) histogram
   Answer:  D
   Diff: 1
   Keywords:  histogram
   Objective:  2.2.2
51) A statistics professor kept attendance records and recorded the number of absent students per class. This data is displayed in the following histogram with the frequency of each number of absent students shown above the bars.

How many total classes do these data represent?
A) 46
B) 100
C) 129
D) 150
Answer: C
Diff: 2
Keywords: histogram
Objective: 2.2.2
52) A statistics professor kept attendance records and recorded the number of absent students per class. This data is displayed in the following histogram with the frequency of each number of absent students shown above the bars.

How many statistics classes had two or fewer students absent?
A) 9
B) 40
C) 42
D) 85
Answer: D
Diff: 2
Keywords: histogram
Objective: 2.2.2

53) The class ________ is the breadth, or range, of numbers we plan to put into each class of a frequency distribution using grouped quantitative data.
A) boundary
B) frequency
C) width
D) number
Answer: C
Diff: 1
Keywords: class width, frequency distribution, grouped data
Objective: 2.2.1
54) The class ________ represent the minimum and maximum values for each class of a frequency distribution using grouped quantitative data.
   A) boundaries
   B) frequencies
   C) widths
   D) numbers
   Answer: A
   Diff: 1
   Keywords: class boundary, frequency distribution, grouped data
   Objective: 2.2.1

55) Class ________ are the number of observations for each class of a frequency distribution using grouped quantitative data.
   A) boundaries
   B) frequencies
   C) widths
   D) numbers
   Answer: B
   Diff: 1
   Keywords: class frequency, frequency distribution, grouped data
   Objective: 2.2.1

56) Which of the following is not a rule for constructing a frequency distribution using grouped quantitative data?
   A) Use equal-size classes.
   B) Use mutually exclusive classes.
   C) Avoid empty classes.
   D) Avoid close-ended classes.
   Answer: D
   Diff: 1
   Keywords: frequency distribution, grouped data
   Objective: 2.2.1
57) Consider the following frequency distribution.

<table>
<thead>
<tr>
<th>Number of Minutes</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to less than 5</td>
<td>6</td>
</tr>
<tr>
<td>5 to less than 10</td>
<td>9</td>
</tr>
<tr>
<td>8 to less than 13</td>
<td>14</td>
</tr>
<tr>
<td>13 to less than 18</td>
<td>2</td>
</tr>
</tbody>
</table>

Which rule for constructing a frequency distribution using grouped quantitative data has been violated?
A) Use equal-size classes.
B) Use mutually exclusive classes.
C) Avoid empty classes.
D) No rule has been violated.
Answer: B
Diff: 1
Keywords: frequency distribution, grouped data
Objective: 2.2.1

58) Consider the following frequency distribution.

<table>
<thead>
<tr>
<th>Number of Minutes</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to less than 5</td>
<td>3</td>
</tr>
<tr>
<td>5 to less than 10</td>
<td>11</td>
</tr>
<tr>
<td>10 to less than 15</td>
<td>10</td>
</tr>
<tr>
<td>15 to less than 20</td>
<td>7</td>
</tr>
</tbody>
</table>

Which rule for constructing a frequency distribution using grouped quantitative data has been violated?
A) Use equal-size classes.
B) Use mutually exclusive classes.
C) Avoid empty classes.
D) No rule has been violated.
Answer: D
Diff: 1
Keywords: frequency distribution, grouped data
Objective: 2.2.1
59) Consider the following frequency distribution.

<table>
<thead>
<tr>
<th>Number of Customers</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-2</td>
<td>10</td>
</tr>
<tr>
<td>3-5</td>
<td>7</td>
</tr>
<tr>
<td>6-10</td>
<td>12</td>
</tr>
<tr>
<td>11-15</td>
<td>5</td>
</tr>
</tbody>
</table>

Which rule for constructing a frequency distribution using grouped quantitative data has been violated?
A) Use equal-size classes.
B) Use mutually exclusive classes.
C) Avoid empty classes.
D) No rule has been violated.
Answer: A
Diff: 1
Keywords: frequency distribution, grouped data
Objective: 2.2.1

60) A data set has 60 observations with a minimum value equal to 30 and a maximum value equal to 72. The number of classes using the \(2^k \geq n\) rule is
A) 5.
B) 6.
C) 7.
D) 8.
Answer: B
Diff: 1
Keywords: frequency distribution, grouped data
Objective: 2.2.1

61) A data set has 60 observations with a minimum value equal to 30 and a maximum value equal to 72. The estimated class width using the \(2^k \geq n\) rule to determine the number of classes is
A) 7.
B) 9.
C) 10.
D) 12.
Answer: A
Diff: 1
Keywords: frequency distribution, grouped data
Objective: 2.2.1
62) _______ classes are classes with boundaries that do not overlap.
   A) Equal-size
   B) Open-ended
   C) Mutually exclusive
   D) Close-ended
   Answer: C
   Diff: 1
   Keywords: frequency distribution, grouped data
   Objective: 2.2.1

63) The following frequency distribution displays the daily sales of muffins at Avalon Bakery.

<table>
<thead>
<tr>
<th>Number Sold</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-7</td>
<td>5</td>
</tr>
<tr>
<td>8-14</td>
<td>8</td>
</tr>
<tr>
<td>15-21</td>
<td>13</td>
</tr>
<tr>
<td>20-28</td>
<td>21</td>
</tr>
<tr>
<td>27-35</td>
<td>3</td>
</tr>
</tbody>
</table>

What is the width of each class in this distribution?
A) 1
B) 7
C) 10
D) 35
Answer: B
Diff: 1
Keywords: frequency distribution, grouped data
Objective: 2.2.1
64) The following frequency distribution displays the daily sales of muffins at Avalon Bakery.

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</tr>
<tr>
<td>20-28</td>
<td>21</td>
</tr>
<tr>
<td>27-35</td>
<td>3</td>
</tr>
</tbody>
</table>

How many days of data are included in this frequency distribution?
A) 25
B) 50
C) 75
D) 100
Answer: B
Diff: 1
Keywords: frequency distribution, grouped data
Objective: 2.2.1

65) The following frequency distribution displays the daily sales of muffins at Avalon Bakery.

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<td>20-28</td>
<td>21</td>
</tr>
<tr>
<td>27-35</td>
<td>3</td>
</tr>
</tbody>
</table>

What is the probability that between 15 to 21 muffins will be sold tomorrow?
A) 0.26
B) 0.36
C) 0.44
D) 0.50
Answer: A
Diff: 1
Keywords: frequency distribution, grouped data
Objective: 2.2.1
66) The following frequency distribution displays the daily sales of muffins at Avalon Bakery.

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<td>13</td>
</tr>
<tr>
<td>20-28</td>
<td>21</td>
</tr>
<tr>
<td>27-35</td>
<td>3</td>
</tr>
</tbody>
</table>

What is the probability that 21 or fewer muffins will be sold tomorrow?
A) 0.52
B) 0.66
C) 0.80
D) 0.92
Answer: A
Diff: 1
Keywords: frequency distribution, grouped data
Objective: 2.2.1

67) The following frequency distribution displays the daily sales of muffins at Avalon Bakery.

