Statistical Techniques in Business and Economics, 17e **(Lind)**
Chapter 2 Describing Data: Frequency Tables, Frequency Distributions, and Graphic Presentation

1) A frequency distribution is a grouping of quantitative data into overlapping classes showing the number of observations in each class.

Answer: FALSE
Explanation: Classes in a frequency distribution may not overlap and must be mutually exclusive.
Difficulty: 1 Easy
Topic: Constructing Frequency Distributions
Learning Objective: 02-03 Summarize quantitative variables with frequency and relative frequency distributions.
Bloom's: Remember
AACSB: Communication
Accessibility: Keyboard Navigation

2) A frequency table for qualitative data has class limits.

Answer: FALSE
Explanation: Qualitative data are not numeric, so there cannot be class limits.
Difficulty: 1 Easy
Topic: Constructing Frequency Tables
Learning Objective: 02-01 Summarize qualitative variables with frequency and relative frequency tables.
Bloom's: Remember
AACSB: Communication
Accessibility: Keyboard Navigation

3) To summarize the gender of students attending a college, the number of classes in a frequency table depends on the number of students.

Answer: FALSE
Explanation: Gender is a nominal, qualitative variable that has two values. Therefore, there will be only two classes: male and female.
Difficulty: 1 Easy
Topic: Constructing Frequency Tables
Learning Objective: 02-01 Summarize qualitative variables with frequency and relative frequency tables.
Bloom's: Understand
AACSB: Communication
Accessibility: Keyboard Navigation

4) In frequency distributions, classes are mutually exclusive if each individual, object, or measurement is included in only one category.

Answer: TRUE
Explanation: This is the definition of the term mutually exclusive.
Difficulty: 1 Easy
Topic: Constructing Frequency Distributions
Learning Objective: 02-03 Summarize quantitative variables with frequency and relative frequency distributions.
Bloom's: Analyze
AACSB: Communication
Accessibility: Keyboard Navigation

5) In a bar chart, the horizontal axis is usually labeled with the values of a qualitative variable.

Answer: TRUE
Explanation: Bar charts set up with vertical bars will put the quantitative variable on the horizontal axis, while the frequency or counts will be on the vertical axis.
Difficulty: 1 Easy
Topic: Graphic Presentation of Qualitative Data
Learning Objective: 02-02 Display a frequency table using a bar or pie chart.
Bloom's: Analyze
AACSB: Communication
Accessibility: Keyboard Navigation

6) In a bar chart, the heights of the bars represent the frequencies in each class.

Answer: TRUE
Explanation: Bar charts set up with vertical bars will put the quantitative variable on the horizontal axis, while the frequency or counts will be on the vertical axis.
Difficulty: 1 Easy
Topic: Graphic Presentation of Qualitative Data
Learning Objective: 02-02 Display a frequency table using a bar or pie chart.
Bloom's: Analyze
AACSB: Communication
Accessibility: Keyboard Navigation

7) The midpoint of a class is halfway between the lower and upper limits.

Answer: TRUE
Explanation: The midpoint is the center of each class. To find it, you add the lower and upper limits and divide by two.
Difficulty: 1 Easy
Topic: Constructing Frequency Distributions
Learning Objective: 02-03 Summarize quantitative variables with frequency and relative frequency distributions.
Bloom's: Remember
AACSB: Communication
Accessibility: Keyboard Navigation

8) A class interval can be determined by subtracting the lower limit of a class from the lower limit of the next higher class.

Answer: TRUE
Explanation: This is how one determines the class interval. One can also determine the class interval by subtracting the class midpoints from one class to the next class.
Difficulty: 1 Easy
Topic: Constructing Frequency Distributions
Learning Objective: 02-03 Summarize quantitative variables with frequency and relative frequency distributions.
Bloom's: Remember
AACSB: Communication
Accessibility: Keyboard Navigation

9) To convert a frequency distribution to a relative frequency distribution, divide each class frequency by the sum of the class frequencies.

Answer: TRUE
Explanation: Relative frequency is the class frequency divided by the sum or total of the class frequencies.
Difficulty: 1 Easy
Topic: Constructing Frequency Distributions
Learning Objective: 02-03 Summarize quantitative variables with frequency and relative frequency distributions.
Bloom's: Remember
AACSB: Communication
Accessibility: Keyboard Navigation

10) To convert a frequency distribution to a relative frequency distribution, divide each class frequency by the number of classes.

Answer: FALSE
Explanation: Relative frequencies are computed by dividing class frequencies by the total of the class frequencies.
Difficulty: 1 Easy
Topic: Constructing Frequency Distributions
Learning Objective: 02-03 Summarize quantitative variables with frequency and relative frequency distributions.
Bloom's: Remember
AACSB: Communication
Accessibility: Keyboard Navigation

11) A pie chart is similar to a relative frequency distribution.

Answer: TRUE
Explanation: Pie charts are essentially visual representations of relative frequencies: these charts show the percentage or proportion of each class relative to the total frequency.
Difficulty: 2 Medium
Topic: Graphic Presentation of Qualitative Data
Learning Objective: 02-02 Display a frequency table using a bar or pie chart.
Bloom's: Analyze
AACSB: Communication
Accessibility: Keyboard Navigation

12) A pie chart shows the relative frequency in each class.

Answer: TRUE
Explanation: Pie charts are essentially visual representations of relative frequencies: these charts show the percentage or proportion of each class relative to the total frequency.
Difficulty: 2 Medium
Topic: Graphic Presentation of Qualitative Data
Learning Objective: 02-02 Display a frequency table using a bar or pie chart.
Bloom's: Analyze
AACSB: Communication
Accessibility: Keyboard Navigation

13) To construct a pie chart, relative class frequencies are used to graph the "slices" of the pie.

Answer: TRUE
Explanation: Pie charts visually represent the percentage or proportion of each class relative to the total. Relative frequencies are found by dividing the frequency of each class divided by the total frequency, which makes it a percentage or proportion of that total.
Difficulty: 1 Easy
Topic: Graphic Presentation of Qualitative Data
Learning Objective: 02-02 Display a frequency table using a bar or pie chart.
Bloom's: Remember
AACSB: Communication
Accessibility: Keyboard Navigation

14) A cumulative frequency distribution is used when we want to determine how many observations lie above or below certain values.

