Chapter 02
Describing Data: Frequency Tables, Frequency Distributions, and Graphic Presentation

True / False Questions

1. A frequency distribution groups data into classes showing the number of observations in each class.
True False

2. A frequency distribution for qualitative data has class limits.
True False

3. To summarize the gender of students attending a college, the number of classes in a frequency distribution depends on the number of students.
True False

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

5. In a bar chart, the x-axis is labeled with the values of a qualitative variable.
True False

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

7. The midpoint of a class, which is also called a class mark, is halfway between the lower and upper limits.
True False

8. A class interval, which is the width of a class, can be determined by subtracting the lower limit of a class from the lower limit of the next higher class.
True False

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

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

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

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

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

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

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

Multiple Choice Questions

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. histogram.
B. raw data.
C. frequency distribution.
D. frequency polygon.

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. Histogram
B. Class limits
C. Class frequencies
D. Raw data

18. When data is 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. Number of classes is equal to the number of variable's values.
D. The "5 to the k rule" can be applied.

19. When data is collected using a qualitative, nominal 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. Number of classes is equal to the number of variable's values plus 2.
D. The "5 to the k rule" can be applied.

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

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 is 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

Why is the table NOT a frequency distribution?
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.

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 is 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. Pie Chart
C. Scatter plot
D. Frequency Polygon

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 is 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 relative class frequencies?
A. Bar Chart
B. Pie Chart
C. Scatter plot
D. Frequency Polygon

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.

25. The relative frequency for a class is computed as the class
A. width divided by class interval.
B. midpoint divided by the class frequency.
C. frequency divided by the class interval.
D. frequency divided by the total frequency.

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

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. 30 students responded high interest; 40 students responded medium interest; 30 students responded low interest. What is the relative frequency of students with high interest?
A. .30
B. .50
C. .40
D. Cannot be determined.

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. 30 students responded high interest; 50 students responded medium interest; 20 students responded low interest. What is the **best** way to illustrate the relative frequency of student interest?
A. Cumulative frequency polygon
B. Bar chart
C. Pie chart
D. Frequency table

29. The monthly salaries of a sample of 100 employees were rounded to the nearest ten dollars. 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

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.

31. A student was studying the political party preferences of a university's student population. The survey instrument asked students to identify their political preference, for example, democrat, republican, libertarian, or other party. The best way to illustrate the frequencies for each political preference is a:
A. Bar chart.
B. Pie chart.
C. Histogram.
D. Frequency polygon.

32. A student was studying the political party preferences of a university's student population. The survey instrument asked students to identify their political preference, for example, democrat, republican, libertarian, or other party. The best way to illustrate the relative frequency distribution is a:
A. Bar chart.
B. Pie chart.
C. Histogram.
D. Frequency polygon.

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

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"
Number	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

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

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

37. The age distribution of a sample of part-time employees at Lloyd's Fast Food Emporium is:

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 type of chart should be drawn to present this data?
A. Histogram
B. Simple line chart
C. Cumulative Frequency Distribution
D. Pie chart
E. Frequency polygon

38. A sample distribution of hourly earnings in Paul's Cookie Factory is:

Hourly Earnings	$6 up to $9	$9 up to $12	$12 up to $15
Numbers	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

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	22
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 those salespersons that earn from $1,600 up to $1,800?
A. .02
B. .024
C. .20
D. .24

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	22
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

The first coordinate for a cumulative frequency distribution would be:
A. $X = 0$, $Y = 500$.
B. $X = 500$, $Y = 3$.
C. $X = 3$, $Y = 600$.
D. $X = 500$, $Y = 0$.

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	22
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 those salespersons that earn $1,600 or more?
A. 25.5%
B. 27.5%
C. 29.5%
D. 30.8%

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	22
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 distribution above, what is the midpoint of the class with the greatest frequency?
A. 1400
B. 1500
C. 1700
D. The midpoint cannot be determined.

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	22
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

44. Refer to the following wage breakdown for a garment factory.

Hourly Wages	Number of Wage Earners
$ 4 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 table of wages above?
A. $2
B. $3
C. $4
D. $5

45. Refer to the following wage breakdown for a garment factory.

Hourly Wages	Number of Wage Earners
$ 4 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

46. Refer to the following wage breakdown for a garment factory.

Hourly Wages	Number of Wage Earners
$ 4 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

47. Refer to the following distribution of ages:

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

For the distribution of ages above, what is the relative class frequency for the lowest class?
A. .50
B. .18
C. .20
D. .10

48. Refer to the following distribution of ages:

Ages	Number
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

49. Refer to the following distribution of ages:

Ages	Number
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

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"

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

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

53. Refer to the following distribution:

Cost of Textbooks	Number
$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. .02
B. .04
C. .05
D. .10

54. Refer to the following distribution:

Cost of Textbooks	Number
$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

55. Refer to the following distribution:

Cost of Textbooks	Number
$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 class with the highest frequency?
A. 55 and 64
B. 54 and 64
C. 55 and up to 65
D. 55 and 64.5

56. Refer to the following frequency distribution on 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 between 3 up to 6 days?
A. 31
B. 29
C. 14
D. 2

57. Refer to the following frequency distribution on 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

58. Refer to the following frequency distribution on 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 days or more?
A. 8
B. 4
C. 22
D. 31

59. Refer to the following frequency distribution on 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 from 6 up to 12 days?
A. 20
B. 8
C. 12
D. 17

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 the frequency table above?
A. 10
B. 20
C. 40
D. None of the above

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 of the above

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 percent of the responses indicated that customers were satisfied?
A. 40%
B. 33%
C. 50%
D. 100%

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. Pie chart
B. Bar chart
C. Histogram
D. Frequency Polygon

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. Pie chart
B. Bar chart
C. Histogram
D. Frequency Polygon

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 frequency table above?
A. 10
B. 20
C. 40
D. None of the above

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 of the above

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 percent of the responses indicated that users were somewhat concerned?
A. 40%
B. 70%
C. 20%
D. 100%

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. Pie chart
B. Bar chart
C. Histogram
D. Frequency Polygon

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. Pie chart
B. Bar chart
C. Histogram
D. Frequency Polygon

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 frequency table above?
A. 10
B. 20
C. 40
D. None of the above

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.

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 percent of the responses indicated that users were very confident?
A. 63%
B. 21%
C. 45%
D. 33%

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. Pie chart
B. Bar chart
C. Histogram
D. Frequency Polygon

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. Pie chart
B. Bar chart
C. Histogram
D. Frequency Polygon

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.

