Test Bank for Business Statistics Communicating with Numbers 3rd Edition by Jaggia

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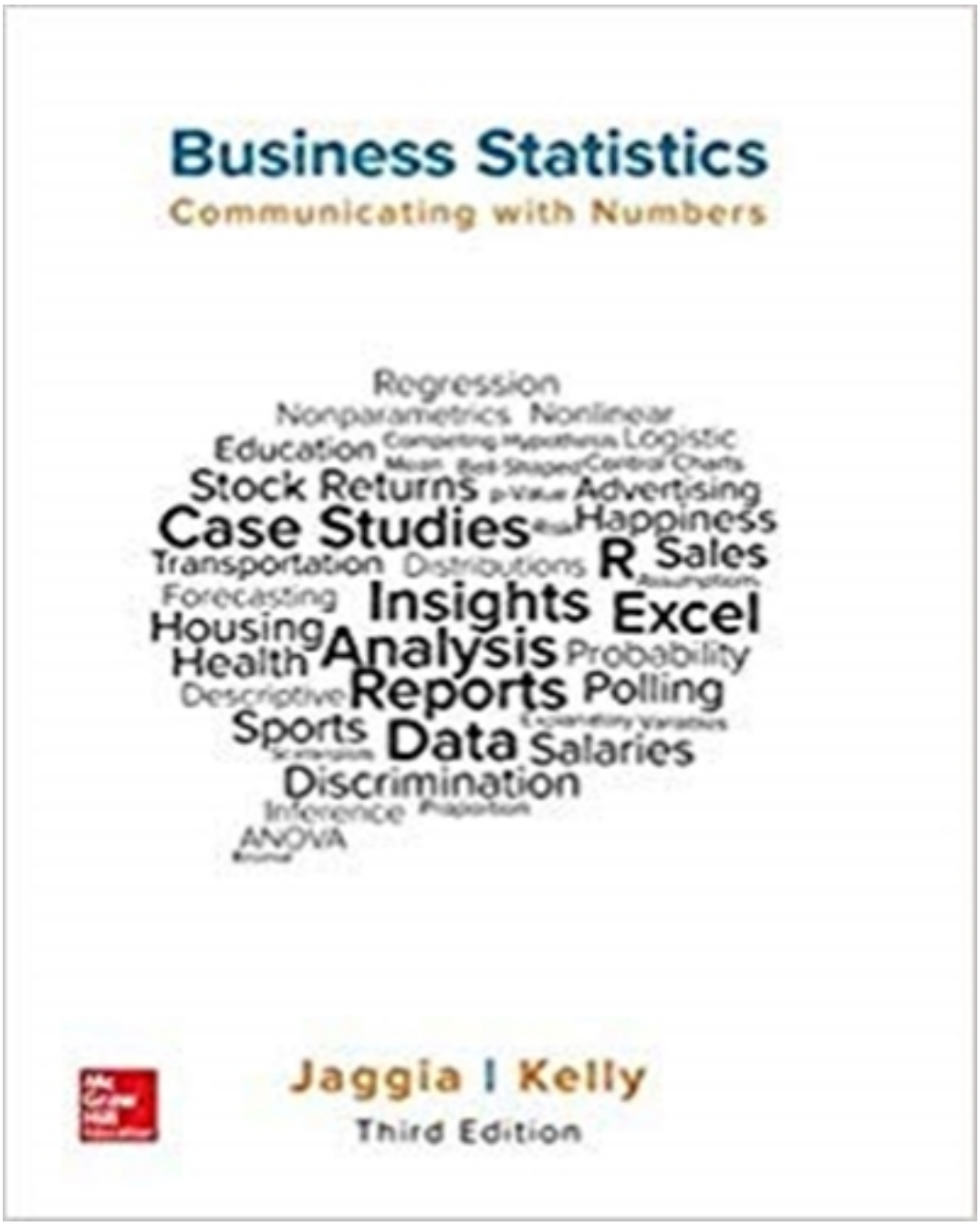

Test Bank

Business Statistics: Communicating with Numbers, 3e **(Jaggia)**
Chapter 2 Tabular and Graphical Methods

1) A frequency distribution for qualitative data groups these data into classes called intervals and records the total number of observations in each class.

2) The relative frequency of a category is calculated by dividing the category's frequency by the total number of observations.

3) The percent frequency of a category equals the frequency of the category multiplied by 100%.

4) A pie chart is a segmented circle that portrays the categories and relative sizes of some quantitative variable.