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<td>20-28</td>
<td>21</td>
</tr>
<tr>
<td>27-35</td>
<td>3</td>
</tr>
</tbody>
</table>

What is the probability that between 20 and 35 muffins will be sold tomorrow?
A) 0.14
B) 0.48
C) 0.58
D) 0.66
Answer: B
Diff: 1
Keywords: frequency distribution, grouped data
Objective: 2.2.1
68) The following distribution shows the frequency of daily revenue for an Italian restaurant in Wilmington, Delaware.

<table>
<thead>
<tr>
<th>Revenue</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under $2,000</td>
<td>18</td>
</tr>
<tr>
<td>$2,000 to under $4,000</td>
<td>10</td>
</tr>
<tr>
<td>$4,000 to under $6,000</td>
<td>26</td>
</tr>
<tr>
<td>$6,000 to under $8,000</td>
<td>14</td>
</tr>
<tr>
<td>$8,000 to under $10,000</td>
<td>8</td>
</tr>
<tr>
<td>Over $10,000</td>
<td>4</td>
</tr>
</tbody>
</table>

What is the width of each class for this distribution?
A) $10,000
B) $8,000
C) $5,000
D) $2,000
Answer: D
Diff: 1
Keywords: frequency distribution, grouped data
Objective: 2.2.1

69) The following distribution shows the frequency of daily revenue for an Italian restaurant in Wilmington, Delaware.

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<td>8</td>
</tr>
<tr>
<td>Over $10,000</td>
<td>4</td>
</tr>
</tbody>
</table>

How many business days does this frequency distribution represent?
A) 100
B) 80
C) 32
D) 18
Answer: B
Diff: 1
Keywords: frequency distribution, grouped data
Objective: 2.2.1
70) The following distribution shows the frequency of daily revenue for an Italian restaurant in Wilmington, Delaware.

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<td>Over $10,000</td>
<td>4</td>
</tr>
</tbody>
</table>

What is the probability that a randomly selected day will generate between $2,000 and under $4,000 in revenue?
A) 0.100
B) 0.125
C) 0.325
D) 0.500
Answer: B
Diff: 1
Keywords: frequency distribution, grouped data
Objective: 2.2.1

71) The following distribution shows the frequency of daily revenue for an Italian restaurant in Wilmington, Delaware.

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</tr>
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</tr>
<tr>
<td>Over $10,000</td>
<td>4</td>
</tr>
</tbody>
</table>

What is the probability that a randomly selected day will generate under $2,000 in revenue?
A) 0.050
B) 0.160
C) 0.225
D) 0.500
Answer: C
Diff: 1
Keywords: frequency distribution, grouped data
Objective: 2.2.1
72) The following distribution shows the frequency of daily revenue for an Italian restaurant in Wilmington, Delaware.

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</tr>
<tr>
<td>$8,000 to under $10,000</td>
<td>8</td>
</tr>
<tr>
<td>Over $10,000</td>
<td>4</td>
</tr>
</tbody>
</table>

What is the probability that a randomly selected day will generate more than $6,000 in revenue?

A) 0.325  
B) 0.650  
C) 0.775  
D) 0.900  
Answer: A  
Diff: 1  
Keywords: frequency distribution, grouped data  
Objective: 2.2.1

73) Bins in Excel represent the ______________.

A) lower boundary of each class in a frequency distribution  
B) upper boundary of each class in a frequency distribution  
C) width of each class in a frequency distribution  
D) number of classes in a frequency distribution  
Answer: B  
Diff: 1  
Keywords: frequency distribution, grouped data, bins  
Objective: 2.2.2

74) When you want to compare the shape of two or more distributions on one graph, a ______ is your best choice

A) frequency distribution  
B) histogram  
C) percentage polygon  
D) relative frequency distribution  
Answer: C  
Diff: 1  
Keywords: percentage polygon  
Objective: 2.2.2
75) The ________ graphs the midpoint of each class as a line rather than a column.
A) bar chart  
B) histogram  
C) scatter plot  
D) percentage polygon  
Answer: D  
Diff: 1  
Keywords: percentage polygon  
Objective: 2.2.2

76) The ________ is a line graph that plots the cumulative relative frequency distribution.
A) ogive  
B) histogram  
C) scatter plot  
D) percentage polygon  
Answer: A  
Diff: 1  
Keywords: ogive  
Objective: 2.2.2
77) The following graph is a percent polygon showing the battery life, in hours, for a sample of iPad 2s and iPad 3s. The diamond markers represent the iPad 2 battery life while the square markers represent the iPad 3 battery life. Based on this graph, which of the following statements is true?

A) The battery life of the iPad 3 tends to be longer than the battery life of the iPad 2.
B) The battery life of the iPad 3 tends to be about the same as the battery life of the iPad 2.
C) The battery life of the iPad 2 tends to be longer than the battery life of the iPad 3.
D) The difference in battery life between the iPad 2 and iPad 3 cannot be detected with this graph.

Answer: C
Diff: 2
Keywords: percent polygon
Objective: 2.2.2
78) The following graph is a cumulative percent polygon showing the battery life, in hours, for a sample of iPad 2s and iPad 3s. The diamond markers represent the iPad 2 battery life while the square markers represent the iPad 3 battery life. Based on this graph, which of the following statements is true?

A) Approximately 20% of the iPad 2 batteries lasted more than 10 hours.
B) Approximately 20% of the iPad 2 batteries lasted less than 10 hours.
C) Approximately 60% of the iPad 3 batteries lasted more than 8 hours.
D) Approximately 80% of the iPad 3 batteries lasted less than 8 hours.

Answer: B
Diff: 2
Keywords: percent polygon
Objective: 2.2.2
79) The following chart shows the percentage of adults from various countries who admitted to texting while driving in a recent survey.

This chart is an example of a ________ bar chart.
A) horizontal
B) stacked
C) clustered
D) vertical
Answer: D
Diff: 1
Keywords: vertical bar charts
Objective: 2.2.3
80) The following chart shows the percentage of adults from various countries who admitted to texting while driving in a recent survey.

![Texting While Driving](chart.png)

Which of the following statements is not correct?
A) The USA has the highest percentage of adults who admitted to texting while driving.
B) The United Kingdom has a higher percentage of adults who admit to texting while driving when compared to Germany.
C) Spain has the lowest percentage of adults who admitted to texting while driving.
D) The United Kingdom has a lower percentage of adults who admit to texting while driving when compared to France.

Answer: B

Diff: 1
Keywords: vertical bar charts
Objective: 2.2.3
81) The following chart shows the average movie ticket price according to a survey by the National Association of Theater Owners.

This chart is an example of a _________ chart.
A) horizontal bar
B) vertical bar
C) stacked bar
D) Pareto
Answer: B
Diff: 1
Keywords: vertical bar charts
Objective: 2.2.3
82) The following chart shows the average number of fast food meals consumed per year by 18- to 24-year-olds.