Answer: TRUE
Explanation: A cumulative frequency distribution shows the number of values below a given value. If we know how many lie below that value, we can use this information to determine how many lie above that value.
Difficulty: 1 Easy
Topic: Graphic Presentation of Frequency Distribution
Learning Objective: 02-04 Display a frequency distribution using a histogram or frequency polygon.
Bloom's: Understand
AACSB: Communication
Accessibility: Keyboard Navigation

15) A frequency polygon is a very useful graphic technique when comparing two or more distributions.

Answer: TRUE
Explanation: This is a major advantage of using frequency polygons because you can place the graphs on top of each other, something you can't do with histograms.
Difficulty: 1 Easy
Topic: Graphic Presentation of Frequency Distribution
Learning Objective: 02-04 Display a frequency distribution using a histogram or frequency polygon.
Bloom's: Apply
AACSB: Communication
Accessibility: Keyboard Navigation

16) Monthly commissions of first-year insurance brokers are $1,270, $1,310, $1,680, $1,380, $1,410, $1,570, $1,180, and $1,420. These figures are referred to as
A) a histogram.
B) raw data.
C) a frequency distribution.
D) a frequency polygon.

Answer: B
Explanation: Histograms, frequency distributions, and frequency polygons all summarize data. The data in the question are individual observations or raw data that are not summarized.
Difficulty: 1 Easy
Topic: Graphic Presentation of Frequency Distribution
Learning Objective: 02-04 Display a frequency distribution using a histogram or frequency polygon.
Bloom's: Remember
AACSB: Communication
Accessibility: Keyboard Navigation

17) A small sample of computer operators shows monthly incomes of $1,950, $1,775, $2,060, $1,840, $1,795, $1,890, $1,925, and $1,810. What are these ungrouped numbers called?
A) Histograms
B) Class limits
C) Class frequencies
D) Raw data

Answer: D
Explanation: Histograms and frequency distributions summarize data. The data in the question are the individual observations that are not summarized.
Difficulty: 1 Easy
Topic: Constructing Frequency Distributions
Learning Objective: 02-03 Summarize quantitative variables with frequency and relative frequency distributions.
Bloom's: Remember
AACSB: Communication
Accessibility: Keyboard Navigation

18) When data are collected using a quantitative, ratio variable, what is true about a frequency distribution that summarizes the data?
A) Upper and lower class limits must be calculated.
B) A pie chart can be used to summarize the data.
C) The number of classes is equal to the number of variable values.
D) The "5 to the k rule" can be applied.

Answer: A
Explanation: The statements "a pie chart can be used to summarize the data" and "the number of classes is equal to the number of variable values" refer to frequency distributions for qualitative variables. For quantitative, ratio variables, the number of classes, the class interval, and class limits must be computed.
Difficulty: 2 Medium
Topic: Constructing Frequency Distributions
Learning Objective: 02-03 Summarize quantitative variables with frequency and relative frequency distributions.
Bloom's: Analyze
AACSB: Analytic
Accessibility: Keyboard Navigation

19) When data are collected using a qualitative, nominal variable, what is true about a frequency table that summarizes the data?
A) The upper and lower class limits must be calculated.
B) A pie chart can be used to summarize the data.
C) The number of classes is equal to the number of variable's values plus 2.
D) The "5 to the k rule" can be applied.

Answer: B
Explanation: A pie chart is used to show the relative frequency for a qualitative, nominal, or ordinal variable. Class limits and rules for determining the number of classes apply to quantitative variables. To determine the number of classes for quantitative data, we use the 2 to the k rule (not the 5 to the k rule). With qualitative data, the number of classes is equal to the number of variables only.
Difficulty: 2 Medium
Topic: Graphic Presentation of Qualitative Data
Learning Objective: 02-02 Display a frequency table using a bar or pie chart.
Bloom's: Analyze
AACSB: Analytic
Accessibility: Keyboard Navigation

20) When data are collected using a qualitative, nominal variable (e.g., male or female), what is true about a frequency table that summarizes the data?
A) The upper and lower class limits must be calculated.
B) Class midpoints can be computed.
C) The number of classes corresponds to the number of a variable's values.
D) The "2 to the k rule" can be applied.

Answer: C
Explanation: Gender is a nominal, qualitative variable that has two values. Therefore, the frequency distribution will have only two classes: male and female.
Difficulty: 2 Medium
Topic: Constructing Frequency Tables
Learning Objective: 02-01 Summarize qualitative variables with frequency and relative frequency tables.
Bloom's: Analyze
AACSB: Analytic
Accessibility: Keyboard Navigation

21) A student was interested in the cigarette-smoking habits of college students and collected data from an unbiased random sample of students. The data are summarized in the following table:

Males	50
Females	75
Males who smoke	20
Males who do not smoke	30
Females who smoke	25
Females who do not smoke	50

What is wrong with this frequency table?
A) The number of males does not equal the sum of males that smoke and do not smoke.
B) The classes are not mutually exclusive.
C) There are too many classes.
D) Class limits cannot be computed.