5) A bar chart depicts the frequency or relative frequency of each category of qualitative data as a bar rising vertically from the horizontal axis. It is also acceptable for the bar to extend horizontally from the vertical axis.

6) A bar chart may be displayed horizontally.

7) To approximate the width of a class in the creation of a bar chart, we may use this formula:

$$\frac{\text{Maximum value} - \text{Minimum value}}{\text{Number of classes}}$$

8) For quantitative data, a relative frequency distribution identifies the proportion of observations that fall into each class.

9) For quantitative data, a cumulative relative frequency distribution records the proportion (fraction) of values that fall below the upper limit of each class.

10) A histogram is a series of rectangles where the width and height of each rectangle represent the frequency (or relative frequency) and the width of the respective class.

11) A polygon connects a series of neighboring points where each point represents the midpoint of a particular class and its associated frequency or relative frequency.

12) An ogive is a graph that plots the cumulative frequency (or the cumulative relative frequency) of each class above the lower limit of the corresponding class.

13) A stem-and-leaf diagram is useful in that it gives an overall picture of where quantitative data are centered and how the data are dispersed from the center.

14) A scatterplot is a graphical tool that helps determine whether or not two quantitative variables are related.

15) When constructing a scatterplot for two quantitative variables, we usually refer to one variable as *x* and another one as *y*. Typically, we graph *x* on the vertical axis and *y* on the horizontal axis.

16) When constructing a pie chart, only a few, the most frequent, categories must be included in the pie.

17) When summarizing quantitative data it is always better to have up to 30 classes in a frequency distribution.

18) Scatterplot is a graphical tool that is focused on describing one variable.

19) Frequency distributions may be used to describe which of the following types of data?
A) Nominal and ordinal data only
B) Nominal and interval data only
C) Nominal, ordinal, and interval data only
D) Nominal, ordinal, interval, and ratio data

20) In order to summarize qualitative data, a useful tool is a _____.
A) histogram
B) frequency distribution
C) stem-and-leaf diagram
D) All of the above

21) For both qualitative and quantitative data, what is the difference between the relative frequency and the percent frequency?
A) The relative frequency equals the percent frequency multiplied by 100.
B) The percent frequency equals the relative frequency multiplied by 100.
C) As opposed to the relative frequency, the percent frequency is divided by the number of observations in the data set.
D) As opposed to the percent frequency, the relative frequency is divided by the number of observations in the data set.

22) For which of the following data sets will a pie chart be *most* useful?
A) Heights of high school freshmen
B) Ambient temperatures in the U.S. Capitol Building
C) Percentage of net sales by product for Lenovo in Year 1
D) Growth rates of firms in a particular industry

23) An auto parts chain asked customers to complete a survey rating the chain's customer service as average, above average, or below average. The following shows the results from the survey:

Average	Below Average	Average
Above Average	Above Average	Above Average
Below Average	Average	Average
Below Average	Average	Below Average
Below Average	Below Average	Below Average

(See the Excel Data File.)

The proportion of customers who felt the customer service was Average is the closest to _____.
A) 0.20
B) 0.33
C) 0.46
D) 0.53

24) An auto parts chain asked customers to complete a survey rating the chain's customer service as average, above average, or below average. The following table shows the results from the survey.

Average	Below Average	Average
Above Average	Above Average	Above Average
Below Average	Average	Average
Below Average	Average	Below Average
Below Average	Below Average	Below Average

(See the Excel Data File.)

A rating of Average or Above Average accounted for what number of responses to the survey?
A) 3
B) 7
C) 8
D) 10

25) The following is a list of five of the world's busiest airports by passenger traffic for Year 1.

Name	Location	# of Passengers (in millions)
Hartsfield-Jackson	Atlanta, Georgia, United States	89
Capital International	Beijing, China	74
London Heathrow	London, United Kingdom	67
O'Hare	Chicago, Illinois, United States	66
Tokyo	Tokyo, Japan	64

The percentage of passenger traffic in the five busiest airports that occurred in Asia is the closest to _____.
A) 18%
B) 21%
C) 25%
D) 38%

26) The following is a list of five of the world's busiest airports by passenger traffic for Year 1.

Name	Location	# of Passengers (in millions)
Hartsfield-Jackson	Atlanta, Georgia, United States	89
Capital International	Beijing, China	74
London Heathrow	London, United Kingdom	67
O'Hare	Chicago, Illinois, United States	66
Tokyo	Tokyo, Japan	64

How many more millions of passengers flew out of Atlanta than flew out of Chicago?
A) 13
B) 21
C) 23
D) 25

27) A city in California spent $6 million repairing damage to its public buildings in Year 1. The following table shows the categories where the money was directed.