Which of the following statements is not correct?
A) The average ticket price has decreased over time.
B) The lowest average ticket price occurred in 2006.
C) The highest average ticket price occurred in 2012.
D) The average ticket price in 2010 was higher than the average ticket price in 2008.

Answer: A

Diff: 1
Keywords: vertical bar charts
Objective: 2.2.3
83) The following chart shows the average market price for five brands of cars in March 2013.

This chart is an example of a _________ bar chart.
A) horizontal
B) stacked
C) clustered
D) vertical
Answer: A
Diff: 1
Keywords: horizontal bar charts
Objective: 2.2.3
84) The following chart shows the average market price for five brands of cars in March 2013.

Which of the following statements is not correct?
A) The Nissan Versa has the lowest average market value.
B) The Kia Soul has a higher average market price than the Ford Fiesta.
C) The Hyundai Accent has a lower average market price than the Toyota Yaris.
D) The Hyundai Accent has a lower average market price than the Nissan Versa.
Answer: D
Diff: 1
Keywords: vertical bar charts
Objective: 2.2.3
85) The following chart shows the average number of hours commuters spend in traffic delays per year at the six most congested cities in the U.S.

This chart is an example of a ____________ chart.
A) stacked bar  
B) horizontal bar  
C) Pareto  
D) vertical bar  
Answer: B  
Diff: 1  
Keywords: horizontal bar charts  
Objective: 2.2.3
86) The following chart shows the average number of hours commuters spend in traffic delays per year at the six most congested cities in the U.S.

![](chart.png)

Which of the following statements is not correct?
A) Chicago commuters have the highest average number of hours spent per year in traffic delays.
B) Baltimore commuters have the lowest average number of hours spent per year in traffic delays.
C) Houston commuters have a higher average number of hours spent per year in traffic delays when compared to New York commuters.
D) Los Angeles commuters have a lower average number of hours spent per year in traffic delays when compared to Washington commuters.
Answer: A
Diff: 1
Keywords: vertical bar charts
Objective: 2.2.3

87) ________ group several values side by side within the same category in a vertical direction.
A) Stacked bar charts
B) Clustered bar charts
C) Pie charts
D) Scatter plots
Answer: B
Diff: 1
Keywords: clustered bar charts
Objective: 2.2.3
88) ________ group several values in a single column within the same category in a vertical
direction.
A) Stacked bar charts
B) Clustered bar charts
C) Pie charts
D) Scatter plots
Answer: A
Diff: 1
Keywords: stacked bar charts
Objective: 2.2.3

89) ________ charts are a specific type of bar chart used in quality control programs by
businesses to graphically display the causes of problems.
A) Stacked bar
B) Clustered bar
C) Pie
D) Pareto
Answer: D
Diff: 1
Keywords: Pareto charts
Objective: 2.2.3

90) Pareto charts also plot the cumulative relative frequency as a line on the chart. This line is
known as a(n) ________.
A) scatter plot
B) ogive
C) histogram
D) frequency distribution
Answer: B
Diff: 1
Keywords: Pareto charts, ogive
Objective: 2.2.3

91) Use a ________ chart if you want to compare the relative sizes of the classes in a frequency
distribution and together they comprise all possible categories.
A) horizontal bar
B) vertical bar
C) Pareto
D) pie
Answer: D
Diff: 1
Keywords: pie charts
Objective: 2.2.3
92) The following table shows the percentage of e-mails that are sent each day of the business week according to an Intermedia survey.

<table>
<thead>
<tr>
<th>Day</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday</td>
<td>15%</td>
</tr>
<tr>
<td>Tuesday</td>
<td>23%</td>
</tr>
<tr>
<td>Wednesday</td>
<td>22%</td>
</tr>
<tr>
<td>Thursday</td>
<td>21%</td>
</tr>
<tr>
<td>Friday</td>
<td>19%</td>
</tr>
</tbody>
</table>

Which of the following best displays this data?
A) horizontal bar chart
B) vertical bar chart
C) pie chart
D) histogram
Answer: C
Diff: 1
Keywords: pie charts
Objective: 2.2.3

93) The following table shows the percentage of U.S. energy consumption according to various sources.

<table>
<thead>
<tr>
<th>Source</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Petroleum</td>
<td>37%</td>
</tr>
<tr>
<td>Natural Gas</td>
<td>25%</td>
</tr>
<tr>
<td>Coal</td>
<td>21%</td>
</tr>
<tr>
<td>Nuclear</td>
<td>9%</td>
</tr>
<tr>
<td>All renewable</td>
<td>8%</td>
</tr>
</tbody>
</table>

Which of the following best displays this data?
A) horizontal bar chart
B) vertical bar chart
C) pie chart
D) histogram
Answer: C
Diff: 1
Keywords: pie charts
Objective: 2.2.3
94) ________ provide a format to display observations that have more than one value associated with them.
A) Histograms
B) Contingency tables
C) Frequency distributions
D) Pie charts
Answer:  B
Diff: 1
Keywords:  contingency tables
Objective:  2.2.4

95) In Excel, contingency tables are known as ______________.
A) pivot tables
B) bins
C) frequency distributions
D) bar charts
Answer:  A
Diff: 1
Keywords:  contingency tables
Objective:  2.2.4

96) Porter Automotive is a car dealership that sells Buicks and Hondas. The following data shows the number of buyers this month according to the brand of car they purchased as well as their age group.

<table>
<thead>
<tr>
<th>Age</th>
<th>Buick</th>
<th>Honda</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under 40 years old</td>
<td>6</td>
<td>17</td>
</tr>
<tr>
<td>40 years or older</td>
<td>19</td>
<td>8</td>
</tr>
</tbody>
</table>

This data is an example of a ________________.
A) histogram
B) contingency table
C) relative frequency distribution
D) stem and leaf diagram
Answer:  B
Diff: 1
Keywords:  contingency tables
Objective:  2.2.4
97) Porter Automotive is a car dealership that sells Buicks and Hondas. The following data shows the number of buyers this month according to the brand of car they purchased as well as their age group.

<table>
<thead>
<tr>
<th>Age</th>
<th>Buick</th>
<th>Honda</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under 40 years old</td>
<td>6</td>
<td>17</td>
</tr>
<tr>
<td>40 years or older</td>
<td>19</td>
<td>8</td>
</tr>
</tbody>
</table>

The percentage of buyers 40 years or older who purchased a Honda is _____.
A) 12%
B) 16%
C) 34%
D) 38%
Answer: B
Diff: 1
Keywords: contingency tables
Objective: 2.2.4

98) Porter Automotive is a car dealership that sells Buicks and Hondas. The following data shows the number of buyers this month according to the brand of car they purchased as well as their age group.