Fill in the Blank Questions

76. In constructing a frequency polygon, class frequencies are scaled on which axis? _____
_____

77. A frequency distribution for nominal data requires that the categories be _____ and _____.
_____

78. For a frequency distribution of quantitative data, if every individual, object or measurement can be assigned to a class, the frequency distribution is _____.
_____

79. For a frequency distribution of qualitative data, if the observations can be assigned to only one class, the classes are _____.
_____

80. What is the number of observations in each class of a frequency distribution called?
_____
_____

81. A _____ is useful for displaying the relative frequency distribution for a nominal variable.
_____

82. To calculate a relative frequency, a class frequency is divided by _____.
_____

83. In a relative frequency distribution, the sum of the relative class frequencies is _____.
_____

84. A class relative frequency represents a _____ of the total observations in the class.
_____

85. A _____ chart is useful for displaying a frequency distribution for a qualitative variable.
_____

86. A _____ chart is useful for displaying a frequency distribution for a nominal variable.
_____

87. The midpoint of a class interval is also called a class _____.
_____

88. A table showing the number of observations that have been grouped into each of several classes is called a frequency _____.
_____

89. In a cumulative frequency distribution, what percent of the total frequencies would fall below the upper limit of the highest class? _____
_____

90. Unorganized data is referred to as _____ data.
_____

91. When classes in a frequency table are constructed so that each observation will fit into only one class, the categories are _____.
_____

92. What is the suggested class interval for a frequency distribution if the data ranges from 100 to 220 with 50 observations? _____
_____

93. If the number of observations is 124, calculate the suggested number of classes using the "2 to the k rule" _____.
_____

94. In a frequency distribution, a class defined as "Under $100" and "$1,000 and over" is called an _____.
_____

95. In a deck of cards, a class of all cards that are hearts and a class of all cards that are kings are NOT _____.
_____

96. To construct a histogram, the class frequencies are plotted on the _____
_____

97. To construct a bar chart, the class frequencies are plotted on the _____
_____

98. To construct a pie chart, the class frequencies are converted to _____
_____

99. To summarize the gender of students attending a college in a frequency distribution, how many classes would be required? _____
_____

100. A _____ chart is useful for displaying a relative frequency distribution.
_____

Short Answer Questions

101. Refer to the following ages (rounded to the nearest whole year) of employees at a large company that were grouped into a distribution with class limits:
20 up to 30
30 up to 40
40 up to 50
50 up to 60
60 up to 70
The class limits for the class 50 up to 60 are _____ and _____.

102. Refer to the following ages (rounded to the nearest whole year) of employees at a large company that were grouped into a distribution with class limits:
20 up to 30
30 up to 40
40 up to 50
50 up to 60
60 up to 70
What is the midpoint for the class 40 up to 50? _____

103. Refer to the following ages (rounded to the nearest whole year) of employees at a large company that were grouped into a distribution with class limits:
20 up to 30
30 up to 40
40 up to 50
50 up to 60
60 up to 70
What is the class interval? _____

104. Refer to the following class marks or midpoints for a frequency distribution of "weights of college men" recorded to the nearest pound:
The first three class marks are 105, 115, and 125.
What is the class interval? _____

105. Refer to the following class marks or midpoints for a frequency distribution of "weights of college men" recorded to the nearest pound:
The first three class marks are 105, 115, and 125.
What is the lower limit for the third class? _____

106. Refer to the following class marks or midpoints for a frequency distribution of "weights of college men" recorded to the nearest pound:
The first three class marks are 105, 115, and 125.
What is the upper limit for the third class? _____

107. Refer to the following class marks or midpoints for a frequency distribution of "weights of college men" recorded to the nearest pound:
The first three class marks are 105, 115, and 125.
What are the class limits for the fourth class? _____ and _____

108. Refer to the following breakdown of responses to a survey of room cleanliness in a hotel.

Response	Frequency
Not Satisfied	20
Satisfied	40
Highly Satisfied	20

What is the class interval for the frequency table above?

109. Refer to the following breakdown of responses to a survey of room cleanliness in a hotel.

Response	Frequency
Not Satisfied	20
Satisfied	40
Highly Satisfied	20

What is the class with the greatest frequency?

110. Refer to the following breakdown of responses to a survey of room cleanliness in a hotel.

Response	Frequency
Not Satisfied	20
Satisfied	40
Highly Satisfied	20

What percent of the responses indicated that customers were satisfied?

111. Refer to the following breakdown of responses to a survey of room cleanliness in a hotel.

Response	Frequency
Not Satisfied	20
Satisfied	40
Highly Satisfied	20

Draw a bar graph that illustrates the frequency table above.

112. Refer to the following breakdown of responses to a survey of room cleanliness in a hotel.

Response	Frequency
Not Satisfied	20
Satisfied	40
Highly Satisfied	20

Draw a bar graph that illustrates the relative frequencies.

113. Refer to the following breakdown of responses to a survey of room cleanliness in a hotel.

Response	Frequency
Not Satisfied	20
Satisfied	40
Highly Satisfied	20

Draw a pie chart that illustrates the relative frequencies.

114. A data set consists of 40 observations. For a quantitative variable, how many classes would you recommend for the frequency distribution? _____

115. A data set has 100 observations. In the data, a quantitative variable's highest value is 117 and its lowest value is 47. What is the minimum class interval that you would recommend? _____

116. A data set has 200 observations. In the data, a quantitative variable's highest value is 1080 and its lowest value is 960. What is the minimum class interval that you would recommend? _____

117. A data set has 200 observations. In the data, a qualitative variable's highest value is "extremely satisfied" and its lowest value is "extremely dissatisfied". What is the minimum class interval that you would recommend? _____

118. The following frequency distribution shows the distribution of delivery times (in days) for swimstuff.com customer orders during the last month.

Delivery times in days	Frequency
0 - 1	150
1 – 2	60
2 – 3	45
3 – 4	30
4 - 5	10
5 – 6	5

How many orders were delivered in less than one day or 24 hours?

119. The following frequency distribution shows the distribution of delivery times (in days) for swimstuff.com customer orders during the last month.

Delivery times in days	Frequency
0 - 1	150
1 – 2	60
2 – 3	45
3 – 4	30
4 - 5	10
5 – 6	5

What is the relative frequency for orders delivered in less than one day or 24 hours?

120. The following frequency distribution shows the distribution of delivery times (in days) for swimstuff.com customer orders during the last month.

Delivery times in days	Frequency
0 - 1	150
1 – 2	60
2 – 3	45
3 – 4	30
4 - 5	10
5 – 6	5

How many orders were delivered in less than three days?

121. The following frequency distribution shows the distribution of delivery times (in days) for swimstuff.com customer orders during the last month.

Delivery times in days	Frequency
0 - 1	150
1 – 2	60
2 – 3	45
3 – 4	30
4 - 5	10
5 – 6	5

What is the relative frequency for orders delivered in less than three days?

122. The following frequency distribution shows the distribution of delivery times (in days) for swimstuff.com customer orders during the last month.

Delivery times in days	Frequency
0 - 1	150
1 – 2	60
2 – 3	45
3 – 4	30
4 - 5	10
5 – 6	5

How many orders were delivered in three days or more?

123. The following frequency distribution shows the distribution of delivery times (in days) for swimstuff.com customer orders during the last month.

Delivery times in days	Frequency
0 - 1	150
1 – 2	60
2 – 3	45
3 – 4	30
4 - 5	10
5 – 6	5

What is the relative frequency for orders delivered in three days or more?

124. The following frequency distribution shows the distribution of delivery times (in days) for swimstuff.com customer orders during the last month.

Delivery times in days	Frequency
0 - 1	150
1 – 2	60
2 – 3	45
3 – 4	30
4 - 5	10
5 – 6	5

How many orders were delivered from 1 day up to 3 days?

125. The following frequency distribution shows the distribution of delivery times (in days) for swimstuff.com customer orders during the last month.

Delivery times in days	Frequency
0 - 1	150
1 – 2	60
2 – 3	45
3 – 4	30
4 - 5	10
5 – 6	5

What is the relative frequency of the orders delivered from 1 day up to 3 days?

Essay Questions

126. The following frequency distribution shows the distribution of delivery times (in days) for swimstuff.com customer orders during the last month.

