1. **a. Explain the difference between categorical and quantitative variables.**

   b. Give an example of a categorical variable.

   c. Give an example of a quantitative variable.

   a. What is the difference between categorical and quantitative variables?

   - **A.** A categorical variable is any characteristic observed in a study. A quantitative variable is the numerical value associated with each characteristic.

   - **B.** A variable is called categorical if each observation is measured numerically. A variable is called quantitative if observations on it represent different magnitudes of the variable.

   - **C.** A variable is called categorical if each observation belongs to one of a set of categories. A variable is called quantitative if observations on it can be placed into one singular categorical group.

   - **D.** A variable is called categorical if each observation belongs to one of a set of categories. A variable is called quantitative if observations on it take numerical values that represent different magnitudes of the variable.

   b. Give an example of a categorical variable. Select all that apply.

   - [ ] A. Dating status
   - [ ] B. GPA
   - [ ] C. Gender
   - [ ] D. Height

   c. Give an example of a quantitative variable. Select all that apply.

   - [ ] A. Age
   - [ ] B. Number of siblings
   - [ ] C. Education level
   - [ ] D. Sex
2. Identify each of the following variables as categorical or quantitative.

   a. Natural hair color
   b. Distance of commute to work
   c. Time worked in week
   d. Native language

a. Is the variable categorical or quantitative? Why?
   - A. Natural hair color is a quantitative variable. Its values are not numerical.
   - B. Natural hair color is a categorical variable. Its values are not numerical.
   - C. Natural hair color is a quantitative variable. Its values are numerical.
   - D. Natural hair color is a categorical variable. Its values are numerical.

b. Is the variable categorical or quantitative? Why?
   - A. Distance of commute to work is a quantitative variable. Its values are numerical.
   - B. Distance of commute to work is a categorical variable. Its values are not numerical.
   - C. Distance of commute to work is a categorical variable. Its values are numerical.
   - D. Distance of commute to work is a categorical variable. Its values are not numerical.

c. Is the variable categorical or quantitative? Why?
   - A. Time worked in week is a categorical variable. Its values are not numerical.
   - B. Time worked in week is a quantitative variable. Its values are not numerical.
   - C. Time worked in week is a categorical variable. Its values are numerical.
   - D. Time worked in week is a quantitative variable. Its values are numerical.

d. Is the variable categorical or quantitative? Why?
   - A. Native language is a categorical variable. Its values are not numerical.
   - B. Native language is a quantitative variable. Its values are not numerical.
   - C. Native language is a categorical variable. Its values are numerical.
   - D. Native language is a quantitative variable. Its values are numerical.
3. Identify each of the following variables as categorical or quantitative.

   a. Drugs used
   b. Storage space on a computer drive
   c. Dream vacation location
   d. Number of artificial flavors in a cereal

   a. Is the variable categorical or quantitative? Why?
      - A. Drugs used is a categorical variable. Its values are not numerical.
      - B. Drugs used is a categorical variable. Its values are numerical.
      - C. Drugs used is a quantitative variable. Its values are not numerical.
      - D. Drugs used is a quantitative variable. Its values are numerical.

   b. Is the variable categorical or quantitative? Why?
      - A. Storage space on a computer drive is a quantitative variable. Its values are not numerical.
      - B. Storage space on a computer drive is a quantitative variable. Its values are numerical.
      - C. Storage space on a computer drive is a categorical variable. Its values are not numerical.
      - D. Storage space on a computer drive is a categorical variable. Its values are numerical.

   c. Is the variable categorical or quantitative? Why?
      - A. Dream vacation location is a quantitative variable. Its values are not numerical.
      - B. Dream vacation location is a quantitative variable. Its values are numerical.
      - C. Dream vacation location is a categorical variable. Its values are numerical.
      - D. Dream vacation location is a categorical variable. Its values are not numerical.

   d. Is the variable categorical or quantitative? Why?
      - A. Number of artificial flavors in a cereal is a quantitative variable. Its values are numerical.
      - B. Number of artificial flavors in a cereal is a quantitative variable. Its values are not numerical.
      - C. Number of artificial flavors in a cereal is a categorical variable. Its values are not numerical.
      - D. Number of artificial flavors in a cereal is a categorical variable. Its values are numerical.
4. In a survey, respondents answered the question, "How many siblings have you ever had?" The results are below.