<table>
<thead>
<tr>
<th>Age</th>
<th>Buick</th>
<th>Honda</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under 40 years old</td>
<td>6</td>
<td>17</td>
</tr>
<tr>
<td>40 years or older</td>
<td>19</td>
<td>8</td>
</tr>
</tbody>
</table>

The percentage of buyers who are under 40 years old in this data is _____.
A) 20%
B) 46%
C) 50%
D) 54%
Answer: B
Diff: 2
Keywords: contingency tables
Objective: 2.2.4
99) Porter Automotive is a car dealership that sells Buicks and Hondas. The following data shows the number of buyers this month according to the brand of car they purchased as well as their age group.

<table>
<thead>
<tr>
<th>Age</th>
<th>Buick</th>
<th>Honda</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under 40 years old</td>
<td>6</td>
<td>17</td>
</tr>
<tr>
<td>40 years or older</td>
<td>19</td>
<td>8</td>
</tr>
</tbody>
</table>

Which one of the following statements is true based on the data?
A) There are more Buick owners than Honda owners in this data.
B) Honda owners tend to be older than Buick owners.
C) There are fewer Buick owners than Honda owners in this data.
D) Buick owners tend to be older than Honda owners.
Answer: D
Diff: 2
Keywords: contingency tables
Objective: 2.2.4

100) A stem and leaf display most resembles a __________.
A) histogram
B) contingency table
C) relative frequency distribution
D) pie chart
Answer: A
Diff: 1
Keywords: stem and leaf display
Objective: 2.2.5

101) Consider the following stem and leaf display.

| 3 | 1 1 1 4 5 |
| 4 | 4 6 7    |
| 5 | 0 0 4 5 6 6 8 9 |
| 6 | 1 3 3 6 |

Which data value occurs most often?
A) 1
B) 5
C) 31
D) 59
Answer: C
Diff: 1
Keywords: stem and leaf display
Objective: 2.2.5
102) Consider the following stem and leaf display.

```
3 | 1 1 1 4 5  
4 | 4 6 7       
5 | 0 0 4 5 6 6 8 9  
6 | 1 3 3 6     
```

Which of the following statements is correct?
A) There are a total of 10 data values in this data set.
B) The data value that occurs most often is 50.
C) This largest data value is 59.
D) The class 50-59 contains the most values.

Answer: D
Diff: 1
Keywords: stem and leaf display
Objective: 2.2.5

103) Consider the following stem and leaf display.

```
1(0) | 2 4 4     
1(5) | 6 6 7 8   
2(0) | 0 0 1 1 1 2 2  
2(5) | 5 5 7 8   
3(0) | 0 1 3 4   
```

Which data value occurs most often?
A) 1   
B) 21  
C) 22  
D) 200

Answer: B
Diff: 1
Keywords: stem and leaf display
Objective: 2.2.5
104) Consider the following stem and leaf display.

1(0) | 2 4 4
1(5) | 6 6 7 8
2(0) | 0 0 1 1 1 2 2
2(5) | 5 5 7 8
3(0) | 0 1 3 4

Which of the following statements is correct?
A) There are a total of 10 data values in this data set.
B) The data value that occurs most often is 22.
C) This largest data value is 34.
D) The class 15-19 contains the most values.
Answer: C
Diff: 1
Keywords: stem and leaf display
Objective: 2.2.5

105) _______ provide a picture of the relationship between two data points that are paired together.
A) Scatter plots
B) Pareto charts
C) Histograms
D) Pie charts
Answer: A
Diff: 1
Keywords: scatter plots
Objective: 2.2.6

106) A _____ chart is a special type of scatter plot in which the data points in the scatter plot are connected with a line.
A) bar
B) Pareto
C) line
D) pie
Answer: C
Diff: 1
Keywords: scatter plot, line chart
Objective: 2.2.6
107) The following graph shows the curb weight of seven cars, in pounds, along with their corresponding highway miles per gallon.

This graph is an example of a _________.
A) line chart
B) scatter plot
C) Pareto chart
D) histogram
Answer: B
Diff: 1
Keywords: scatter plots
Objective: 2.2.6
108) The following graph shows the curb weight of seven cars, in pounds, along with their corresponding highway miles per gallon.

Which one of the following statements is correct?
A) Curb weight is the dependent variable in the graph.
B) Miles per gallon is the independent variable in the graph.
C) As the curb weight increases, the highway miles per gallon tend to decrease.
D) As the curb weight increases, the highway miles per gallon tend to increase.
Answer: C
Diff: 1
Keywords: scatter plots
Objective: 2.2.6
109) The following graph shows the square footage of 10 homes along with their corresponding heating cost for the most recent month.

This graph is an example of a _____________.
A) line chart
B) horizontal bar chart
C) Pareto chart
D) scatter plot
Answer: D
Diff: 1
Keywords: scatter plots
Objective: 2.2.6
110) The following graph shows the square footage of 10 homes along with their corresponding heating cost for the most recent month.

Which one of the following statements is not correct?
A) Monthly heating cost is the dependent variable in the graph.
B) Square footage is the independent variable in the graph.
C) As the square footage of the home increases, the monthly heating cost tends to increase.
D) As the square footage of the home increases, the monthly heating cost tends to decrease.

Answer: D
Diff: 1
Keywords: scatter plots
Objective: 2.2.6
111) The following graph shows the average grade point average for a particular college from 2006 until 2013.

This graph is an example of a _________.
A) line chart
B) vertical bar chart
C) Pareto chart
D) histogram
Answer: A
Diff: 1
Keywords: line chart
Objective: 2.2.6
112) The following graph shows the average grade point average for a particular college from 2006 until 2013.

Which one of the following statements is correct?
A) Average GPA is the dependent variable in the graph.
B) Year is the dependent variable in the graph.
C) Historically, the Average GPA of the college tends to decrease.
D) There appears to be no relationship between Year and Average GPA.

Answer: A

Diff: 1

Keywords: line chart

Objective: 2.2.6
113) The following graph shows the average price of LCD TVs from 2005 until 2012.

This graph is an example of a ________.
A) histogram  
B) vertical bar chart  
C) Pareto chart  
D) line chart  
Answer: D  
Diff: 1  
Keywords: line chart  
Objective: 2.2.6
114) The following graph shows the average price of LCD TVs from 2005 until 2012.

Which one of the following statements is correct?
A) Year is the dependent variable in the graph.
B) Average Price is the independent variable in the graph.
C) Historically, the average price of LCD TVs tends to increase.
D) Historically, the average price of LCD TVs tends to decrease.