Answer: B
Explanation: In a frequency distribution, the classes must be mutually exclusive so that each data item can be assigned to only one class. In this example, the classes are not mutually exclusive because a female can be assigned to two classes: females, and females who smoke or females who do not smoke.
Difficulty: 2 Medium
Topic: Constructing Frequency Tables
Learning Objective: 02-01 Summarize qualitative variables with frequency and relative frequency tables.
Bloom's: Understand
AACSB: Communication

22) A student was interested in the cigarette-smoking habits of college students and collected data from an unbiased random sample of students. The data are summarized in the following table:

Males who smoke	20
Males who do not smoke	30
Females who smoke	25
Females who do not smoke	50

What type of chart best represents the frequency table?
A) Bar chart
B) Box plot
C) Scatter plot
D) Frequency polygon

Answer: A
Explanation: The variables are nominal and qualitative. The frequency table is best presented with a bar chart.
Difficulty: 2 Medium
Topic: Graphic Presentation of Qualitative Data
Learning Objective: 02-02 Display a frequency table using a bar or pie chart.
Bloom's: Understand
AACSB: Communication

23) A student was interested in the cigarette-smoking habits of college students and collected data from an unbiased random sample of students. The data are summarized in the following table:

Males who smoke	20
Males who do not smoke	30
Females who smoke	25
Females who do not smoke	50

What type of chart best represents the relative class frequencies?
A) Box plot
B) Pie chart
C) Scatter plot
D) Frequency polygon

Answer: B
Explanation: The variables are nominal and qualitative. Relative frequencies for a qualitative, nominal variable are best summarized with a pie chart.
Difficulty: 2 Medium
Topic: Graphic Presentation of Qualitative Data

Learning Objective: 02-02 Display a frequency table using a bar or pie chart.
Bloom's: Understand
AACSB: Communication

24) When a class interval is expressed as 100 up to 200,
A) observations with values of 100 are excluded from the class.
B) observations with values of 200 are included in the class.
C) observations with values of 200 are excluded from the class.
D) the class interval is 99.

Answer: C
Explanation: Class intervals must be interpreted so they are mutually exclusive. The class interval, 100 up to 200, includes values equal to 100 and less than 200.
Difficulty: 1 Easy
Topic: Constructing Frequency Distributions
Learning Objective: 02-03 Summarize quantitative variables with frequency and relative frequency distributions.
Bloom's: Understand
AACSB: Communication
Accessibility: Keyboard Navigation

25) For a relative frequency distribution, relative frequency is computed as
A) the class width divided by the class interval.
B) the class midpoint divided by the class frequency.
C) the class frequency divided by the class interval.
D) the class frequency divided by the number of observations.

Answer: D
Explanation: By definition, relative frequency is computed as class frequency divided by total frequency.
Difficulty: 1 Easy
Topic: Constructing Frequency Distributions
Learning Objective: 02-03 Summarize quantitative variables with frequency and relative frequency distributions.
Bloom's: Remember
AACSB: Communication
Accessibility: Keyboard Navigation

26) The relative frequency for a class represents the
A) class width.
B) class midpoint.
C) class interval.
D) percentage of observations in the class.

Answer: D
Explanation: By definition, relative frequency is computed as class frequency divided by total frequency, which is a percentage of the total observations in a class.
Difficulty: 1 Easy
Topic: Constructing Frequency Distributions
Learning Objective: 02-03 Summarize quantitative variables with frequency and relative frequency distributions.
Bloom's: Remember
AACSB: Communication
Accessibility: Keyboard Navigation

27) A group of 100 students was surveyed about their interest in a new International Studies program. Interest was measured in terms of high, medium, or low. In the study, 30 students responded high interest, 40 students responded medium interest, and 30 students responded low interest. What is the relative frequency of students with high interest?
A) 0.30
B) 0.50
C) 0.40
D) 0.030

Answer: A
Explanation: For calculations, 30 of the 100 students have a high interest, or 30/100 = 0.30.
Difficulty: 2 Medium
Topic: Constructing Frequency Distributions
Learning Objective: 02-03 Summarize quantitative variables with frequency and relative frequency distributions.
Bloom's: Apply
AACSB: Analytic
Accessibility: Keyboard Navigation

28) A group of 100 students were surveyed about their interest in a new Economics major. Interest was measured in terms of high, medium, or low. In the study, 30 students responded high interest, 50 students responded medium interest, and 20 students responded low interest. What is the best way to illustrate the relative frequency of student interest?
A) Use a cumulative frequency polygon.
B) Use a box plot.
C) Use a pie chart.
D) Use a frequency table.

Answer: C
Explanation: Interest is a qualitative, ordinal variable. The relative frequencies for a qualitative, ordinal variable are best summarized with a pie chart.
Difficulty: 2 Medium
Topic: Graphic Presentation of Qualitative Data
Learning Objective: 02-02 Display a frequency table using a bar or pie chart.
Bloom's: Analyze
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

29) The monthly salaries of a sample of 100 employees were rounded to the nearest $10. They ranged from a low of $1,040 to a high of $1,720. If we want to condense the data into seven classes, what is the most convenient class interval?
A) $50
B) $100
C) $150
D) $200

Answer: B
Explanation: ($1720 − 1040)/7 = $97.14. Of the answer choices, a class interval of $100 is closest to $97.14.
Difficulty: 2 Medium
Topic: Constructing Frequency Distributions
Learning Objective: 02-03 Summarize quantitative variables with frequency and relative frequency distributions.
Bloom's: Understand
AACSB: Analytic
Accessibility: Keyboard Navigation

30) A student was studying the political party preferences of a university's student population. The survey instrument asked students to identify themselves as a Democrat or a Republican. This question is flawed because
A) students generally don't know their political preferences.
B) the categories are generally mutually exclusive.
C) the categories are not exhaustive.
D) political preference is a continuous variable.

Answer: C
Explanation: The survey is not exhaustive because it does not include all possible party preferences, such as Independent or Libertarian.
Difficulty: 2 Medium
Topic: Constructing Frequency Tables
Learning Objective: 02-01 Summarize qualitative variables with frequency and relative frequency tables.
Bloom's: Analyze
AACSB: Communication
Accessibility: Keyboard Navigation

31) A student was studying the political party preferences of a university's student population. The survey instrument asked students to identify their political preferences—for example, Democrat, Republican, Libertarian, or another party. The best way to illustrate the frequencies for each political preference is a
A) bar chart.
B) box plot.
C) histogram.
D) frequency polygon.

Answer: A
Explanation: Political preference is a qualitative, nominal variable. Frequencies for a qualitative, nominal variable are best presented with a bar chart.
Difficulty: 2 Medium
Topic: Graphic Presentation of Qualitative Data
Learning Objective: 02-02 Display a frequency table using a bar or pie chart.
Bloom's: Analyze
AACSB: Communication
Accessibility: Keyboard Navigation

32) A student was studying the political party preferences of a university's student population. The survey instrument asked students to identify their political preferences—for example, Democrat, Republican, Libertarian, or another party. The best way to illustrate the relative frequency distribution is a
A) bar chart.
B) pie chart.
C) histogram.
D) frequency polygon.