Cause	Percent
Termites	22%
Water Damage	6%
Mold	12%
Earthquake	27%
Other	33%

How much did the city spend to fix damage caused by mold?
A) $360,000
B) $720,000
C) $1,440,000
D) $1,800,000

28) A city in California spent $6 million repairing damage to its public buildings in Year 1. The following table shows the categories where the money was directed.

Cause	Percent
Termites	22%
Water Damage	6%
Mold	12%
Earthquake	27%
Other	33%

How much more did the city spend to fix damage caused by termites compared to the damage caused by water?
A) $360,000
B) $720,000
C) $960,000
D) $1,320,000

29) Students in Professor Smith's business statistics course have evaluated the overall effectiveness of the professor's instruction on a five-point scale, where a score of 1 indicates very poor performance and a score of 5 indicates outstanding performance. The raw scores are displayed in the accompanying table:

1	4	4	5	5	3	4	3	4	1
5	5	4	4	2	3	3	2	3	3
4	5	5	5	5	3	2	3	3	2

(See the Excel Data File.)

What is the most common score given in the evaluations?
A) 2
B) 3
C) 4
D) 5

30) Students in Professor Smith's business statistics course have evaluated the overall effectiveness of the professor's instruction on a five-point scale, where a score of 1 indicates very poor performance and a score of 5 indicates outstanding performance. The raw scores are displayed in the accompanying table.

1	4	4	5	5	3	4	3	4	1
5	5	4	4	2	3	3	2	3	3
4	5	5	5	5	3	2	3	3	2

(See the Excel Data File.)

What percentage of students gave professor Smith an evaluation higher than 3?
A) 20%
B) 30%
C) 50%
D) 80%

31) Students in Professor Smith's business statistics course have evaluated the overall effectiveness of the professor's instruction on a five-point scale, where a score of 1 indicates very poor performance and a score of 5 indicates outstanding performance. The raw scores are displayed in the accompanying table.

1	4	4	5	5	3	4	3	4	1
5	5	4	4	2	3	3	2	3	3
4	5	5	5	5	3	2	3	3	2

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What percentage of students gave Professor Smith an evaluation of 2 or less?
A) 6.7%
B) 13.3%
C) 20%
D) 80%

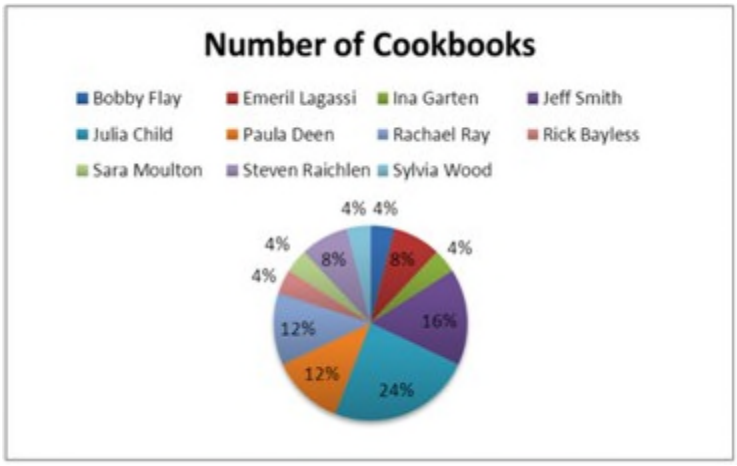
32) Students in Professor Smith's business statistics course have evaluated the overall effectiveness of the professor's instruction on a five-point scale, where a score of 1 indicates very poor performance and a score of 5 indicates outstanding performance. The raw scores are displayed in the accompanying table:

1	4	4	5	5	3	4	3	4	1
5	5	4	4	2	3	3	2	3	3
4	5	5	5	5	3	2	3	3	2

(See the Excel Data File.)

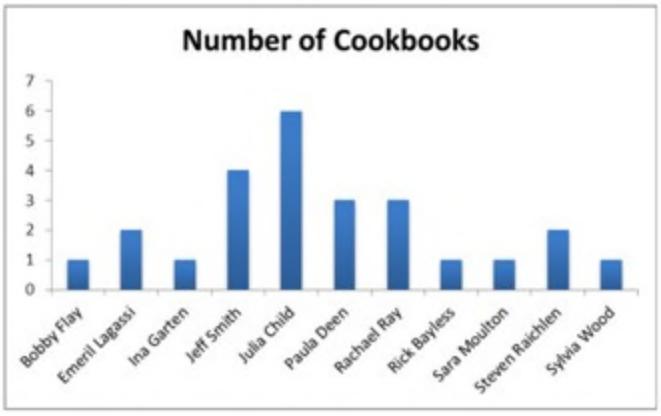
What is the relative frequency of the students who gave Professor Smith an evaluation of 3?
A) 0.3
B) 0.5
C) 9
D) 15

33) In the following pie chart representing a collection of cookbooks, which author has more titles?