Delivery times in days	Frequency
0 - 1	150
1 – 2	60
2 – 3	45
3 – 4	30
4 - 5	10
5 – 6	5

For 300 observations, our rule-of-thumb for number of classes would indicate 9 classes. In this case what is the class interval and why would it be reasonable to use that class interval and only 6 classes?

127. What is the difference in application between a bar chart and a pie chart?

128. What is the difference between a frequency distribution and a cumulative frequency distribution?

129. In a bar chart, why are there spaces between the bars on the horizontal axis?

Chapter 02 Describing Data: Frequency Tables, Frequency Distributions, and Grap Answer Key

True / False Questions

1. A frequency distribution groups data into classes showing the number of observations in each class.
TRUE

AACSB: Communication Abilities
Bloom's: Knowledge
Difficulty: Easy
Learning Objective: 02-04 Create a frequency distribution for a data set.
Topic: Frequency Distribution Concepts

2. A frequency distribution for qualitative data has class limits.
FALSE

AACSB: Communication Abilities
Bloom's: Knowledge
Difficulty: Easy
Learning Objective: 02-01 Make a frequency table for a set of data.
Topic: Constructing Frequency Distributions: qualitative data

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

AACSB: Communication Abilities
Bloom's: Comprehension
Difficulty: Easy
Learning Objective: 02-01 Make a frequency table for a set of data.
Topic: Constructing Frequency Distributions: qualitative data

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

AACSB: Communication Abilities
Bloom's: Analysis
Difficulty: Easy
Learning Objective: 02-04 Create a frequency distribution for a data set.
Topic: Frequency Distribution Concepts

5. In a bar chart, the x-axis is labeled with the values of a qualitative variable.
TRUE

AACSB: Communication Abilities
Bloom's: Analysis
Difficulty: Easy
Learning Objective: 02-02 Organize data into a bar chart.
Topic: Constructing Frequency Distributions: qualitative data

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

AACSB: Communication Abilities
Bloom's: Analysis
Difficulty: Easy
Learning Objective: 02-02 Organize data into a bar chart.
Topic: Constructing Frequency Distributions: qualitative data

7. The midpoint of a class, which is also called a class mark, is halfway between the lower and upper limits.
TRUE

AACSB: Communication Abilities
Bloom's: Knowledge
Difficulty: Easy
Learning Objective: 02-04 Create a frequency distribution for a data set.
Topic: Constructing Frequency Distributions: quantitative data

8. A class interval, which is the width of a class, can be determined by subtracting the lower limit of a class from the lower limit of the next higher class.
TRUE

AACSB: Communication Abilities
Bloom's: Knowledge
Difficulty: Easy
Learning Objective: 02-04 Create a frequency distribution for a data set.
Topic: Constructing Frequency Distributions: quantitative data

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

AACSB: Communication Abilities
Bloom's: Knowledge
Difficulty: Easy
Learning Objective: 02-05 Understand a relative frequency distribution.
Topic: Relative Frequency Distributions

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

AACSB: Communication Abilities
Bloom's: Knowledge
Difficulty: Easy
Learning Objective: 02-05 Understand a relative frequency distribution.
Topic: Relative Frequency Distributions

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

AACSB: Communication Abilities
Bloom's: Analysis
Difficulty: Medium
Learning Objective: 02-03 Present a set of data in a pie chart.
Topic: Constructing Frequency Distributions: qualitative data

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

AACSB: Communication Abilities
Bloom's: Analysis
Difficulty: Medium
Learning Objective: 02-03 Present a set of data in a pie chart.
Topic: Constructing Frequency Distributions: qualitative data

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

AACSB: Communication Abilities
Bloom's: Knowledge
Difficulty: Easy
Learning Objective: 02-03 Present a set of data in a pie chart.
Topic: Constructing Frequency Distributions: qualitative data

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

AACSB: Communication Abilities
Bloom's: Comprehension
Difficulty: Easy
Learning Objective: 02-07 Construct and interpret a cumulative frequency distribution.
Topic: Cumulative Frequency Distribution

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

AACSB: Communication Abilities
Bloom's: Application
Difficulty: Easy
Learning Objective: 02-06 Present data from a frequency distribution in a histogram or frequency polygon.
Topic: Constructing Frequency Distributions: quantitative data

Multiple Choice Questions

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. histogram.
B. raw data.
C. frequency distribution.
D. frequency polygon.

AACSB: Communication Abilities
Bloom's: Knowledge
Difficulty: Easy
Learning Objective: 02-04 Create a frequency distribution for a data set.
Topic: Constructing Frequency Distributions: quantitative data

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. Histogram
B. Class limits
C. Class frequencies
D. Raw data

AACSB: Communication Abilities
Bloom's: Knowledge
Difficulty: Easy
Learning Objective: 02-04 Create a frequency distribution for a data set.
Topic: Constructing Frequency Distributions: quantitative data

18. When data is 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. Number of classes is equal to the number of variable's values.
D. The "5 to the k rule" can be applied.

AACSB: Analytic Skills
Bloom's: Analysis
Difficulty: Medium
Learning Objective: 02-04 Create a frequency distribution for a data set.
Topic: Constructing Frequency Distributions: quantitative data

19. When data is collected using a qualitative, nominal 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. Number of classes is equal to the number of variable's values plus 2.
D. The "5 to the k rule" can be applied.

AACSB: Analytic Skills
Bloom's: Analysis
Difficulty: Medium
Learning Objective: 02-03 Present a set of data in a pie chart.
Topic: Constructing Frequency Distributions: qualitative data

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

AACSB: Analytic Skills
Bloom's: Analysis
Difficulty: Medium
Learning Objective: 02-01 Make a frequency table for a set of data.
Topic: Constructing Frequency Distributions: qualitative data

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 is 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

Why is the table NOT a frequency distribution?
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.

AACSB: Communication Abilities
Bloom's: Comprehension
Difficulty: Medium
Learning Objective: 02-01 Make a frequency table for a set of data.
Topic: Constructing Frequency Distributions: qualitative data

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 is 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. Pie Chart
C. Scatter plot
D. Frequency Polygon

AACSB: Communication Abilities
Bloom's: Comprehension
Difficulty: Medium
Learning Objective: 02-02 Organize data into a bar chart.
Topic: Constructing Frequency Distributions: qualitative data

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 is 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 relative class frequencies?
A. Bar Chart
B. Pie Chart
C. Scatter plot
D. Frequency Polygon

AACSB: Communication Abilities
Bloom's: Comprehension
Difficulty: Medium
Learning Objective: 02-03 Present a set of data in a pie chart.
Topic: Constructing Frequency Distributions: qualitative data

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.

AACSB: Communication Abilities
Bloom's: Comprehension
Difficulty: Easy
Learning Objective: 02-04 Create a frequency distribution for a data set.
Topic: Constructing Frequency Distributions: quantitative data

25. The relative frequency for a class is computed as the class
A. width divided by class interval.
B. midpoint divided by the class frequency.
C. frequency divided by the class interval.
D. frequency divided by the total frequency.

AACSB: Communication Abilities
Bloom's: Knowledge
Difficulty: Easy
Learning Objective: 02-05 Understand a relative frequency distribution.
Topic: Relative Frequency Distributions

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

AACSB: Communication Abilities
Bloom's: Knowledge
Difficulty: Easy
Learning Objective: 02-05 Understand a relative frequency distribution.
Topic: Relative Frequency Distributions

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. 30 students responded high interest; 40 students responded medium interest; 30 students responded low interest. What is the relative frequency of students with high interest?
A. .30
B. .50
C. .40
D. Cannot be determined.