Answer: D

Diff: 1
Keywords: scatter plots
Objective: 2.2.6
115) The following data shows the number of students that came to office hours per day for a particular faculty member.

```
0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 1 1
1 1 1 1 1 1 1 1 2 2
2 2 2 2 3 3 3 3 4 4
```

Construct a frequency distribution for this data.
Answer:

<table>
<thead>
<tr>
<th>Number of Students</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>18</td>
</tr>
<tr>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>40</td>
</tr>
</tbody>
</table>

Diff: 1  
Keywords: frequency distribution  
Objective: 2.2.1

116) The following data shows the number of students that came to office hours per day for a particular faculty member.

```
0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 1 1
1 1 1 1 1 1 1 1 2 2
2 2 2 2 3 3 3 3 4 4
```

Construct a relative frequency distribution for this data and determine the probability that one student will come to office hours today.
Answer:

<table>
<thead>
<tr>
<th>Number of Students</th>
<th>Frequency</th>
<th>Relative Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>18</td>
<td>0.45</td>
</tr>
<tr>
<td>1</td>
<td>10</td>
<td>0.25</td>
</tr>
<tr>
<td>2</td>
<td>6</td>
<td>0.15</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
<td>0.10</td>
</tr>
<tr>
<td>4</td>
<td>2</td>
<td>0.05</td>
</tr>
<tr>
<td>Total</td>
<td>40</td>
<td>1.00</td>
</tr>
</tbody>
</table>

\[ P(x = 1) = 0.25 \]
Diff: 1  
Keywords: relative frequency distributions  
Objective: 2.2.1
The following data shows the number of students that came to office hours per day for a particular faculty member.

<table>
<thead>
<tr>
<th>Number of Students</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>18</td>
</tr>
<tr>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>40</td>
</tr>
</tbody>
</table>

Construct a cumulative relative frequency distribution for this data and determine the probability that fewer than three students will come to office hours today.

Answer:

\[
P(x < 3) = 0.85
\]

Diff: 1

Keywords: cumulative relative frequency distributions

Objective: 2.2.1
118) The following data shows the number of students that came to office hours per day for a particular faculty member.

0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 1 1
1 1 1 1 1 1 1 1 2 2
2 2 2 2 3 3 3 3 4 4

Construct a histogram for this data.

Answer:

<table>
<thead>
<tr>
<th>Number of Students</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>18</td>
</tr>
<tr>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>40</td>
</tr>
</tbody>
</table>

Diff: 1
Keywords: frequency distribution
Objective: 2.2.2
119) The following data show the number of pairs of men's New Balance sneakers that were sold over the last 25 weeks at a discount shoe store.

```
1 4 6 6 8 8 9 11 11 11 12 12 14 14 14 15 17 17 17 19 19 20 21 24 24
```

Construct a frequency distribution for this data.

Answer: Set \( k = 5 \) because \( 2^5 = 32 \geq 25 \).

Estimated Class Width \( = \frac{24 - 1}{5} = 4.6 \approx 5 \)

<table>
<thead>
<tr>
<th>Number of Pairs</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-5</td>
<td>2</td>
</tr>
<tr>
<td>6-10</td>
<td>5</td>
</tr>
<tr>
<td>11-15</td>
<td>9</td>
</tr>
<tr>
<td>16-20</td>
<td>6</td>
</tr>
<tr>
<td>21-25</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td>25</td>
</tr>
</tbody>
</table>

Diff: 1  
Keywords: frequency distribution, grouped data  
Objective: 2.2.1
120) The following data show the number of pairs of men's New Balance sneakers that were sold over the last 25 weeks at a discount shoe store.

1 4 6 6 8 8 9 11 11 11 12 12 14 14 14 15 17 17 17 19 19 20 21 24 24

Construct a relative frequency distribution for this data and determine the probability that between 6 to 10 pairs of New Balance shoes will be sold next week.

Answer: Set $k = 5$ because $2^5 = 32 \geq 25$.

Estimated Class Width $= \frac{24 - 1}{5} = 4.6 \approx 5$

<table>
<thead>
<tr>
<th>Number of Pairs</th>
<th>Frequency</th>
<th>Relative Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-5</td>
<td>2</td>
<td>0.08</td>
</tr>
<tr>
<td>6-10</td>
<td>5</td>
<td>0.20</td>
</tr>
<tr>
<td>11-15</td>
<td>9</td>
<td>0.36</td>
</tr>
<tr>
<td>16-20</td>
<td>6</td>
<td>0.24</td>
</tr>
<tr>
<td>21-25</td>
<td>3</td>
<td>0.12</td>
</tr>
<tr>
<td>Total</td>
<td>25</td>
<td>1.00</td>
</tr>
</tbody>
</table>

$P(6 \leq x \leq 10) = 0.20$

Diff: 1

Keywords: relative frequency distribution, grouped data

Objective: 2.2.1
121) The following data show the number of pairs of men's New Balance sneakers that were sold over the last 25 weeks at a discount shoe store.

<table>
<thead>
<tr>
<th>Number of Pairs</th>
<th>Frequency</th>
<th>Relative Frequency</th>
<th>Cumulative Relative Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-5</td>
<td>2</td>
<td>0.08</td>
<td>0.08</td>
</tr>
<tr>
<td>6-10</td>
<td>5</td>
<td>0.20</td>
<td>0.28</td>
</tr>
<tr>
<td>11-15</td>
<td>9</td>
<td>0.36</td>
<td>0.64</td>
</tr>
<tr>
<td>16-20</td>
<td>6</td>
<td>0.24</td>
<td>0.88</td>
</tr>
<tr>
<td>21-25</td>
<td>3</td>
<td>0.12</td>
<td>1.00</td>
</tr>
<tr>
<td>Total</td>
<td>25</td>
<td></td>
<td>1.00</td>
</tr>
</tbody>
</table>

\[ P(x \leq 15) = 0.64 \]

Diff: 1
Keywords: relative frequency distribution, grouped data
Objective: 2.2.1
122) The following data show the number of pairs of men's New Balance sneakers that were sold over the last 25 weeks at a discount shoe store.

<table>
<thead>
<tr>
<th>Number of Pairs</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-5</td>
<td>2</td>
</tr>
<tr>
<td>6-10</td>
<td>5</td>
</tr>
<tr>
<td>11-15</td>
<td>9</td>
</tr>
<tr>
<td>16-20</td>
<td>6</td>
</tr>
<tr>
<td>21-25</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td>25</td>
</tr>
</tbody>
</table>

Construct a histogram for this data.
Answer: Set \( k = 5 \) because \( 2^k = 32 \geq 25 \).

Estimated Class Width = \( \frac{24 - 1}{5} = 4.6 \approx 5 \)

Diff: 1
Keywords: relative frequency distribution, grouped data
Objective: 2.2.2

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123) The following data show the monthly rental for a random sample of one-bedroom apartments in York, Pennsylvania.

$600  $615  $660  $660  $675  $680  $690  $700  $720  $725
$755  $760  $775  $775  $780  $780  $780  $785  $810  $840

Construct a frequency distribution for this data.
Answer: Set $k = 5$ because $2^5 = 32 \geq 20$.
Estimated Class Width $= \frac{\$840 - \$600}{5} = \$48 \approx \$50$

<table>
<thead>
<tr>
<th>Monthly Rent</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>$600 to under $650</td>
<td>2</td>
</tr>
<tr>
<td>$650 to under $700</td>
<td>5</td>
</tr>
<tr>
<td>$700 to under $750</td>
<td>3</td>
</tr>
<tr>
<td>$750 to under $800</td>
<td>8</td>
</tr>
<tr>
<td>$800 to under $850</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>20</td>
</tr>
</tbody>
</table>

Diff: 1
Keywords: frequency distribution, grouped data
Objective: 2.2.1

124) The following data show the monthly rental for a random sample of one-bedroom apartments in York, Pennsylvania.