Answer: B
Explanation: Political preference is a qualitative, nominal variable. The relative frequencies for a qualitative, nominal variable are best summarized with a pie chart.
Difficulty: 2 Medium
Topic: Graphic Presentation of Qualitative Data
Learning Objective: 02-02 Display a frequency table using a bar or pie chart.
Bloom's: Analyze
AACSB: Communication
Accessibility: Keyboard Navigation

33) What is the following table called?

Ages	Number of Ages
20 up to 30	16
30 up to 40	25
40 up to 50	51
50 up to 60	80
60 up to 70	20
70 up to 80	8

A) Histogram
B) Frequency polygon
C) Cumulative frequency distribution
D) Frequency distribution

Answer: D
Explanation: The table is not a graph, such as a histogram or a frequency polygon. The table shows the number of people in each class.
Difficulty: 1 Easy
Topic: Constructing Frequency Distributions
Learning Objective: 02-03 Summarize quantitative variables with frequency and relative frequency distributions.
Bloom's: Remember
AACSB: Communication

34) For the following distribution of heights, what are the limits for the class with the greatest frequency?

Heights	60" up to 65"	65" up to 70"	70" up to 75"
Frequency	10	70	20

A) 64 and up to 70
B) 65 and 69
C) 65 and up to 70
D) 69.5 and 74.5

Answer: C
Explanation: The frequency table has three classes with frequencies of 10, 70, and 20. The class 65" up to 70" corresponds with the greatest frequency of 70.
Difficulty: 2 Medium
Topic: Constructing Frequency Distributions
Learning Objective: 02-03 Summarize quantitative variables with frequency and relative frequency distributions.
Bloom's: Understand
AACSB: Communication

35) In a frequency distribution, the number of observations in a class is called the class
A) midpoint.
B) interval.
C) array.
D) frequency.

Answer: D
Explanation: By definition, frequency is the number of observations in a class.
Difficulty: 1 Easy
Topic: Constructing Frequency Distributions
Learning Objective: 02-03 Summarize quantitative variables with frequency and relative frequency distributions.
Bloom's: Remember
AACSB: Communication
Accessibility: Keyboard Navigation

36) Why are unequal class intervals sometimes used in a frequency distribution?
A) To avoid a large number of classes with very small frequencies.
B) For the sake of variety in presenting the data.
C) To make the class frequencies smaller.
D) To avoid the need for midpoints.

Answer: A
Explanation: When constructing frequency distributions, sometimes there are extreme or outlier values. Therefore, there would be several classes with zero frequencies. To better summarize the data, a class would be created with extended limits that would include the classes with zero frequencies and all the outlier or extreme values.
Difficulty: 1 Easy
Topic: Constructing Frequency Distributions
Learning Objective: 02-03 Summarize quantitative variables with frequency and relative frequency distributions.
Bloom's: Analyze
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

37) The number of employees less than the upper limit of each class at Lloyd's Fast Food Emporium is shown in the following table:

Ages	Cumulative Number
18 up to 23	6
23 up to 28	19
28 up to 33	52
33 up to 38	61
38 up to 43	65

What is it called?
A) A histogram
B) A cumulative frequency distribution
C) A pie chart
D) A frequency polygon

Answer: B
Explanation: The table shows the number of employees in each class or less. So each class frequency is a cumulative total and the table is a cumulative frequency distribution.
Difficulty: 2 Medium
Topic: Graphic Presentation of Frequency Distribution
Learning Objective: 02-04 Display a frequency distribution using a histogram or frequency polygon.
Bloom's: Remember
AACSB: Communication

38) Here is a sample distribution of hourly earnings in Paul's Cookie Factory:

Hourly Earning	$6 up to $9	$9 up to $12	$12 up to $15
Frequency	16	42	10

The limits of the class with the smallest frequency are
A) $6.00 and $9.00.
B) $12.00 and up to $14.00.
C) $11.75 and $14.25.
D) $12.00 and up to $15.00.

Answer: D
Explanation: The frequency table has three classes with frequencies of 16, 42, and 10. The class $12 up to $15 corresponds with the smallest frequency of 10.
Difficulty: 2 Medium
Topic: Constructing Frequency Distributions
Learning Objective: 02-03 Summarize quantitative variables with frequency and relative frequency distributions.
Bloom's: Understand
AACSB: Communication

39) Refer to the following distribution of commissions:

Monthly Commissions	Class Frequencies
$600 up to $800	3
800 up to 1,000	7
1,000 up to 1,200	11
1,200 up to 1,400	12
1,400 up to 1,600	40
1,600 up to 1,800	24
1,800 up to 2,000	9
2,000 up to 2,200	4

What is the relative frequency for salespeople who earn from $1,600 up to $1,800?
A) 0.02
B) 0.024
C) 0.20
D) 0.24

Answer: C
Explanation: The number 0.20 is found by 24/120. Here 120 is the total number of salespeople in the distribution.
Difficulty: 2 Medium
Topic: Constructing Frequency Distributions
Learning Objective: 02-03 Summarize quantitative variables with frequency and relative frequency distributions.
Bloom's: Understand
AACSB: Analytic

40) Refer to the following distribution of commissions:

Monthly Commissions	Class Frequencies
$600 up to $800	3
800 up to 1,000	7
1,000 up to 1,200	11
1,200 up to 1,400	12
1,400 up to 1,600	40
1,600 up to 1,800	24
1,800 up to 2,000	9
2,000 up to 2,200	4

To plot a cumulative frequency distribution, the first coordinate would be
A) $X = 0,\ Y = 600.$
B) $X = 500,\ Y = 3.$
C) $X = 3,\ Y = 600.$
D) $X = 600,\ Y = 0.$

Answer: D
Explanation: To plot a cumulative frequency distribution, the first point would show a frequency of zero ($Y = 0$) at the lower limit of the first class.
Difficulty: 2 Medium
Topic: Graphic Presentation of Frequency Distribution
Learning Objective: 02-04 Display a frequency distribution using a histogram or frequency polygon.
Bloom's: Apply
AACSB: Analytic