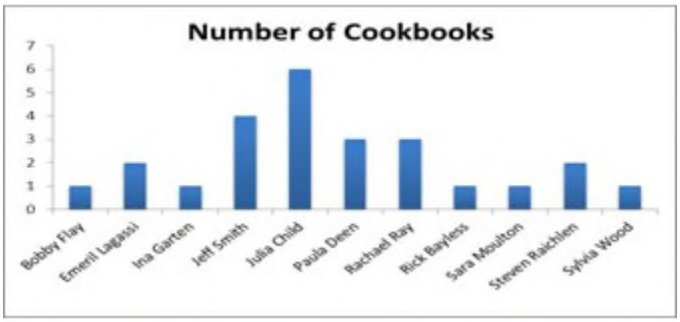
A) Jeff Smith
B) Julia Child
C) Rachael Ray
D) Paula Deen

34) The accompanying chart shows the numbers of books written by each author in a collection of cookbooks. What type of chart is this?



A) Bar chart for qualitative data
B) Bar chart for quantitative data
C) Frequency histogram for qualitative data
D) Frequency histogram for quantitative data

35) The accompanying chart shows the number of books written by each author in a collection of cookbooks. What type of data is being represented?



A) Quantitative, ordinal
B) Quantitative, ratio
C) Qualitative, nominal
D) Qualitative, ordinal

36) Horizontal bar charts are constructed by placing _____.
A) each category on the vertical axis and the appropriate range of values on the horizontal axis
B) each category on the horizontal axis and the appropriate range of values on the vertical axis
C) each interval of values on the vertical axis and the appropriate range of values on the horizontal axis
D) None of the above

37) When constructing a frequency distribution for quantitative data, it is important to remember that _____.
A) classes are mutually exclusive
B) classes are collectively exhaustive
C) the total number of classes usually ranges from 5 to 20
D) All of the above

38) Which of the following best describes a frequency distribution for qualitative data?
A) It groups data into histograms and records the proportion (fraction) of observations in each histogram.
B) It groups data into categories and records the number of observations in each category.
C) It groups data into intervals called classes and records the proportion (fraction) of observations in each class.
D) It groups data into intervals called classes and records the number of observations in each class.

39) What graphical tool is *best* used to display the relative frequency of grouped quantitative data?
A) Ogive
B) Pie chart
C) Bar chart
D) Histogram

40) The following data represent scores on a pop quiz in a statistics section.

45	66	74	72	62	44	55	70	33	82
56	56	84	16	16	47	32	32	17	37

(See the Excel Data File.)

Suppose the data on quiz scores will be grouped into five classes. The width of the classes for a frequency distribution or histogram is the closest to _____.
A) 10
B) 12
C) 14
D) 16

41) The following data represent scores on a pop quiz in a statistics section:

45	66	74	72	62	44	55	70	33	82
56	56	84	16	16	47	32	32	17	37

(See the Excel Data File.)e

Suppose the data are grouped into five classes, and one of them will be "30 up to 44"—that is, $\{x; 30 \leq x < 44\}$. The frequency of this class is _____.
A) 0.20
B) 0.25
C) 4
D) 5

42) The following data represent scores on a pop quiz in a statistics section.

45	66	74	72	62	44	55	70	33	82
56	56	84	16	16	47	32	32	17	37

(See the Excel Data File.)

Suppose the data are grouped into five classes, and one of them will be "30 up to 44"—that is, $\{x; 30 \leq x < 44\}$. The relative frequency of this class is _____.
A) 0.20
B) 0.25
C) 4
D) 5

43) The following data represent the recent sales price (in $1,000s) of 24 homes in a Midwestern city.

187	125	165	170	230	139	195	229
239	135	188	210	228	172	127	139
122	181	196	237	115	199	170	239

(See the Excel Data File.)