AACSB: Analytic Skills
Bloom's: Application
Difficulty: Medium
Learning Objective: 02-05 Understand a relative frequency distribution.
Topic: Relative Frequency Distributions

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. 30 students responded high interest; 50 students responded medium interest; 20 students responded low interest. What is the **best** way to illustrate the relative frequency of student interest?
A. Cumulative frequency polygon
B. Bar chart
C. Pie chart
D. Frequency table

AACSB: Reflective Thinking Skills
Bloom's: Analysis
Difficulty: Medium
Learning Objective: 02-03 Present a set of data in a pie chart.
Topic: Constructing Frequency Distributions: qualitative data

29. The monthly salaries of a sample of 100 employees were rounded to the nearest ten dollars. 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

AACSB: Analytic Skills
Bloom's: Comprehension
Difficulty: Medium
Learning Objective: 02-04 Create a frequency distribution for a data set.
Topic: Constructing Frequency Distributions: quantitative data

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.

AACSB: Communication Abilities
Bloom's: Analysis
Difficulty: Medium
Learning Objective: 02-01 Make a frequency table for a set of data.
Topic: Constructing Frequency Distributions: qualitative data

31. A student was studying the political party preferences of a university's student population. The survey instrument asked students to identify their political preference, for example, democrat, republican, libertarian, or other party. The best way to illustrate the frequencies for each political preference is a:
A. Bar chart.
B. Pie chart.
C. Histogram.
D. Frequency polygon.

AACSB: Communication Abilities
Bloom's: Analysis
Difficulty: Medium
Learning Objective: 02-02 Organize data into a bar chart.
Topic: Constructing Frequency Distributions: qualitative data

32. A student was studying the political party preferences of a university's student population. The survey instrument asked students to identify their political preference, for example, democrat, republican, libertarian, or other party. The best way to illustrate the relative frequency distribution is a:
A. Bar chart.
B. Pie chart.
C. Histogram.
D. Frequency polygon.

AACSB: Communication Abilities
Bloom's: Analysis
Difficulty: Medium
Learning Objective: 02-03 Present a set of data in a pie chart.
Topic: Constructing Frequency Distributions: qualitative data

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

AACSB: Communication Abilities
Bloom's: Knowledge
Difficulty: Easy
Learning Objective: 02-04 Create a frequency distribution for a data set.
Topic: Frequency Distribution Concepts

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"
Number	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

AACSB: Communication Abilities
Bloom's: Comprehension
Difficulty: Medium
Learning Objective: 02-04 Create a frequency distribution for a data set.
Topic: Constructing Frequency Distributions: quantitative data

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

AACSB: Communication Abilities
Bloom's: Knowledge
Difficulty: Easy
Learning Objective: 02-01 Make a frequency table for a set of data.
Topic: Constructing Frequency Distributions: qualitative data

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

AACSB: Reflective Thinking Skills
Bloom's: Analysis
Difficulty: Easy
Learning Objective: 02-04 Create a frequency distribution for a data set.
Topic: Constructing Frequency Distributions: quantitative data

37. The age distribution of a sample of part-time employees at Lloyd's Fast Food Emporium is:

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 type of chart should be drawn to present this data?
A. Histogram
B. Simple line chart
C. Cumulative Frequency Distribution
D. Pie chart
E. Frequency polygon

AACSB: Communication Abilities
Bloom's: Knowledge
Difficulty: Medium
Learning Objective: 02-07 Construct and interpret a cumulative frequency distribution.
Topic: Cumulative Frequency Distribution

38. A sample distribution of hourly earnings in Paul's Cookie Factory is:

Hourly Earnings	$6 up to $9	$9 up to $12	$12 up to $15
Numbers	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

AACSB: Communication Abilities
Bloom's: Comprehension
Difficulty: Medium
Learning Objective: 02-04 Create a frequency distribution for a data set.
Topic: Constructing Frequency Distributions: quantitative data

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	22
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 those salespersons that earn from $1,600 up to $1,800?
A. .02
B. .024
C. .20
D. .24

AACSB: Analytic Skills
Bloom's: Comprehension
Difficulty: Medium
Learning Objective: 02-05 Understand a relative frequency distribution.
Topic: Relative Frequency Distributions

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	22
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

The first coordinate for a cumulative frequency distribution would be:
A. $X = 0$, $Y = 500$.
B. $X = 500$, $Y = 3$.
C. $X = 3$, $Y = 600$.
D. $X = 500$, $Y = 0$.

AACSB: Analytic Skills
Bloom's: Application
Difficulty: Medium
Learning Objective: 02-07 Construct and interpret a cumulative frequency distribution.
Topic: Cumulative Frequency Distribution

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	22
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 those salespersons that earn $1,600 or more?

A. 25.5%
B. 27.5%
C. 29.5%
D. 30.8%

AACSB: Communication Abilities
Bloom's: Comprehension
Difficulty: Medium
Learning Objective: 02-05 Understand a relative frequency distribution.
Topic: Relative Frequency Distributions

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	22
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 distribution above, what is the midpoint of the class with the greatest frequency?

A. 1400
B. 1500
C. 1700
D. The midpoint cannot be determined.

AACSB: Communication Abilities
Bloom's: Comprehension
Difficulty: Medium
Learning Objective: 02-04 Create a frequency distribution for a data set.
Topic: Constructing Frequency Distributions: quantitative data

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	22
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

AACSB: Communication Abilities
Bloom's: Comprehension
Difficulty: Medium
Learning Objective: 02-04 Create a frequency distribution for a data set.
Topic: Constructing Frequency Distributions: quantitative data

44. Refer to the following wage breakdown for a garment factory.

Hourly Wages	Number of Wage Earners
$ 4 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 table of wages above?

A. $2
B. $3
C. $4
D. $5

AACSB: Analytic Skills
Bloom's: Comprehension
Difficulty: Easy
Learning Objective: 02-04 Create a frequency distribution for a data set.
Topic: Constructing Frequency Distributions: quantitative data

45. Refer to the following wage breakdown for a garment factory.

Hourly Wages	Number of Wage Earners
$ 4 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

AACSB: Analytic Skills
Bloom's: Application
Difficulty: Medium
Learning Objective: 02-04 Create a frequency distribution for a data set.
Topic: Constructing Frequency Distributions: quantitative data

46. Refer to the following wage breakdown for a garment factory.

Hourly Wages	Number of Wage Earners
$ 4 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

AACSB: Communication Abilities
Bloom's: Comprehension
Difficulty: Medium
Learning Objective: 02-04 Create a frequency distribution for a data set.
Topic: Constructing Frequency Distributions: quantitative data

47. Refer to the following distribution of ages:

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

For the distribution of ages above, what is the relative class frequency for the lowest class?