41) Refer to the following distribution of commissions:

Monthly Commissions	Class Frequencies
$600 up to $800	3
800 up to 1,000	7
1,000 up to 1,200	11
1,200 up to 1,400	12
1,400 up to 1,600	40
1,600 up to 1,800	24
1,800 up to 2,000	9
2,000 up to 2,200	4

What is the relative frequency of salespeople who earn $1,600 or more?
A) 25.5%
B) 27.5%
C) 29.5%
D) 30.8%

Answer: D
Explanation: The figure of 30.8%, or 37/120, is found by taking the total of the frequencies for $1,600 or more (24 + 9 + 4) and dividing by the total of 120.
Difficulty: 2 Medium
Topic: Constructing Frequency Distributions
Learning Objective: 02-03 Summarize quantitative variables with frequency and relative frequency distributions.
Bloom's: Understand
AACSB: Communication

42) Refer to the following distribution of commissions:

Monthly Commissions	Class Frequencies
$600 up to $800	3
800 up to 1,000	7
1,000 up to 1,200	11
1,200 up to 1,400	12
1,400 up to 1,600	40
1,600 up to 1,800	24
1,800 up to 2,000	9
2,000 up to 2,200	4

For the preceding distribution, what is the midpoint of the class with the greatest frequency?
A) 1,400
B) 1,500
C) 1,700
D) The midpoint cannot be determined.

Answer: B
Explanation: The class with the greatest frequency is "1,400 up to 1,600." The class midpoint is the lower limit (1,400) plus one half of the class interval (1/2 × 200 = 100) or 1,400 + 100 = 1,500.
Difficulty: 2 Medium
Topic: Constructing Frequency Distributions
Learning Objective: 02-03 Summarize quantitative variables with frequency and relative frequency distributions.
Bloom's: Understand
AACSB: Communication

43) Refer to the following distribution of commissions:

Monthly Commissions	Class Frequencies
$600 up to $800	3
800 up to 1,000	7
1,000 up to 1,200	11
1,200 up to 1,400	12
1,400 up to 1,600	40
1,600 up to 1,800	24
1,800 up to 2,000	9
2,000 up to 2,200	4

What is the class interval?
A) 200
B) 300
C) 3,500
D) 400

Answer: A
Explanation: The class interval is 200, found by calculating the difference between any consecutive lower or upper class limits.
Difficulty: 2 Medium
Topic: Constructing Frequency Distributions
Learning Objective: 02-03 Summarize quantitative variables with frequency and relative frequency distributions.
Bloom's: Understand
AACSB: Communication

44) Refer to the following wage breakdown for a garment factory:

Hourly Wages	Number of employees
$6 up to $7	18
7 up to 10	36
10 up to 13	20
13 up to 16	6

What is the class interval for the preceding table of wages?
A) $2
B) $3
C) $4
D) $5

Answer: B
Explanation: The class interval is $3, found by calculating the difference between any consecutive lower or upper class limits.
Difficulty: 1 Easy
Topic: Constructing Frequency Distributions
Learning Objective: 02-03 Summarize quantitative variables with frequency and relative frequency distributions.
Bloom's: Understand
AACSB: Analytic

45) Refer to the following wage breakdown for a garment factory:

Hourly Wages	Number of employees
$6 up to $7	18
7 up to 10	36
10 up to 13	20
13 up to 16	6

What is the class midpoint for the class with the greatest frequency?
A) $5.50
B) $8.50
C) $11.50
D) $14.50

Answer: B
Explanation: The class with the greatest frequency is "7 up to 10." The class midpoint is the lower limit (7) plus half of the class interval (1/2 × 3 = 1.5) or $7 + 1.5 = $8.50.
Difficulty: 2 Medium
Topic: Constructing Frequency Distributions
Learning Objective: 02-03 Summarize quantitative variables with frequency and relative frequency distributions.
Bloom's: Apply
AACSB: Analytic

46) Refer to the following wage breakdown for a garment factory:

Hourly Wages	Number of employees
$6 up to $7	18
7 up to 10	36
10 up to 13	20
13 up to 16	6

What are the class limits for the class with the smallest frequency?
A) 3.5 and 6.5
B) 4 and up to 7
C) 13 and up to 16
D) 12.5 and 15.5

Answer: C
Explanation: This class has the lowest frequency with 6 wage earners in the class.
Difficulty: 2 Medium
Topic: Constructing Frequency Distributions
Learning Objective: 02-03 Summarize quantitative variables with frequency and relative frequency distributions.
Bloom's: Understand
AACSB: Communication

47) Refer to the following distribution of ages:

Ages	Frequency
40 up to 50	10
50 up to 60	28
60 up to 70	12

For this distribution of ages, what is the relative class frequency for the lowest class?
A) 0.50
B) 0.18
C) 0.20
D) 0.10

Answer: C
Explanation: The answer 0.20, or 10/50, is found by dividing 10 by the total of 50.
Difficulty: 2 Medium
Topic: Constructing Frequency Distributions
Learning Objective: 02-03 Summarize quantitative variables with frequency and relative frequency distributions.
Bloom's: Apply
AACSB: Analytic

48) Refer to the following distribution of ages:

Ages	Frequency
40 up to 50	10
50 up to 60	28
60 up to 70	12

What is the class interval?
A) 9
B) 10
C) 10.5
D) 11

Answer: B
Explanation: The class interval is 10, found by calculating the difference between any consecutive lower or upper class limits.
Difficulty: 2 Medium
Topic: Constructing Frequency Distributions
Learning Objective: 02-03 Summarize quantitative variables with frequency and relative frequency distributions.
Bloom's: Understand
AACSB: Communication

49) Refer to the following distribution of ages:

Ages	Frequency
40 up to 50	10
50 up to 60	28
60 up to 70	12

What is the class midpoint of the highest class?
A) 54
B) 55
C) 64
D) 65

Answer: D
Explanation: The highest class is "60 up to 70." The class midpoint is the lower limit (60) plus half of the class interval: $1/2 \times 10 = 5$, or $60 + 5 = 65$.
Difficulty: 2 Medium
Topic: Constructing Frequency Distributions
Learning Objective: 02-03 Summarize quantitative variables with frequency and relative frequency distributions.
Bloom's: Apply
AACSB: Analytic