$600  $615  $660  $660  $675  $680  $690  $700  $720  $725
$755  $760  $775  $775  $780  $780  $780  $785  $810  $840

Construct a relative frequency distribution for this data and determine the probability a randomly selected one-bedroom apartment will rent between $700 and less than $750 per month.
Answer: Set $k = 5$ because $2^5 = 32 \geq 20$.
Estimated Class Width $= \frac{\$840 - \$600}{5} = \$48 \approx \$50$

<table>
<thead>
<tr>
<th>Monthly Rent</th>
<th>Frequency</th>
<th>Relative Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>$600 to under $650</td>
<td>2</td>
<td>0.10</td>
</tr>
<tr>
<td>$650 to under $700</td>
<td>5</td>
<td>0.25</td>
</tr>
<tr>
<td>$700 to under $750</td>
<td>3</td>
<td>0.15</td>
</tr>
<tr>
<td>$750 to under $800</td>
<td>8</td>
<td>0.40</td>
</tr>
<tr>
<td>$800 to under $850</td>
<td>2</td>
<td>0.10</td>
</tr>
<tr>
<td>Total</td>
<td>20</td>
<td>1.00</td>
</tr>
</tbody>
</table>

$P(\$700 \leq x < \$750) = 0.15$

Diff: 1
Keywords: relative frequency distribution, grouped data
Objective: 2.2.1
125) The following data show the monthly rental for a random sample of one-bedroom apartments in York, Pennsylvania.

$600 $615 $660 $660 $675 $680 $690 $700 $720 $725 $755 $760 $775 $775 $780 $780 $780 $785 $810 $840

Construct a cumulative relative frequency distribution for this data and determine the probability a randomly selected one-bedroom apartment will rent for less than $700 per month.

Answer: Set \( k = 5 \) because \( 2^5 = 32 \geq 20 \).

Estimated Class Width \( = \frac{840 - 600}{5} = 48 \approx 50 \)

<table>
<thead>
<tr>
<th>Monthly Rent</th>
<th>Frequency</th>
<th>Relative Frequency</th>
<th>Cumulative Relative Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>$600 to under $650</td>
<td>2</td>
<td>0.10</td>
<td>0.10</td>
</tr>
<tr>
<td>$650 to under $700</td>
<td>5</td>
<td>0.25</td>
<td>0.35</td>
</tr>
<tr>
<td>$700 to under $750</td>
<td>3</td>
<td>0.15</td>
<td>0.50</td>
</tr>
<tr>
<td>$750 to under $800</td>
<td>8</td>
<td>0.40</td>
<td>0.90</td>
</tr>
<tr>
<td>$800 to under $850</td>
<td>2</td>
<td>0.10</td>
<td>1.00</td>
</tr>
<tr>
<td>Total</td>
<td>20</td>
<td>1.00</td>
<td></td>
</tr>
</tbody>
</table>

\( P(x < 700) = 0.35 \)

Diff: 1

Keywords: cumulative relative frequency distributions, grouped data

Objective: 2.2.1
126) The following data show the monthly rental for a random sample of one-bedroom apartments in York, Pennsylvania.

|$600$ | $615$ | $660$ | $660$ | $675$ | $680$ | $690$ | $700$ | $720$ | $725$
|$755$ | $760$ | $775$ | $775$ | $780$ | $780$ | $780$ | $785$ | $810$ | $840$

Construct a histogram for this data.

Answer:
Set $k = 5$ because $2^5 = 32 \geq 20$.

Estimated Class Width $= \frac{840 - 600}{5} = 48 \approx 50$

<table>
<thead>
<tr>
<th>Monthly Rent</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>$600$ to under $650$</td>
<td>2</td>
</tr>
<tr>
<td>$650$ to under $700$</td>
<td>5</td>
</tr>
<tr>
<td>$700$ to under $750$</td>
<td>3</td>
</tr>
<tr>
<td>$750$ to under $800$</td>
<td>8</td>
</tr>
<tr>
<td>$800$ to under $850$</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>20</td>
</tr>
</tbody>
</table>

Diff: 1
Keywords: frequency distribution, grouped data
Objective: 2.2.2
127) The following table shows the number of points scored by the Green Bay Packers and the Detroit Lions of the National Football League over 15 recent seasons.

<table>
<thead>
<tr>
<th>Green Bay</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>560</td>
<td>388</td>
<td>461</td>
<td>419</td>
<td>435</td>
<td>301</td>
<td>298</td>
<td>424</td>
</tr>
<tr>
<td>442</td>
<td>398</td>
<td>390</td>
<td>353</td>
<td>357</td>
<td>408</td>
<td>422</td>
<td></td>
</tr>
<tr>
<td>Detroit</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>474</td>
<td>362</td>
<td>262</td>
<td>268</td>
<td>346</td>
<td>305</td>
<td>254</td>
<td>296</td>
</tr>
<tr>
<td>270</td>
<td>306</td>
<td>270</td>
<td>307</td>
<td>322</td>
<td>306</td>
<td>379</td>
<td></td>
</tr>
</tbody>
</table>

Use four classes, each with a class width of 100. Start classes with 201-300, 301-400, and so on, and construct a percentage polygon. What conclusions can you draw comparing these two teams?

Answer:

Green Bay tended to score more points per season than Detroit during this time span.

Diff: 2
Keywords: percent polygon
Objective: 2.2.2
128) The following table shows the number of points scored by the Green Bay Packers and the Detroit Lions of the National Football League over 15 recent seasons.

<table>
<thead>
<tr>
<th>Green Bay</th>
<th>Detroit</th>
</tr>
</thead>
<tbody>
<tr>
<td>560 388 461 419 435 301 298 424 442 398 390 353 357 408 422</td>
<td>474 362 262 268 346 305 254 296 270 306 270 322 306 379</td>
</tr>
</tbody>
</table>

Use four classes, each with a class width of 100. Start classes with 201-300, 301-400, and so on, and construct a cumulative percentage polygon. What conclusions can you draw comparing these two teams?

Answer: Green Bay tended to score more points per season than Detroit during this time span.

Diff: 2
Keywords: cumulative percentage polygon
Objective: 2.2.2
129) The following table shows the number of patents that various corporations filed in a recent year.

<table>
<thead>
<tr>
<th>Company</th>
<th>Number of Patents</th>
</tr>
</thead>
<tbody>
<tr>
<td>IBM</td>
<td>6,180</td>
</tr>
<tr>
<td>Samsung</td>
<td>4,894</td>
</tr>
<tr>
<td>Canon</td>
<td>2,821</td>
</tr>
<tr>
<td>Panasonic</td>
<td>2,559</td>
</tr>
<tr>
<td>Toshiba</td>
<td>2,483</td>
</tr>
</tbody>
</table>

Construct the type of chart that would be most appropriate if the goal was to compare the number of patents among companies.