A. .50
B. .18
C. .20
D. .10

AACSB: Analytic Skills
Bloom's: Application
Difficulty: Medium
Learning Objective: 02-05 Understand a relative frequency distribution.
Topic: Relative Frequency Distributions

48. Refer to the following distribution of ages:

Ages	Number
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

AACSB: Communication Abilities
Bloom's: Comprehension
Difficulty: Medium
Learning Objective: 02-04 Create a frequency distribution for a data set.
Topic: Constructing Frequency Distributions: quantitative data

49. Refer to the following distribution of ages:

Ages	Number
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

AACSB: Analytic Skills
Bloom's: Application
Difficulty: Medium
Learning Objective: 02-04 Create a frequency distribution for a data set.
Topic: Constructing Frequency Distributions: quantitative data

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"

AACSB: Communication Abilities
Bloom's: Comprehension
Difficulty: Easy
Learning Objective: 02-04 Create a frequency distribution for a data set.
Topic: Constructing Frequency Distributions: quantitative data

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

AACSB: Analytic Skills
Bloom's: Analysis
Difficulty: Hard
Learning Objective: 02-04 Create a frequency distribution for a data set.
Topic: Constructing Frequency Distributions: quantitative data

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

AACSB: Analytic Skills
Bloom's: Analysis
Difficulty: Hard
Learning Objective: 02-04 Create a frequency distribution for a data set.
Topic: Constructing Frequency Distributions: quantitative data

53. Refer to the following distribution:

Cost of Textbooks	Number
$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. .02
B. .04
C. .05
D. .10

AACSB: Analytic Skills
Bloom's: Comprehension
Difficulty: Medium
Learning Objective: 02-05 Understand a relative frequency distribution.
Topic: Relative Frequency Distributions

54. Refer to the following distribution:

Cost of Textbooks	Number
$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

AACSB: Analytic Skills
Bloom's: Application
Difficulty: Medium
Learning Objective: 02-04 Create a frequency distribution for a data set.
Topic: Constructing Frequency Distributions: quantitative data

55. Refer to the following distribution:

Cost of Textbooks	Number
$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 class with the highest frequency?
A. 55 and 64
B. 54 and 64
C. 55 and up to 65
D. 55 and 64.5

AACSB: Communication Abilities
Bloom's: Comprehension
Difficulty: Medium
Learning Objective: 02-04 Create a frequency distribution for a data set.
Topic: Constructing Frequency Distributions: quantitative data

56. Refer to the following frequency distribution on 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 between 3 up to 6 days?
A. 31
B. 29
C. 14
D. 2

AACSB: Communication Abilities
Bloom's: Comprehension
Difficulty: Easy
Learning Objective: 02-04 Create a frequency distribution for a data set.
Topic: Constructing Frequency Distributions: quantitative data

57. Refer to the following frequency distribution on 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

AACSB: Analytic Skills
Bloom's: Application
Difficulty: Hard
Learning Objective: 02-07 Construct and interpret a cumulative frequency distribution.
Topic: Cumulative Frequency Distribution

58. Refer to the following frequency distribution on 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 days or more?

A. 8
B. 4
C. 22
D. 31

AACSB: Analytic Skills
Bloom's: Application
Difficulty: Hard
Learning Objective: 02-07 Construct and interpret a cumulative frequency distribution.
Topic: Cumulative Frequency Distribution

59. Refer to the following frequency distribution on 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 from 6 up to 12 days?

A. 20
B. 8
C. 12
D. 17

AACSB: Analytic Skills
Bloom's: Application
Difficulty: Hard
Learning Objective: 02-07 Construct and interpret a cumulative frequency distribution.
Topic: Cumulative Frequency Distribution

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 the frequency table above?

A. 10
B. 20
C. 40
D. None of the above

AACSB: Communication Abilities
Bloom's: Comprehension
Difficulty: Easy
Learning Objective: 02-01 Make a frequency table for a set of data.
Topic: Constructing Frequency Distributions: qualitative data

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 of the above

AACSB: Communication Abilities
Bloom's: Comprehension
Difficulty: Easy
Learning Objective: 02-01 Make a frequency table for a set of data.
Topic: Constructing Frequency Distributions: qualitative data

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 percent of the responses indicated that customers were satisfied?
A. 40%
B. 33%
C. 50%
D. 100%

AACSB: Analytic Skills
Bloom's: Comprehension
Difficulty: Easy
Learning Objective: 02-05 Understand a relative frequency distribution.
Topic: Relative Frequency Distributions

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. Pie chart
B. Bar chart
C. Histogram
D. Frequency Polygon

AACSB: Analytic Skills
Bloom's: Comprehension
Difficulty: Easy
Learning Objective: 02-02 Organize data into a bar chart.
Topic: Constructing Frequency Distributions: qualitative data

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. Pie chart
B. Bar chart
C. Histogram
D. Frequency Polygon

AACSB: Analytic Skills
Bloom's: Comprehension
Difficulty: Easy
Learning Objective: 02-03 Present a set of data in a pie chart.
Topic: Constructing Frequency Distributions: qualitative data

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 frequency table above?
A. 10
B. 20
C. 40
D. None of the above

AACSB: Communication Abilities
Bloom's: Comprehension
Difficulty: Easy
Learning Objective: 02-01 Make a frequency table for a set of data.
Topic: Constructing Frequency Distributions: qualitative data

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 of the above

AACSB: Communication Abilities
Bloom's: Comprehension
Difficulty: Easy
Learning Objective: 02-01 Make a frequency table for a set of data.
Topic: Constructing Frequency Distributions: qualitative data

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 percent of the responses indicated that users were somewhat concerned?
A. 40%
B. 70%
C. 20%
D. 100%

AACSB: Analytic Skills
Bloom's: Comprehension
Difficulty: Easy
Learning Objective: 02-05 Understand a relative frequency distribution.
Topic: Relative Frequency Distributions

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. Pie chart
B. Bar chart
C. Histogram
D. Frequency Polygon

AACSB: Analytic Skills
Bloom's: Comprehension
Difficulty: Easy
Learning Objective: 02-02 Organize data into a bar chart.
Topic: Constructing Frequency Distributions: qualitative data

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. Pie chart
B. Bar chart
C. Histogram
D. Frequency Polygon

AACSB: Analytic Skills
Bloom's: Comprehension
Difficulty: Easy
Learning Objective: 02-03 Present a set of data in a pie chart.
Topic: Constructing Frequency Distributions: qualitative data

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 frequency table above?
A. 10
B. 20
C. 40
D. None of the above

AACSB: Communication Abilities
Bloom's: Comprehension
Difficulty: Easy
Learning Objective: 02-01 Make a frequency table for a set of data.
Topic: Constructing Frequency Distributions: qualitative data

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.

AACSB: Communication Abilities
Bloom's: Comprehension
Difficulty: Easy
Learning Objective: 02-01 Make a frequency table for a set of data.
Topic: Constructing Frequency Distributions: qualitative data

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 percent of the responses indicated that users were very confident?
A. 63%
B. 21%
C. 45%
D. 33%

AACSB: Analytic Skills
Bloom's: Comprehension
Difficulty: Easy
Learning Objective: 02-05 Understand a relative frequency distribution.
Topic: Relative Frequency Distributions

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. Pie chart
B. Bar chart
C. Histogram
D. Frequency Polygon

AACSB: Analytic Skills
Bloom's: Comprehension
Difficulty: Easy
Learning Objective: 02-02 Organize data into a bar chart.
Topic: Constructing Frequency Distributions: qualitative data

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. Pie chart
B. Bar chart
C. Histogram
D. Frequency Polygon

AACSB: Analytic Skills
Bloom's: Comprehension
Difficulty: Easy
Learning Objective: 02-03 Present a set of data in a pie chart.
Topic: Constructing Frequency Distributions: qualitative data

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.