50) Refer to the following information from a frequency distribution for heights of college women recorded to the nearest inch: the first two class midpoints are 62.5" and 65.5". What is the class interval?
A) 1"
B) 2"
C) 2.5"
D) 3"

Answer: D
Explanation: The class interval can be computed as the difference between adjacent class midpoints (65.5 − 62.5 = 3).
Difficulty: 1 Easy
Topic: Constructing Frequency Distributions
Learning Objective: 02-03 Summarize quantitative variables with frequency and relative frequency distributions.
Bloom's: Understand
AACSB: Communication
Accessibility: Keyboard Navigation

51) Refer to the following information from a frequency distribution for heights of college women recorded to the nearest inch: the first two class midpoints are 62.5" and 65.5". What are the class limits for the lowest class?
A) 61 and up to 64
B) 62 and up to 64
C) 62 and 65
D) 62 and 63

Answer: A
Explanation: Based on the class midpoints, the class interval is 3. The class limit for the lowest class would be the class midpoint less one half of the class interval, or 62.5 − (1/2 × 3) = 61.
Difficulty: 3 Hard
Topic: Constructing Frequency Distributions
Learning Objective: 02-03 Summarize quantitative variables with frequency and relative frequency distributions.
Bloom's: Analyze
AACSB: Analytic
Accessibility: Keyboard Navigation

52) Refer to the following information from a frequency distribution for heights of college women recorded to the nearest inch: the first two class midpoints are 62.5" and 65.5". What are the class limits for the third class?
A) 64 and up to 67
B) 67 and 69
C) 67 and up to 70
D) 66 and 68

Answer: C
Explanation: Based on the class midpoints, the class interval is 3. The class limit for the lowest class would be the class midpoint less half of the class interval, or $62.5 - (1/2 \times 3) = 61$. Then adding the class interval, the lower limit of the second class would be 64 and the lower limit of the third class would be 67. Again, applying the class interval, the upper limit of the third class would be "up to 70".
Difficulty: 3 Hard
Topic: Constructing Frequency Distributions
Learning Objective: 02-03 Summarize quantitative variables with frequency and relative frequency distributions.
Bloom's: Analyze
AACSB: Analytic
Accessibility: Keyboard Navigation

53) Refer to the following distribution:

Cost of Textbooks	Frequency
$25 up to 35	2
35 up to 45	5
45 up to 55	7
55 up to 65	20
65 up to 75	16

What is the relative class frequency for the $25 up to $35 class?
A) 0.02
B) 0.04
C) 0.05
D) 0.10

Answer: B
Explanation: The class frequency is divided by the total observations: 2/50 = 0.04.
Difficulty: 2 Medium
Topic: Constructing Frequency Distributions
Learning Objective: 02-03 Summarize quantitative variables with frequency and relative frequency distributions.
Bloom's: Understand
AACSB: Analytic

54) Refer to the following distribution:

Cost of Textbooks	Frequency
$25 up to 35	2
35 up to 45	5
45 up to 55	7
55 up to 65	20
65 up to 75	16

What is the class midpoint for the $45 up to $55 class?
A) 49
B) 49.5
C) 50
D) 50.5

Answer: C
Explanation: The class midpoint is the lower limit (45) plus half of the class interval: $1/2 \times 10 = 5$, or $45 + 5 = 50$.
Difficulty: 2 Medium
Topic: Constructing Frequency Distributions
Learning Objective: 02-03 Summarize quantitative variables with frequency and relative frequency distributions.
Bloom's: Apply
AACSB: Analytic

55) Refer to the following distribution:

Cost of Textbooks	Frequency
$25 up to 35	2
35 up to 45	5
45 up to 55	7
55 up to 65	20
65 up to 75	16

What are the class limits for the class with the highest frequency?
A) 55 up to 64
B) 54 up to 64
C) 55 up to 65
D) 55 up to 64.5

Answer: C
Explanation: This class with the highest frequency of 20 observations is "55 up to 65."
Difficulty: 2 Medium
Topic: Constructing Frequency Distributions
Learning Objective: 02-03 Summarize quantitative variables with frequency and relative frequency distributions.
Bloom's: Understand
AACSB: Communication

56) Refer to the following frequency distribution of days absent during a calendar year by employees of a manufacturing company:

Days Absent	Number of employees
0 up to 3	60
3 up to 6	31
6 up to 9	14
9 up to 12	6
12 up to 15	2

How many employees were absent for 3 up to 6 days?
A) 31
B) 29
C) 14
D) 2

Answer: A
Explanation: From the chart, there are 31 employees who were absent 3 up to 6 days.
Difficulty: 1 Easy
Topic: Constructing Frequency Distributions
Learning Objective: 02-03 Summarize quantitative variables with frequency and relative frequency distributions.
Bloom's: Understand
AACSB: Communication

57) Refer to the following frequency distribution of days absent during a calendar year by employees of a manufacturing company:

Days Absent	Number of employees
0 up to 3	60
3 up to 6	31
6 up to 9	14
9 up to 12	6
12 up to 15	2

How many employees were absent fewer than six days?
A) 60
B) 31
C) 91
D) 46

Answer: C
Explanation: To find the number of employees who were absent fewer than six days, add the frequencies for the classes, 0 up to 3 days, and 3 up to 6 days, or 60 + 31 = 91.
Difficulty: 3 Hard
Topic: Graphic Presentation of Frequency Distribution
Learning Objective: 02-04 Display a frequency distribution using a histogram or frequency polygon.
Bloom's: Apply
AACSB: Analytic

58) Refer to the following frequency distribution of days absent during a calendar year by employees of a manufacturing company:

Days Absent	Number of employees
0 up to 3	60
3 up to 6	31
6 up to 9	14
9 up to 12	6
12 up to 15	2