Answer:

![Number of Patents Chart](image)

Diff: 2
Keywords: bar charts
Objective: 2.2.3
130) The following table shows the percentage of adults invested in stocks through 401(k)s or mutual funds from a Gallup survey.

<table>
<thead>
<tr>
<th>Year</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>65%</td>
</tr>
<tr>
<td>2009</td>
<td>57%</td>
</tr>
<tr>
<td>2011</td>
<td>54%</td>
</tr>
<tr>
<td>2013</td>
<td>52%</td>
</tr>
</tbody>
</table>

Construct the type of chart that would be most appropriate if the goal was to compare the percentages over time.

Answer:

Diff: 2
Keywords: bar charts
Objective: 2.2.3
131) The following table shows the average number of diners at a restaurant during each day of the week.

<table>
<thead>
<tr>
<th>Day</th>
<th>Average Number of Diners</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday</td>
<td>73</td>
</tr>
<tr>
<td>Tuesday</td>
<td>102</td>
</tr>
<tr>
<td>Wednesday</td>
<td>100</td>
</tr>
<tr>
<td>Thursday</td>
<td>79</td>
</tr>
<tr>
<td>Friday</td>
<td>128</td>
</tr>
<tr>
<td>Saturday</td>
<td>227</td>
</tr>
<tr>
<td>Sunday</td>
<td>99</td>
</tr>
</tbody>
</table>

Construct the type of chart that would be most appropriate if the goal was to compare the number of diners during the week.

Answer:

```

<table>
<thead>
<tr>
<th>Day</th>
<th>Average Number of Diners</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday</td>
<td>73</td>
</tr>
<tr>
<td>Tuesday</td>
<td>102</td>
</tr>
<tr>
<td>Wednesday</td>
<td>100</td>
</tr>
<tr>
<td>Thursday</td>
<td>79</td>
</tr>
<tr>
<td>Friday</td>
<td>128</td>
</tr>
<tr>
<td>Saturday</td>
<td>227</td>
</tr>
<tr>
<td>Sunday</td>
<td>99</td>
</tr>
</tbody>
</table>
```

Diff: 2
Keywords: bar charts
Objective: 2.2.3
132) The following table shows customer satisfaction scores for five airlines in 2010 and 2013.

<table>
<thead>
<tr>
<th>Airline</th>
<th>2010</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>JetBlue</td>
<td>764</td>
<td>787</td>
</tr>
<tr>
<td>Southwest</td>
<td>742</td>
<td>770</td>
</tr>
<tr>
<td>West Jet</td>
<td>740</td>
<td>714</td>
</tr>
<tr>
<td>AirTran</td>
<td>704</td>
<td>706</td>
</tr>
<tr>
<td>Frontier</td>
<td>688</td>
<td>708</td>
</tr>
</tbody>
</table>

Construct the type of chart that would be most appropriate if the goal was to investigate changes in satisfaction scores for each airline between the two years.

Answer:

![Clustered bar chart](image)

Diff: 1
Keywords: clustered bar charts
Objective: 2.2.3

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133) The following table shows the average roundtrip airfare for domestic and international flights for each of three years.

<table>
<thead>
<tr>
<th>Year</th>
<th>Domestic</th>
<th>International</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>$291</td>
<td>$710</td>
</tr>
<tr>
<td>2010</td>
<td>$302</td>
<td>$753</td>
</tr>
<tr>
<td>2011</td>
<td>$320</td>
<td>$863</td>
</tr>
</tbody>
</table>

Construct the type of chart that would be most appropriate if the goal was to compare the domestic and international airfare.

Answer:

[Graph showing the comparison of domestic and international airfare for 2009, 2010, and 2011.]
134) The following table shows the number of complaints recorded at a restaurant over the past several years.

<table>
<thead>
<tr>
<th>Complaint</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rude server</td>
<td>42</td>
</tr>
<tr>
<td>Feeling rushed</td>
<td>25</td>
</tr>
<tr>
<td>Too noisy</td>
<td>15</td>
</tr>
<tr>
<td>Poor food</td>
<td>11</td>
</tr>
<tr>
<td>Other</td>
<td>7</td>
</tr>
</tbody>
</table>

Construct a Pareto chart to display this data.

Answer:

[Diagram of a Pareto chart showing the complaints and their frequencies.

Diff: 2
Keywords: Pareto charts
Objective: 2.2.3]
135) The following table shows the number of complaints recorded at a college from the student body this past school year.

<table>
<thead>
<tr>
<th>Complaint</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poor food service</td>
<td>20</td>
</tr>
<tr>
<td>Feel like a number</td>
<td>13</td>
</tr>
<tr>
<td>Lack of diversity</td>
<td>9</td>
</tr>
<tr>
<td>Other</td>
<td>8</td>
</tr>
</tbody>
</table>

Construct a Pareto chart to display this data.
Answer:

![Pareto chart image]

Diff: 2
Keywords: Pareto charts
Objective: 2.2.3
A survey of 4,080 workers was asked when they expected to retire. The following table shows the frequency distribution of the respondents.

<table>
<thead>
<tr>
<th>Response</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before age 60</td>
<td>286</td>
</tr>
<tr>
<td>Age 60-69</td>
<td>2,203</td>
</tr>
<tr>
<td>Age 70 or older</td>
<td>1,020</td>
</tr>
<tr>
<td>Not retiring</td>
<td>571</td>
</tr>
</tbody>
</table>

Construct a chart that best displays this data.

Answer:
137) A survey of 2,056 adults was asked how many books they typically read in a year. The following table shows the frequency distribution of the respondents.

<table>
<thead>
<tr>
<th>Response</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>288</td>
</tr>
<tr>
<td>1-2</td>
<td>308</td>
</tr>
<tr>
<td>3-5</td>
<td>390</td>
</tr>
<tr>
<td>6-10</td>
<td>392</td>
</tr>
<tr>
<td>11 or more</td>
<td>678</td>
</tr>
</tbody>
</table>

Construct a chart that best displays this data.

Answer:

![Pie Chart](image)

Diff: 2
Keywords: pie charts
Objective: 2.2.3
Costco is a warehouse store that has two types of membership — standard and executive. The following table shows the gender and type of membership of the last 20 customers at a particular store.