AACSB: Analytic Skills
Bloom's: Comprehension
Difficulty: Easy
Learning Objective: 02-03 Present a set of data in a pie chart.
Topic: Constructing Frequency Distributions: qualitative data

Fill in the Blank Questions

76. In constructing a frequency polygon, class frequencies are scaled on which axis? _____
Y or vertical axis

AACSB: Communication Abilities
Bloom's: Knowledge
Difficulty: Easy
Learning Objective: 02-06 Present data from a frequency distribution in a histogram or frequency polygon.
Topic: Constructing Frequency Distributions: quantitative data

77. A frequency distribution for nominal data requires that the categories be _____ and _____.
mutually exclusive; exhaustive

AACSB: Communication Abilities
Bloom's: Comprehension
Difficulty: Medium
Learning Objective: 02-01 Make a frequency table for a set of data.
Topic: Constructing Frequency Distributions: qualitative data

78. For a frequency distribution of quantitative data, if every individual, object or measurement can be assigned to a class, the frequency distribution is _____.
exhaustive

AACSB: Communication Abilities
Bloom's: Knowledge
Difficulty: Medium
Learning Objective: 02-04 Create a frequency distribution for a data set.
Topic: Constructing Frequency Distributions: quantitative data

79. For a frequency distribution of qualitative data, if the observations can be assigned to only one class, the classes are _____.
mutually exclusive

AACSB: Communication Abilities
Bloom's: Knowledge
Difficulty: Medium
Learning Objective: 02-01 Make a frequency table for a set of data.
Topic: Constructing Frequency Distributions: qualitative data

80. What is the number of observations in each class of a frequency distribution called?
_____
Class frequency or frequency

AACSB: Communication Abilities
Bloom's: Knowledge
Difficulty: Easy
Learning Objective: 02-04 Create a frequency distribution for a data set.
Topic: Constructing Frequency Distributions: quantitative data

81. A _____ is useful for displaying the relative frequency distribution for a nominal variable.
pie chart

AACSB: Communication Abilities
Bloom's: Application
Difficulty: Medium
Learning Objective: 02-03 Present a set of data in a pie chart.
Topic: Constructing Frequency Distributions: qualitative data

82. To calculate a relative frequency, a class frequency is divided by _____.
total number of observations

AACSB: Communication Abilities
Bloom's: Application
Difficulty: Medium
Learning Objective: 02-05 Understand a relative frequency distribution.
Topic: Relative Frequency Distributions

83. In a relative frequency distribution, the sum of the relative class frequencies is _____.
1.00

AACSB: Communication Abilities
Bloom's: Application
Difficulty: Medium
Learning Objective: 02-05 Understand a relative frequency distribution.
Topic: Relative Frequency Distributions

84. A class relative frequency represents a _____ of the total observations in the class.
proportion

AACSB: Communication Abilities
Bloom's: Application
Difficulty: Medium
Learning Objective: 02-05 Understand a relative frequency distribution.
Topic: Relative Frequency Distributions

85. A _____ chart is useful for displaying a frequency distribution for a qualitative variable.
bar

AACSB: Communication Abilities
Bloom's: Application
Difficulty: Medium
Learning Objective: 02-02 Organize data into a bar chart.
Topic: Constructing Frequency Distributions: qualitative data

86. A _____ chart is useful for displaying a frequency distribution for a nominal variable.
bar

AACSB: Communication Abilities
Bloom's: Application
Difficulty: Medium
Learning Objective: 02-02 Organize data into a bar chart.
Topic: Constructing Frequency Distributions: qualitative data

87. The midpoint of a class interval is also called a class _____.
mark

AACSB: Communication Abilities
Bloom's: Knowledge
Difficulty: Medium
Learning Objective: 02-04 Create a frequency distribution for a data set.
Topic: Constructing Frequency Distributions: quantitative data

88. A table showing the number of observations that have been grouped into each of several classes is called a frequency _____.
distribution

AACSB: Communication Abilities
Bloom's: Knowledge
Difficulty: Easy
Learning Objective: 02-04 Create a frequency distribution for a data set.
Topic: Constructing Frequency Distributions: quantitative data

89. In a cumulative frequency distribution, what percent of the total frequencies would fall below the upper limit of the highest class? _____
100%

AACSB: Communication Abilities
Bloom's: Comprehension
Difficulty: Medium
Learning Objective: 02-07 Construct and interpret a cumulative frequency distribution.
Topic: Cumulative Frequency Distribution

90. Unorganized data is referred to as _____ data.
raw or ungrouped

AACSB: Communication Abilities
Bloom's: Knowledge
Difficulty: Easy
Learning Objective: 02-01 Make a frequency table for a set of data.
Topic: Constructing Frequency Distributions: qualitative data

91. When classes in a frequency table are constructed so that each observation will fit into only one class, the categories are _____.
mutually exclusive

AACSB: Communication Abilities
Bloom's: Knowledge
Difficulty: Medium
Learning Objective: 02-01 Make a frequency table for a set of data.
Topic: Constructing Frequency Distributions: qualitative data

92. What is the suggested class interval for a frequency distribution if the data ranges from 100 to 220 with 50 observations? _____
20

AACSB: Analytic Skills
Bloom's: Application
Difficulty: Medium
Learning Objective: 02-04 Create a frequency distribution for a data set.
Topic: Constructing Frequency Distributions: quantitative data

93. If the number of observations is 124, calculate the suggested number of classes using the "2 to the k rule" _____.
7 intervals

AACSB: Analytic Skills
Bloom's: Comprehension
Difficulty: Medium
Learning Objective: 02-04 Create a frequency distribution for a data set.
Topic: Constructing Frequency Distributions: quantitative data

94. In a frequency distribution, a class defined as "Under $100" and "$1,000 and over" is called an _____.
open class

AACSB: Reflective Thinking Skills
Bloom's: Comprehension
Difficulty: Easy
Learning Objective: 02-04 Create a frequency distribution for a data set.
Topic: Constructing Frequency Distributions: quantitative data

95. In a deck of cards, a class of all cards that are hearts and a class of all cards that are kings are NOT _____.
mutually exclusive

AACSB: Reflective Thinking Skills
Bloom's: Comprehension
Difficulty: Hard
Learning Objective: 02-04 Create a frequency distribution for a data set.
Topic: Frequency Distribution Concepts

96. To construct a histogram, the class frequencies are plotted on the _____
Y or vertical axis

AACSB: Communication Abilities
Bloom's: Knowledge
Difficulty: Easy
Learning Objective: 02-06 Present data from a frequency distribution in a histogram or frequency polygon.
Topic: Constructing Frequency Distributions: quantitative data

97. To construct a bar chart, the class frequencies are plotted on the _____
Y or vertical axis

AACSB: Communication Abilities
Bloom's: Knowledge
Difficulty: Easy
Learning Objective: 02-02 Organize data into a bar chart.
Topic: Constructing Frequency Distributions: qualitative data

98. To construct a pie chart, the class frequencies are converted to _____
relative frequencies

AACSB: Communication Abilities
Bloom's: Knowledge
Difficulty: Easy
Learning Objective: 02-03 Present a set of data in a pie chart.
Topic: Constructing Frequency Distributions: qualitative data

99. To summarize the gender of students attending a college in a frequency distribution, how many classes would be required? _____
Two

AACSB: Communication Abilities
Bloom's: Comprehension
Difficulty: Easy
Learning Objective: 02-01 Make a frequency table for a set of data.
Topic: Constructing Frequency Distributions: qualitative data

100. A _____ chart is useful for displaying a relative frequency distribution.
Pie

AACSB: Communication Abilities
Bloom's: Application
Difficulty: Medium
Learning Objective: 02-05 Understand a relative frequency distribution.
Topic: Relative Frequency Distributions

Short Answer Questions

101. Refer to the following ages (rounded to the nearest whole year) of employees at a large company that were grouped into a distribution with class limits:
20 up to 30
30 up to 40
40 up to 50
50 up to 60
60 up to 70
The class limits for the class 50 up to 60 are _____ and _____.