<table>
<thead>
<tr>
<th>No. siblings</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>995</td>
</tr>
<tr>
<td>1</td>
<td>414</td>
</tr>
<tr>
<td>2</td>
<td>461</td>
</tr>
<tr>
<td>3</td>
<td>429</td>
</tr>
<tr>
<td>4</td>
<td>219</td>
</tr>
<tr>
<td>5</td>
<td>89</td>
</tr>
<tr>
<td>6</td>
<td>41</td>
</tr>
<tr>
<td>7</td>
<td>22</td>
</tr>
<tr>
<td>8+</td>
<td>35</td>
</tr>
</tbody>
</table>

a. Is the variable, number of siblings, categorical or quantitative?

- **A.** Number of siblings is a quantitative variable. Its values are not numerical.
- **B.** Number of siblings is a categorical variable. Its values are not numerical.
- **C.** Number of siblings is a quantitative variable. Its values are numerical.
- **D.** Number of siblings is a categorical variable. Its values are numerical.

b. Is the variable, number of siblings, discrete or continuous?

- **A.** Number of siblings is a continuous variable since it has a finite number of possible values.
- **B.** Number of siblings is a discrete variable since it has an infinite continuum of possible values.
- **C.** Number of siblings is a discrete variable since it has a finite number of possible values.
- **D.** Number of siblings is a continuous variable since it has an infinite continuum of possible values.

c. Add proportions and percentages to this frequency table. Round the proportions to the nearest thousandth and round the percentages to the nearest tenth.

<table>
<thead>
<tr>
<th>No. siblings</th>
<th>Count</th>
<th>Proportion</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>995</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>414</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>461</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>429</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>89</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>41</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>22</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8+</td>
<td>35</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

d. Which response is the mode?

---

Online 02 - Sections 2.1 and 2.2-Doug Ensley

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5. A survey was conducted on the budget for the federal government. Out of those who participated in the survey, 48% said to increase spending, 15% said to decrease spending, 31% said to keep spending the same, and 6% either had no opinion or refused to answer.

a. Sketch a bar chart to display the survey results.

b. Which is easier to sketch relatively accurately, a pie chart or a bar chart?

c. What is the advantage of using a graph to summarize the results instead of merely stating percentages for each response?

a. Choose the correct bar chart below, where those who wanted to increase spending is shown in blue (leftmost bar), decrease spending in red (second from left), keep the spending the same in green (second from right), and no opinion in yellow (rightmost bar).

   - A.
   - B.
   - C.

b. Choose the correct answer below.

   - Pie chart
   - Bar chart

c. Choose the correct response below.

   - A. Viewers get a better sense of the data when they can see the sizes of the various categories.
   - B. Viewers can better ask questions when they have a graph to reference.
   - C. The graph can summarize the data better than merely stating percentages by associating a shape to the various categories.
   - D. Viewers get a better sense of the data when they can associate a number with the various categories.
6. For 222 alligators captured in four different lakes, researchers classified the primary food choice (in volume) found in the alligator's stomach in one of the categories - fish, invertebrate, reptile, bird, or other.

Use the bar chart to answer the following questions.

- Is primary food choice categorical or quantitative?
  - Categorical
  - Quantitative

- What is the mode for primary food source?
  - A. Reptile
  - B. Bird
  - C. Invertebrate
  - D. Other
  - E. Fish

- About what percentage of alligators had invertebrate as the primary food choice?
  - A. 10%
  - B. 20%
  - C. 14%

- This type of bar chart, with categories listed in order of frequency, has a special name. What is it?
  - A. Pie chart
  - B. Pareto
  - C. Histogram
  - D. Dot plot
  - E. Stem-and-leaf
7. A table summarizes shark attacks for different regions of the world. Using software or sketching, construct a bar graph, ordering the regions (i) alphabetically, and (ii) as in a Pareto chart.

Click the icon to view the summary table.

(i) Choose the correct bar graph below.

- [ ] A.
- [ ] B.
- [ ] C.

(ii) Choose the correct Pareto chart below.

- [ ] A.
- [ ] B.
- [ ] C.

1: Table summarizing shark attacks for different regions of the world

<table>
<thead>
<tr>
<th>Region</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>255</td>
</tr>
<tr>
<td>I</td>
<td>42</td>
</tr>
<tr>
<td>C</td>
<td>32</td>
</tr>
<tr>
<td>S</td>
<td>31</td>
</tr>
<tr>
<td>N</td>
<td>28</td>
</tr>
<tr>
<td>A</td>
<td>116</td>
</tr>
<tr>
<td>R</td>
<td>37</td>
</tr>
<tr>
<td>B</td>
<td>21</td>
</tr>
<tr>
<td>H</td>
<td>6</td>
</tr>
<tr>
<td>O</td>
<td>145</td>
</tr>
</tbody>
</table>
8. The following dot plot represents the sugar values (in grams) of a certain breakfast cereal. Complete parts a and b below.