How many employees were absent six or more days?
A) 8
B) 4
C) 22
D) 31

Answer: C
Explanation: To find the number of employees who were absent six or more days, add the frequencies for the classes, 6 up to 9 days, and 9 up to 12 days, and 12 up to 15 days, or 14 + 6 + 2 = 22.
Difficulty: 3 Hard
Topic: Graphic Presentation of Frequency Distribution
Learning Objective: 02-04 Display a frequency distribution using a histogram or frequency polygon.
Bloom's: Apply
AACSB: Analytic

59) Refer to the following frequency distribution of days absent during a calendar year by employees of a manufacturing company:

Days Absent	Number of employees
0 up to 3	60
3 up to 6	31
6 up to 9	14
9 up to 12	6
12 up to 15	2

How many employees were absent for 6 up to 12 days?
A) 20
B) 8
C) 12
D) 17

Answer: A
Explanation: To find the number of employees who were absent for 6 up to 12 days, add the frequencies for the classes, 6 up to 9 days, and 9 up to 12 days, or 14 + 6 = 20.
Difficulty: 3 Hard
Topic: Graphic Presentation of Frequency Distribution
Learning Objective: 02-04 Display a frequency distribution using a histogram or frequency polygon.
Bloom's: Apply
AACSB: Analytic

60) Refer to the following breakdown of responses to a survey of room service in a hotel:

Response	Frequency
Not satisfied	20
Satisfied	40
Highly satisfied	60

What is the class interval for this frequency table?
A) 10
B) 20
C) 40
D) None apply

Answer: D
Explanation: There is no class interval for data measured on an ordinal scale.
Difficulty: 1 Easy
Topic: Constructing Frequency Tables
Learning Objective: 02-01 Summarize qualitative variables with frequency and relative frequency tables.
Bloom's: Understand
AACSB: Communication

61) Refer to the following breakdown of responses to a survey of room service in a hotel:

Response	Frequency
Not satisfied	20
Satisfied	40
Highly satisfied	60

What is the class with the greatest frequency?
A) Not satisfied
B) Satisfied
C) Highly satisfied
D) None apply

Answer: C
Explanation: The highly satisfied class has 60 people.
Difficulty: 1 Easy
Topic: Constructing Frequency Tables
Learning Objective: 02-01 Summarize qualitative variables with frequency and relative frequency tables.
Bloom's: Understand
AACSB: Communication

62) Refer to the following breakdown of responses to a survey of room service in a hotel:

Response	Frequency
Not satisfied	20
Satisfied	40
Highly satisfied	60

What percentage of the responses indicated that customers were satisfied?
A) 40%
B) 33%
C) 50%
D) 100%

Answer: B
Explanation: The answer (33%) is found by dividing the frequency of the satisfied class by the total frequency, or 40/120.
Difficulty: 1 Easy
Topic: Constructing Frequency Tables
Learning Objective: 02-01 Summarize qualitative variables with frequency and relative frequency tables.
Bloom's: Understand
AACSB: Analytic

63) Refer to the following breakdown of responses to a survey of room service in a hotel:

Response	Frequency
Not satisfied	20
Satisfied	40
Highly satisfied	60

What type of chart should be used to describe the frequency table?
A) A pie chart
B) A bar chart
C) A histogram
D) A frequency polygon

Answer: B
Explanation: Bar charts can be used to illustrate a frequency table.
Difficulty: 1 Easy
Topic: Graphic Presentation of Qualitative Data
Learning Objective: 02-02 Display a frequency table using a bar or pie chart.
Bloom's: Understand
AACSB: Analytic

64) Refer to the following breakdown of responses to a survey of room service in a hotel:

Response	Frequency
Not satisfied	20
Satisfied	40
Highly satisfied	60

What type of chart should be used to show relative class frequencies?
A) A pie chart
B) A bar chart
C) A histogram
D) A frequency polygon

Answer: A
Explanation: Pie charts can be used to illustrate relative frequencies for an ordinal variable.
Difficulty: 1 Easy
Topic: Graphic Presentation of Qualitative Data
Learning Objective: 02-02 Display a frequency table using a bar or pie chart.
Bloom's: Understand
AACSB: Analytic

65) Refer to the following breakdown of responses to a survey of "Are you concerned about being tracked while connected to the Internet?"

Response	Frequency
Very concerned	140
Somewhat concerned	40
No concern	20

What is the class interval for the preceding frequency table?
A) 10
B) 20
C) 40
D) None apply

Answer: D
Explanation: There is no class interval for data measured on an ordinal scale.
Difficulty: 1 Easy
Topic: Constructing Frequency Tables
Learning Objective: 02-01 Summarize qualitative variables with frequency and relative frequency tables.
Bloom's: Understand
AACSB: Communication

66) Refer to the following breakdown of responses to a survey of "Are you concerned about being tracked while connected to the Internet?"

Response	Frequency
Very concerned	140
Somewhat concerned	40
No concern	20

What is the class with the greatest frequency?
A) Very concerned
B) Somewhat concerned
C) No concern
D) None apply

Answer: A
Explanation: The very concerned class has 140 people.
Difficulty: 1 Easy
Topic: Constructing Frequency Tables
Learning Objective: 02-01 Summarize qualitative variables with frequency and relative frequency tables.
Bloom's: Understand
AACSB: Communication

67) Refer to the following breakdown of responses to a survey of "Are you concerned about being tracked while connected to the Internet?"

Response	Frequency
Very concerned	140
Somewhat concerned	40
No concern	20

What percentage of the responses indicated that users were somewhat concerned?
A) 40%
B) 70%
C) 20%
D) 100%

Answer: C
Explanation: The answer (20%) is found by dividing the frequency of the somewhat concerned class by the total frequency, or 40/200.
Difficulty: 1 Easy
Topic: Constructing Frequency Tables
Learning Objective: 02-01 Summarize qualitative variables with frequency and relative frequency tables.
Bloom's: Understand
AACSB: Analytic

68) Refer to the following breakdown of responses to a survey of "Are you concerned about being tracked while connected to the Internet?"