Suppose the data on house prices will be grouped into five classes. The width of the classes for a frequency distribution or histogram is the closest to _____.
A) 15
B) 20
C) 25
D) 30

44) The following data represent the recent sales price (in $1,000s) of 24 homes in a Midwestern city

187	125	165	170	230	139	195	229
239	135	188	210	228	172	127	139
122	181	196	237	115	199	170	23

(See the Excel Data File.)

Suppose the data are grouped into five classes, and one of them will be "115 up to 140"—that is, $\{x; 115 \leq x < 140\}$. The relative frequency of this class is _____.
A) 6/24
B) 7/24
C) 6
D) 7

45) The following data represent the recent sales price (in $1,000s) of 24 homes in a Midwestern city.

187	125	165	170	230	139	195	229
239	135	188	210	228	172	127	139
122	181	196	237	115	199	170	239

(See the Excel Data File.)

Suppose the data are grouped into five classes, and one of them will be "165 up to 190"—that is, $\{x; 165 \leq x < 190\}$. The frequency of this class is _____.
A) 6/24
B) 7/24
C) 6
D) 7

46) Thirty students at Eastside High School took the SAT on the same Saturday. Their raw scores are given next.

1,450	1,620	1,800	1,740	1,650	1,710	1,900	1,910	1,950	1,820
1,800	2,010	1,780	1,840	1,490	1,590	2,350	2,260	1,870	1,530
1,620	1,480	2,390	1,640	1,830	1,950	2,000	1,830	1,980	2,100

(See the Excel Data File.)

Consider a frequency distribution of the data that groups the data in classes of 1400 up to 1600, 1600 up to 1800, 1800 up to 2000, and so on. How many students scored at least 1800 but less than 2000?
A) 3
B) 7
C) 12
D) 18

47) Thirty students at Eastside High School took the SAT on the same Saturday. Their raw scores are given next.

1,450	1,620	1,800	1,740	1,650	1,710	1,900	1,910	1,950	1,820
1,800	2,010	1,780	1,840	1,490	1,590	2,350	2,260	1,870	1,530
1,620	1,480	2,390	1,640	1,830	1,950	2,000	1,830	1,980	2,100

(See the Excel Data File.)

Consider a frequency distribution of the data that groups the data in classes of 1400 up to 1600, 1600 up to 1800, 1800 up to 2000, and so on. What percent of students scored less than 2200?
A) 10%
B) 20%
C) 80%
D) 90%

48) Thirty students at Eastside High School took the SAT on the same Saturday. Their raw scores are given next.

1,450	1,620	1,800	1,740	1,650	1,710	1,900	1,910	1,950	1,820
1,800	2,010	1,780	1,840	1,490	1,590	2,350	2,260	1,870	1,530
1,620	1,480	2,390	1,640	1,830	1,950	2,000	1,830	1,980	2,100

(See the Excel Data File.)

Consider a frequency distribution of the data that groups the data in classes of 1400 up to 1600, 1600 up to 1800, 1800 up to 2000, and so on. What is the approximate relative frequency of students who scored more than 1600 but less than 1800?
A) 0.17
B) 0.23
C) 0.40
D) 0.77

49) Thirty students at Eastside High School took the SAT on the same Saturday. Their raw scores are given next.

1,450	1,620	1,800	1,740	1,650	1,710	1,900	1,910	1,950	1,820
1,800	2,010	1,780	1,840	1,490	1,590	2,350	2,260	1,870	1,530
1,620	1,480	2,390	1,640	1,830	1,950	2,000	1,830	1,980	2,100

(See the Excel Data File.)

Consider a frequency distribution of the data that groups the data in classes of 1400 up to 1600, 1600 up to 1800, 1800 up to 2000, and so on. What graphical tool would you use to display the cumulative relative frequency of the grouped data?
A) Ogive
B) Polygon
C) Pie chart
D) Bar chart

50) Consider the following frequency distribution.

Class	Frequency
12 up to 15	3
15 up to 18	6
18 up to 21	3
21 up to 24	4
24 up to 27	4

The total number of observations in the frequency distribution is _____.
A) 5
B) 6
C) 20
D) 24

51) Consider the following frequency distribution.

Class	Frequency
12 up to 15	3
15 up to 18	6
18 up to 21	3
21 up to 24	4
24 up to 27	4

How many observations are at least 15 but less than 18?
A) 3
B) 4
C) 5
D) 6

52) Consider the following frequency distribution.

Class	Frequency
12 up to 15	3
15 up to 18	6
18 up to 21	3
21 up to 24	4
24 up to 27	4

How many observations are less than 21?
A) 6
B) 12
C) 18
D) 24

53) Consider the following frequency distribution.