![Dot Plot Image]

a. Identify the minimum and maximum sugar values.

Minimum = __________ g
Maximum = __________ g

b. Which sugar outcomes occur most frequently? What are these values called?

The outcomes that are most frequent are __________.
(Use ascending order.)

These values are called the (1) __________

(1) circle range.
circle mode.
circle mean.
circle median.

9. A teacher shows her class the scores on the midterm test in the stem-and-leaf plot shown on the right.

a. Identify the number of students and their minimum and maximum scores.

The minimum test score is __________.

The maximum test score is __________.

b. Sketch how the data could be displayed in a dot plot.

c. Sketch how the data could be displayed in a histogram with four intervals.

a. There are __________ students in the class.

b. Chose the correct dot plot below for the given data.

- [ ] A.
- [ ] B.
- [ ] C.
- [ ] D.

c. Choose the correct histogram below.

- [ ] A.
- [ ] B.
- [ ] C.
- [ ] D.
When the observations are large numbers, their final digits are not shown in a stem-and-leaf plot. The plot specifies a leaf unit by which to multiply each observation. For instance, for cereal sugar data expressed in milligrams, MINITAB software reports the stem-and-leaf plot shown above, indicating that "Leaf Unit = 1000". For instance, the observations of 14 and 15 in the final row of the plot represent observations of 14,000 and 15,000. Use this information to complete parts a and b.

10. a. In milligrams, what is the observation in the first row of the plot?
The observation in the first row of the plot is __________ milligrams.

b. Identify the sugar outcome (in mg) that occurs most frequently.
The sugar outcome that occurs most frequently is __________ milligrams.

11. For the following variable, indicate whether you would expect its histogram to be symmetric, skewed to the right, or skewed to the left. Explain why.

Assessed value of houses in a large city

Which of the following best describes the shape of the distribution?

- A. Skewed to the right because of some very expensive homes.
- B. Symmetric because most would fall in the middle with some cheaper and some more expensive.
- C. Skewed to the left because there are a lot of very expensive homes.
12. On a class survey, students were asked to estimate the number of times a week, on average, that they read a daily newspaper.

Answer the following questions.

a. Is this variable continuous or discrete?

- A. Continuous, because the student was asked for the average.
- B. Discrete, because the newspapers come every day.
- C. Continuous, because the newspapers come every day.
- D. Discrete, because the value for each person would be a whole number.

b. The histogram shows the results of this variable when this survey was administered to a class of 33 college students. Report the (i) minimum response, (ii) maximum response, (iii) number of students who did not read the newspaper at all, (iv) mode.

(i) What is the minimum response?

___________

(ii) What is the maximum response?

___________

(iii) How many students did not read a newspaper at all?

___________ student(s)

(iv) What is the mode?

___________

c. Describe the shape of the distribution.

- A. The distribution is unimodal and skewed to the left.
- B. The distribution is unimodal and symmetric.
- C. The distribution is bimodal and skewed to the right.
- D. The distribution is unimodal and skewed to the right.
- E. The distribution is bimodal and skewed to the left.
- F. The distribution is bimodal and symmetric.
1. D.
A variable is called categorical if each observation belongs to one of a set of categories. A variable is called quantitative if observations on it take numerical values that represent different magnitudes of the variable.
   A. Dating status, C. Gender
   A. Age, B. Number of siblings

2. B. Natural hair color is a categorical variable. Its values are not numerical.
   A. Distance of commute to work is a quantitative variable. Its values are numerical.
   D. Time worked in week is a quantitative variable. Its values are numerical.
   A. Native language is a categorical variable. Its values are not numerical.

3. A. Drugs used is a categorical variable. Its values are not numerical.
   B. Storage space on a computer drive is a quantitative variable. Its values are numerical.
   D. Dream vacation location is a categorical variable. Its values are not numerical.
   A. Number of artificial flavors in a cereal is a quantitative variable. Its values are numerical.
4. C. Number of siblings is a quantitative variable. Its values are numerical.
C. Number of siblings is a discrete variable since it has a finite number of possible values.

0.368
36.8
0.153
15.3
0.170
17.0
0.159
15.9
0.081
8.1
0.033
3.3
0.015
1.5
0.008
0.8
0.013
1.3
0

5. A. Bar chart
A. Viewers get a better sense of the data when they can see the sizes of the various categories.

6. Categorical
D. Other
C. 14%
B. Pareto
7. C.

8. 0
   18
   0, 11, 17, 18
   (1) mode.

9. 10
   62
   95

10. 1000
    12,000

11. A. Skewed to the right because of some very expensive homes.

12. D. Discrete, because the value for each person would be a whole number.
B. The distribution is unimodal and symmetric.