50; 59

AACSB: Communication Abilities
Bloom's: Comprehension
Difficulty: Medium
Learning Objective: 02-04 Create a frequency distribution for a data set.
Topic: Constructing Frequency Distributions: quantitative data

102. Refer to the following ages (rounded to the nearest whole year) of employees at a large company that were grouped into a distribution with class limits:
20 up to 30
30 up to 40
40 up to 50
50 up to 60
60 up to 70
What is the midpoint for the class 40 up to 50? _____

45

AACSB: Analytic Skills
Bloom's: Comprehension
Difficulty: Medium
Learning Objective: 02-04 Create a frequency distribution for a data set.
Topic: Constructing Frequency Distributions: quantitative data

103. Refer to the following ages (rounded to the nearest whole year) of employees at a large company that were grouped into a distribution with class limits:
20 up to 30
30 up to 40
40 up to 50
50 up to 60
60 up to 70
What is the class interval? _____

10

AACSB: Communication Abilities
Bloom's: Knowledge
Difficulty: Medium
Learning Objective: 02-04 Create a frequency distribution for a data set.
Topic: Constructing Frequency Distributions: quantitative data

104. Refer to the following class marks or midpoints for a frequency distribution of "weights of college men" recorded to the nearest pound:
The first three class marks are 105, 115, and 125.
What is the class interval? _____

10

AACSB: Analytic Skills
Bloom's: Application
Difficulty: Hard
Learning Objective: 02-04 Create a frequency distribution for a data set.
Topic: Constructing Frequency Distributions: quantitative data

105. Refer to the following class marks or midpoints for a frequency distribution of "weights of college men" recorded to the nearest pound:
The first three class marks are 105, 115, and 125.
What is the lower limit for the third class? _____

120

AACSB: Analytic Skills
Bloom's: Application
Difficulty: Hard
Learning Objective: 02-04 Create a frequency distribution for a data set.
Topic: Constructing Frequency Distributions: quantitative data

106. Refer to the following class marks or midpoints for a frequency distribution of "weights of college men" recorded to the nearest pound:
The first three class marks are 105, 115, and 125.
What is the upper limit for the third class? _____

130

AACSB: Analytic Skills
Bloom's: Application
Difficulty: Medium
Learning Objective: 02-04 Create a frequency distribution for a data set.
Topic: Constructing Frequency Distributions: quantitative data

107. Refer to the following class marks or midpoints for a frequency distribution of "weights of college men" recorded to the nearest pound:
The first three class marks are 105, 115, and 125.
What are the class limits for the fourth class? _____ and _____

130; up to 140

AACSB: Analytic Skills
Bloom's: Analysis
Difficulty: Hard
Learning Objective: 02-04 Create a frequency distribution for a data set.
Topic: Constructing Frequency Distributions: quantitative data

108. Refer to the following breakdown of responses to a survey of room cleanliness in a hotel.

Response	Frequency
Not Satisfied	20
Satisfied	40
Highly Satisfied	20

What is the class interval for the frequency table above?

There is no class interval. The variable is qualitative.

AACSB: Communication Abilities
Bloom's: Comprehension
Difficulty: Easy
Learning Objective: 02-01 Make a frequency table for a set of data.
Topic: Constructing Frequency Distributions: qualitative data

109. Refer to the following breakdown of responses to a survey of room cleanliness in a hotel.

Response	Frequency
Not Satisfied	20
Satisfied	40
Highly Satisfied	20

What is the class with the greatest frequency?

Satisfied

AACSB: Communication Abilities
Bloom's: Comprehension
Difficulty: Easy
Learning Objective: 02-01 Make a frequency table for a set of data.
Topic: Constructing Frequency Distributions: qualitative data

110. Refer to the following breakdown of responses to a survey of room cleanliness in a hotel.

Response	Frequency
Not Satisfied	20
Satisfied	40
Highly Satisfied	20

What percent of the responses indicated that customers were satisfied?

50%

AACSB: Analytic Skills
Bloom's: Comprehension
Difficulty: Easy
Learning Objective: 02-01 Make a frequency table for a set of data.
Topic: Constructing Frequency Distributions: qualitative data

111. Refer to the following breakdown of responses to a survey of room cleanliness in a hotel.

Response	Frequency
Not Satisfied	20
Satisfied	40
Highly Satisfied	20

Draw a bar graph that illustrates the frequency table above.

Graph with appropriate labels on horizontal (satisfaction) and vertical (frequency) axes. The bar for "satisfied" should be twice as high as the "not satisfied and highly satisfied" categories, and these categories should be equal in height.

AACSB: Communication Abilities
Bloom's: Application
Difficulty: Easy
Learning Objective: 02-01 Make a frequency table for a set of data.
Topic: Constructing Frequency Distributions: qualitative data

112. Refer to the following breakdown of responses to a survey of room cleanliness in a hotel.

Response	Frequency
Not Satisfied	20
Satisfied	40
Highly Satisfied	20

Draw a bar graph that illustrates the relative frequencies.

Graph with appropriate labels on horizontal (satisfaction) and vertical (relative frequency) axes. Bars showing approximate relative frequencies or percentages. The bar for "satisfied" should be twice as high as the "not satisfied and highly satisfied" categories, and these categories should be equal in height.

AACSB: Communication Abilities
Bloom's: Application
Difficulty: Easy
Learning Objective: 02-06 Present data from a frequency distribution in a histogram or frequency polygon.
Topic: Constructing Frequency Distributions: quantitative data

113. Refer to the following breakdown of responses to a survey of room cleanliness in a hotel.

Response	Frequency
Not Satisfied	20
Satisfied	40
Highly Satisfied	20

Draw a pie chart that illustrates the relative frequencies.

The pie chart should be divided into three slices. The "satisfied" slice should be ½ of the pie, and "not satisfied" and "highly satisfied" slices should each be ¼ of the pie. The slices should be labeled.

AACSB: Communication Abilities
Bloom's: Application
Difficulty: Medium
Learning Objective: 02-03 Present a set of data in a pie chart.
Topic: Constructing Frequency Distributions: qualitative data

114. A data set consists of 40 observations. For a quantitative variable, how many classes would you recommend for the frequency distribution? _____

6 classes

AACSB: Analytic Skills
Bloom's: Application
Difficulty: Medium
Learning Objective: 02-04 Create a frequency distribution for a data set.
Topic: Constructing Frequency Distributions: quantitative data

115. A data set has 100 observations. In the data, a quantitative variable's highest value is 117 and its lowest value is 47. What is the minimum class interval that you would recommend?
_____

The intermediate answer is 7 classes. The difference between the high and low is 70. So, the class interval is 10.