Response	Frequency
Very concerned	140
Somewhat concerned	40
No concern	20

What type of chart should be used to describe the frequency table?
A) A pie chart
B) A bar chart
C) A histogram
D) A frequency polygon

Answer: B
Explanation: Bar charts can be used to illustrate a frequency table.
Difficulty: 1 Easy
Topic: Graphic Presentation of Qualitative Data
Learning Objective: 02-02 Display a frequency table using a bar or pie chart.
Bloom's: Understand
AACSB: Analytic

69) Refer to the following breakdown of responses to a survey of "Are you concerned about being tracked while connected to the Internet?"

Response	Frequency
Very concerned	140
Somewhat concerned	40
No concern	20

What type of chart should be used to show relative class frequencies?
A) A pie chart
B) A bar chart
C) A histogram
D) A frequency polygon

Answer: A
Explanation: Pie charts can be used to illustrate relative frequencies for an ordinal variable.
Difficulty: 1 Easy
Topic: Graphic Presentation of Qualitative Data
Learning Objective: 02-02 Display a frequency table using a bar or pie chart.
Bloom's: Understand
AACSB: Analytic

70) Refer to the following breakdown of responses to a survey of "How confident are you that you saved enough to retire?"

Response	Frequency
Very confident	63
Somewhat confident	135
Not very confident	99
Don't know	3

What is the class interval for the preceding frequency table?
A) 10
B) 20
C) 40
D) None apply

Answer: D
Explanation: There is no class interval for data measured on an ordinal scale.
Difficulty: 1 Easy
Topic: Constructing Frequency Tables
Learning Objective: 02-01 Summarize qualitative variables with frequency and relative frequency tables.
Bloom's: Understand
AACSB: Communication

71) Refer to the following breakdown of responses to a survey of "How confident are you that you saved enough to retire?"

Response	Frequency
Very confident	63
Somewhat confident	135
Not very confident	99
Don't know	3

What is the class with the greatest frequency?
A) Very confident
B) Somewhat confident
C) Not very confident
D) Don't know

Answer: B
Explanation: The Somewhat Confident class with 135 people has the greatest frequency.
Difficulty: 1 Easy
Topic: Constructing Frequency Tables
Learning Objective: 02-01 Summarize qualitative variables with frequency and relative frequency tables.
Bloom's: Understand
AACSB: Communication

72) Refer to the following breakdown of responses to a survey of "How confident are you that you saved enough to retire?"

Response	Frequency
Very confident	63
Somewhat confident	135
Not very confident	99
Don't know	3

What percentage of the responses indicated that users were very confident?
A) 63%
B) 21%
C) 45%
D) 33%

Answer: B
Explanation: The answer (21%) is found by dividing the frequency of the Very Confident class by the total frequency, or 63/300.
Difficulty: 1 Easy
Topic: Constructing Frequency Tables
Learning Objective: 02-01 Summarize qualitative variables with frequency and relative frequency tables.
Bloom's: Understand
AACSB: Analytic

73) Refer to the following breakdown of responses to a survey of "How confident are you that you saved enough to retire?"

Response	Frequency
Very confident	63
Somewhat confident	135
Not very confident	99
Don't know	3

What type of chart should be used to describe the frequency table?
A) A pie chart
B) A bar chart
C) A histogram
D) A frequency polygon

Answer: B
Explanation: Bar charts can be used to illustrate a frequency table.
Difficulty: 1 Easy
Topic: Graphic Presentation of Qualitative Data
Learning Objective: 02-02 Display a frequency table using a bar or pie chart.
Bloom's: Understand
AACSB: Analytic

74) Refer to the following breakdown of responses to a survey of "How confident are you that you saved enough to retire?"

Response	Frequency
Very confident	63
Somewhat confident	135
Not very confident	99
Don't know	3

What type of chart should be used to show relative class frequencies?
A) A pie chart
B) A bar chart
C) A histogram
D) A frequency polygon

Answer: A
Explanation: Pie charts can be used to illustrate relative frequencies for an ordinal variable.
Difficulty: 1 Easy
Topic: Graphic Presentation of Qualitative Data
Learning Objective: 02-02 Display a frequency table using a bar or pie chart.
Bloom's: Understand
AACSB: Analytic

75) A pie chart shows the
A) relative frequencies of a qualitative variable.
B) relative frequencies of a quantitative variable.
C) frequencies of a nominal variable.
D) frequencies of a ratio variable.

Answer: A
Explanation: Pie charts can be used to illustrate relative frequencies for qualitative variables.
Difficulty: 1 Easy
Topic: Graphic Presentation of Qualitative Data
Learning Objective: 02-02 Display a frequency table using a bar or pie chart.
Bloom's: Understand
AACSB: Analytic
Accessibility: Keyboard Navigation

76) A table summarizing a set of data showing the fraction of the total number of items in several classes is a
A) relative frequency table.
B) frequency table.
C) normal frequency table.
D) cumulative frequency table.

Answer: A
Difficulty: 1 Easy
Topic: Constructing Frequency Tables
Learning Objective: 02-01 Summarize qualitative variables with frequency and relative frequency tables.
Bloom's: Understand
AACSB: Communication
Accessibility: Keyboard Navigation

77) In order to convert class frequency to relative class frequency, we
A) divide the midpoint of the class by the sample size.
B) divide the frequency of the class by the midpoint.
C) divide the sample size by the frequency of the class.
D) divide the frequency of the class by the sample size.

Answer: D
Difficulty: 2 Medium
Topic: Constructing Frequency Distributions
Learning Objective: 02-03 Summarize quantitative variables with frequency and relative frequency distributions.
Bloom's: Understand
AACSB: Communication
Accessibility: Keyboard Navigation

78) In constructing a frequency distribution, the approximate class interval is computed as
A) (maximum value − minimum value)/(number of classes).
B) (maximum value − minimum value)/(sample size).
C) (minimum value − maximum value)/(sample size).
D) (maximum value)/(number of classes − sample size).

Answer: A
Difficulty: 1 Easy
Topic: Constructing Frequency Distributions
Learning Objective: 02-03 Summarize quantitative variables with frequency and relative frequency distributions.
Bloom's: Remember
AACSB: Communication
Accessibility: Keyboard Navigation