<table>
<thead>
<tr>
<th>Membership</th>
<th>Gender</th>
<th>Membership</th>
<th>Gender</th>
</tr>
</thead>
<tbody>
<tr>
<td>standard</td>
<td>male</td>
<td>standard</td>
<td>female</td>
</tr>
<tr>
<td>executive</td>
<td>female</td>
<td>standard</td>
<td>male</td>
</tr>
<tr>
<td>standard</td>
<td>female</td>
<td>standard</td>
<td>female</td>
</tr>
<tr>
<td>executive</td>
<td>male</td>
<td>standard</td>
<td>male</td>
</tr>
<tr>
<td>standard</td>
<td>male</td>
<td>standard</td>
<td>female</td>
</tr>
<tr>
<td>executive</td>
<td>male</td>
<td>executive</td>
<td>female</td>
</tr>
<tr>
<td>standard</td>
<td>male</td>
<td>executive</td>
<td>female</td>
</tr>
<tr>
<td>executive</td>
<td>female</td>
<td>executive</td>
<td>male</td>
</tr>
<tr>
<td>standard</td>
<td>male</td>
<td>executive</td>
<td>female</td>
</tr>
<tr>
<td>executive</td>
<td>female</td>
<td>executive</td>
<td>female</td>
</tr>
</tbody>
</table>

Construct a contingency table for this data.

Answer:

<table>
<thead>
<tr>
<th></th>
<th>Standard</th>
<th>Executive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td>Male</td>
<td>6</td>
<td>3</td>
</tr>
</tbody>
</table>

Diff: 1

Keywords: contingency tables

Objective: 2.2.4
139) Chris is a photographer and sells two types of photography for consignment in an art store—landscapes and flower close-ups. She also sells each in three print sizes—8x10, 11x14, and 13x19 inches. The following table shows the number of prints of each type and size that have recently sold.

<table>
<thead>
<tr>
<th>Type</th>
<th>Size</th>
<th>Type</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>landscape</td>
<td>13x19</td>
<td>flower</td>
<td>11x14</td>
</tr>
<tr>
<td>landscape</td>
<td>11x14</td>
<td>landscape</td>
<td>11x14</td>
</tr>
<tr>
<td>flower</td>
<td>11x14</td>
<td>landscape</td>
<td>8x10</td>
</tr>
<tr>
<td>flower</td>
<td>8x10</td>
<td>flower</td>
<td>8x10</td>
</tr>
<tr>
<td>landscape</td>
<td>13x19</td>
<td>landscape</td>
<td>11x14</td>
</tr>
<tr>
<td>flower</td>
<td>8x10</td>
<td>landscape</td>
<td>13x19</td>
</tr>
<tr>
<td>flower</td>
<td>11x14</td>
<td>flower</td>
<td>11x14</td>
</tr>
<tr>
<td>flower</td>
<td>13x19</td>
<td>landscape</td>
<td>11x14</td>
</tr>
<tr>
<td>landscape</td>
<td>13x19</td>
<td>landscape</td>
<td>13x19</td>
</tr>
</tbody>
</table>

Construct a contingency table for this data.
Answer:

<table>
<thead>
<tr>
<th></th>
<th>Landscape</th>
<th>Flower</th>
</tr>
</thead>
<tbody>
<tr>
<td>8x10</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>11x14</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>13x19</td>
<td>5</td>
<td>1</td>
</tr>
</tbody>
</table>

Diff: 1
Keywords: contingency tables
Objective: 2.2.4

140) The following data represents the high ambient temperature for a particular city over the past 16 days.

52  56  56  58  59  60  62  65
69  73  73  74  76  76  77  78

Construct a stem and leaf display for this data.
Answer:

| 5 | 2 6 6 8 9 |
| 6 | 0 2 5 9 |
| 7 | 3 3 4 6 6 7 8 |

Diff: 1
Keywords: stem and leaf display
Objective: 2.2.5

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141) The following data represents the satisfaction scores from customers at a hotel on a 1-100 scale.

77 77 81 81 82 83 83 84 84 87
87 89 90 92 92 92 93 93 96 97

Construct a stem and leaf display for this data, splitting the stems in half.

Answer:
7(5) | 7 7
8(0) | 1 1 2 3 3 4 4
8(5) | 7 7 9
9(0) | 0 2 2 2 3 3
9(5) | 6 7

Diff: 1

Keywords: stem and leaf display
Objective: 2.2.5
142) The following table shows the number of hours that six students studied for their statistics exam and their corresponding exam grades.

<table>
<thead>
<tr>
<th>Hours of Study</th>
<th>Exam Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>86</td>
</tr>
<tr>
<td>6</td>
<td>95</td>
</tr>
<tr>
<td>4</td>
<td>92</td>
</tr>
<tr>
<td>4</td>
<td>83</td>
</tr>
<tr>
<td>3</td>
<td>78</td>
</tr>
<tr>
<td>2</td>
<td>79</td>
</tr>
</tbody>
</table>

Construct a scatter plot to display this data. What conclusions can be drawn?

Answer:

It appears that the students who studied longer, in general, did better on the exam.

Diff: 1
Keywords: scatter plots
Objective: 2.2.6
143) The following table shows the weekly demand for a particular digital camera and the corresponding price of that camera during the week.

<table>
<thead>
<tr>
<th>Weekly Demand</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>$300</td>
</tr>
<tr>
<td>19</td>
<td>$310</td>
</tr>
<tr>
<td>14</td>
<td>$320</td>
</tr>
<tr>
<td>13</td>
<td>$330</td>
</tr>
<tr>
<td>11</td>
<td>$340</td>
</tr>
<tr>
<td>12</td>
<td>$350</td>
</tr>
<tr>
<td>8</td>
<td>$360</td>
</tr>
</tbody>
</table>

Construct a scatter plot to display this data. What conclusions can be drawn?

Answer:

It appears that as the price increases, demand for the camera decreases.

Diff: 1
Keywords: scatter plots
Objective: 2.2.6
144) The following table shows the enrollment at a private grade school from 2006 until 2013.

<table>
<thead>
<tr>
<th>Year</th>
<th>Enrollment</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>424</td>
</tr>
<tr>
<td>2007</td>
<td>445</td>
</tr>
<tr>
<td>2008</td>
<td>459</td>
</tr>
<tr>
<td>2009</td>
<td>443</td>
</tr>
<tr>
<td>2010</td>
<td>430</td>
</tr>
<tr>
<td>2011</td>
<td>435</td>
</tr>
<tr>
<td>2012</td>
<td>441</td>
</tr>
<tr>
<td>2013</td>
<td>456</td>
</tr>
</tbody>
</table>

Construct a line chart to display this data.
Answer:

![Line chart showing enrollment from 2006 to 2013]

Diff: 1
Keywords: line chart
Objective: 2.2.6
145) The following table shows the percent of car sales that were SUVs from 2005 until 2011.

<table>
<thead>
<tr>
<th>Year</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>27.3</td>
</tr>
<tr>
<td>2006</td>
<td>24.2</td>
</tr>
<tr>
<td>2007</td>
<td>27.2</td>
</tr>
<tr>
<td>2008</td>
<td>26.5</td>
</tr>
<tr>
<td>2009</td>
<td>25.9</td>
</tr>
<tr>
<td>2010</td>
<td>29.0</td>
</tr>
<tr>
<td>2011</td>
<td>32.4</td>
</tr>
</tbody>
</table>

Construct a line chart to display this data.

Answer:

![Line chart showing percent of car sales that were SUVs from 2005 to 2011.](image)

Diff: 1
Keywords: line chart
Objective: 2.2.6