AACSB: Analytic Skills
Bloom's: Application
Difficulty: Hard
Learning Objective: 02-04 Create a frequency distribution for a data set.
Topic: Constructing Frequency Distributions: quantitative data

116. A data set has 200 observations. In the data, a quantitative variable's highest value is 1080 and its lowest value is 960. What is the minimum class interval that you would recommend? _____

The intermediate answer is 8 classes. The difference between the high and low is 120. So, the class interval is 15.

AACSB: Analytic Skills
Bloom's: Application
Difficulty: Hard
Learning Objective: 02-04 Create a frequency distribution for a data set.
Topic: Constructing Frequency Distributions: quantitative data

117. A data set has 200 observations. In the data, a qualitative variable's highest value is "extremely satisfied" and its lowest value is "extremely dissatisfied". What is the minimum class interval that you would recommend? _____

There is no class interval because the variable is qualitative, not quantitative.

AACSB: Reflective Thinking Skills
Bloom's: Analysis
Difficulty: Hard
Learning Objective: 02-01 Make a frequency table for a set of data.
Topic: Constructing Frequency Distributions: qualitative data

118. The following frequency distribution shows the distribution of delivery times (in days) for swimstuff.com customer orders during the last month.

Delivery times in days	Frequency
0 - 1	150
1 – 2	60
2 – 3	45
3 – 4	30
4 - 5	10
5 – 6	5

How many orders were delivered in less than one day or 24 hours?

150

AACSB: Analytic Skills
Bloom's: Application
Difficulty: Easy
Learning Objective: 02-06 Present data from a frequency distribution in a histogram or frequency polygon.
Topic: Constructing Frequency Distributions: quantitative data

119. The following frequency distribution shows the distribution of delivery times (in days) for swimstuff.com customer orders during the last month.

Delivery times in days	Frequency
0 - 1	150
1 – 2	60
2 – 3	45
3 – 4	30
4 - 5	10
5 – 6	5

What is the relative frequency for orders delivered in less than one day or 24 hours?

0.50

AACSB: Analytic Skills
Bloom's: Application
Difficulty: Easy
Learning Objective: 02-05 Understand a relative frequency distribution.
Topic: Relative Frequency Distributions

120. The following frequency distribution shows the distribution of delivery times (in days) for swimstuff.com customer orders during the last month.

Delivery times in days	Frequency
0 - 1	150
1 – 2	60
2 – 3	45
3 – 4	30
4 - 5	10
5 – 6	5

How many orders were delivered in less than three days?

255

AACSB: Analytic Skills
Bloom's: Application
Difficulty: Easy
Learning Objective: 02-06 Present data from a frequency distribution in a histogram or frequency polygon.
Topic: Constructing Frequency Distributions: quantitative data

121. The following frequency distribution shows the distribution of delivery times (in days) for swimstuff.com customer orders during the last month.

Delivery times in days	Frequency
0 - 1	150
1 – 2	60
2 – 3	45
3 – 4	30
4 - 5	10
5 – 6	5

What is the relative frequency for orders delivered in less than three days?

0.85

AACSB: Analytic Skills
Bloom's: Application
Difficulty: Easy
Learning Objective: 02-05 Understand a relative frequency distribution.
Topic: Relative Frequency Distributions

122. The following frequency distribution shows the distribution of delivery times (in days) for swimstuff.com customer orders during the last month.

Delivery times in days	Frequency
0 - 1	150
1 – 2	60
2 – 3	45
3 – 4	30
4 - 5	10
5 – 6	5

How many orders were delivered in three days or more?

45

AACSB: Analytic Skills
Bloom's: Application
Difficulty: Easy
Learning Objective: 02-06 Present data from a frequency distribution in a histogram or frequency polygon.
Topic: Constructing Frequency Distributions: quantitative data

123. The following frequency distribution shows the distribution of delivery times (in days) for swimstuff.com customer orders during the last month.

Delivery times in days	Frequency
0 - 1	150
1 – 2	60
2 – 3	45
3 – 4	30
4 - 5	10
5 – 6	5

What is the relative frequency for orders delivered in three days or more?

0.15

AACSB: Analytic Skills
Bloom's: Application
Difficulty: Easy
Learning Objective: 02-05 Understand a relative frequency distribution.
Topic: Relative Frequency Distributions

124. The following frequency distribution shows the distribution of delivery times (in days) for swimstuff.com customer orders during the last month.

Delivery times in days	Frequency
0 - 1	150
1 – 2	60
2 – 3	45
3 – 4	30
4 - 5	10
5 – 6	5

How many orders were delivered from 1 day up to 3 days?

105

AACSB: Analytic Skills
Bloom's: Application
Difficulty: Medium
Learning Objective: 02-04 Create a frequency distribution for a data set.
Topic: Constructing Frequency Distributions: quantitative data

125. The following frequency distribution shows the distribution of delivery times (in days) for swimstuff.com customer orders during the last month.

Delivery times in days	Frequency
0 - 1	150
1 – 2	60
2 – 3	45
3 – 4	30
4 - 5	10
5 – 6	5

What is the relative frequency of the orders delivered from 1 day up to 3 days?

0.35

AACSB: Analytic Skills
Bloom's: Application
Difficulty: Medium
Learning Objective: 02-05 Understand a relative frequency distribution.
Topic: Relative Frequency Distributions

Essay Questions

126. The following frequency distribution shows the distribution of delivery times (in days) for swimstuff.com customer orders during the last month.

Delivery times in days	Frequency
0 - 1	150
1 – 2	60
2 – 3	45
3 – 4	30
4 - 5	10
5 – 6	5

For 300 observations, our rule-of-thumb for number of classes would indicate 9 classes. In this case what is the class interval and why would it be reasonable to use that class interval and only 6 classes?

The class interval is 1 day. The class interval would be reasonable because that is the level of detail that the company uses to measure delivery time. The number of classes would be limited to 6 because there are no deliveries that take six days or more.

AACSB: Reflective Thinking Skills
Bloom's: Analysis
Difficulty: Hard
Learning Objective: 02-04 Create a frequency distribution for a data set.
Topic: Constructing Frequency Distributions: quantitative data

127. What is the difference in application between a bar chart and a pie chart?

A bar chart shows the frequency for the distribution of a qualitative variable. A pie chart shows the relative frequency for the distribution of a qualitative variable. The pie chart is also a great way to make a visual message of the proportions that each variable contributes to the total observations.

AACSB: Reflective Thinking Skills
Bloom's: Analysis
Difficulty: Hard
Learning Objective: 02-01 Make a frequency table for a set of data.
Topic: Constructing Frequency Distributions: qualitative data

128. What is the difference between a frequency distribution and a cumulative frequency distribution?

A frequency distribution shows the number of observations in each class. A cumulative frequency distribution shows the sum of number of observations in a class plus all lower ranked or valued classes.

AACSB: Reflective Thinking Skills
Bloom's: Analysis
Difficulty: Hard
Learning Objective: 02-07 Construct and interpret a cumulative frequency distribution.
Topic: Cumulative Frequency Distribution

129. In a bar chart, why are there spaces between the bars on the horizontal axis?

A bar chart shows the frequency distribution of a qualitative variable. A qualitative variable is discrete and not continuous. Therefore, placing a space between each bar reflects the fact that a qualitative variable is not continuous.

AACSB: Reflective Thinking Skills
Bloom's: Analysis
Difficulty: Hard
Learning Objective: 02-01 Make a frequency table for a set of data.
Topic: Constructing Frequency Distributions: qualitative data