***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.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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.

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

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.

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.

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.

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.

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

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

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) 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.

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.

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

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.

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

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 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.

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.

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" |
| 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

35) In a frequency distribution, the number of observations in a class is called the 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 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.

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

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.

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

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.

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%

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.

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

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

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

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

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

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

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

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** | **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

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

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

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

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

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

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

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

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

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%

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

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

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

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

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%

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

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

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

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 percentage 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) A pie chart

B) A bar chart

C) A histogram

D) A 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) A pie chart

B) A bar chart

C) A histogram

D) A 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.

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.

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.

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).