Class	Frequency
12 up to 15	3
15 up to 18	6
18 up to 21	3
21 up to 24	4
24 up to 27	4

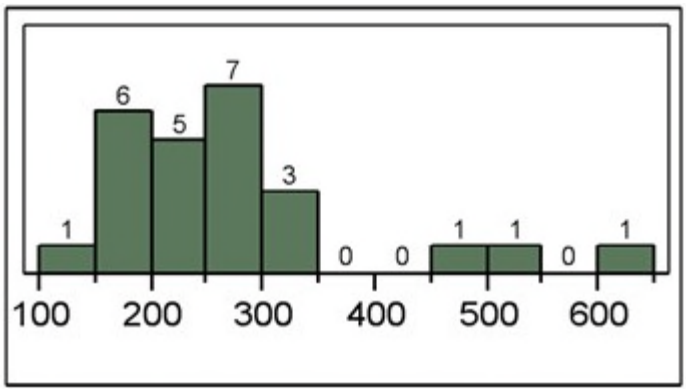
What proportion of the observations are at least 15 but less than 18?
A) 0.20
B) 0.25
C) 0.30
D) 0.35

54) Consider the following frequency distribution.

Class	Frequency
12 up to 15	3
15 up to 18	6
18 up to 21	3
21 up to 24	4
24 up to 27	4

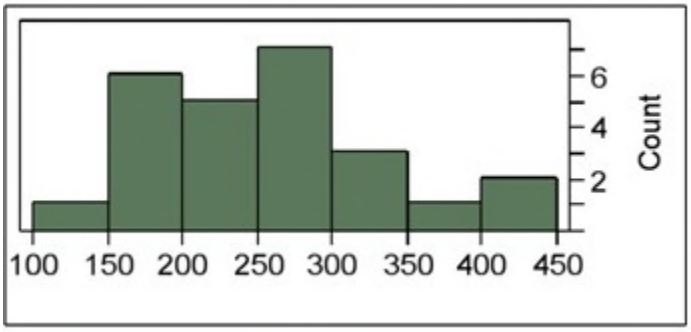
What proportion of the observations are less than 21?
A) 0.30
B) 0.60
C) 0.90
D) 1.00

55) The following histogram represents the number of pages in each book within a collection. What is the frequency of books containing at least 250 but fewer than 300 pages?



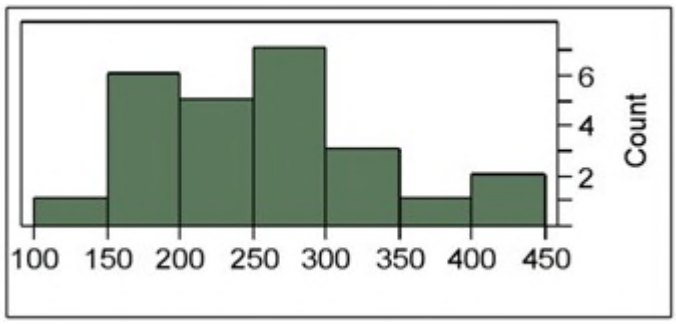
A) 5
B) 6
C) 7
D) 12

56) The following histogram represents the number of pages in each book within a collection. What is the frequency of books containing at least 200 but fewer than 250 pages?



A) 4
B) 5
C) 6
D) 7

57) The following histogram represents the number of pages in each book within a collection. What is the frequency of books containing at least 250 but fewer than 400 pages?



A) 7
B) 10
C) 11
D) 12

58) An analyst constructed the following frequency distribution on the monthly returns for 50 selected stocks.

Class (in percent)	Frequency
–10 up to 0	8
0 up to 10	25
10 up to 20	15
20 up to 30	2

The number of stocks with returns of 0% up to 10% is _____.
A) 2
B) 8
C) 15
D) 25

59) An analyst constructed the following frequency distribution on the monthly returns for 50 selected stocks.

Class (in percent)	Frequency
–10 up to 0	8
0 up to 10	25
10 up to 20	15
20 up to 30	2

The number of stocks with returns of less than 10% is _____.
A) 8
B) 25
C) 33
D) 48

60) An analyst constructed the following frequency distribution on the monthly returns for 50 selected stocks:

Class (in percent)	Frequency
–10 up to 0	8
0 up to 10	25
10 up to 20	15
20 up to 30	2

The proportion of stocks with returns of 0% up to 10% is _____.
A) 0.30
B) 0.50
C) 0.66
D) 0.80

61) An analyst constructed the following frequency distribution on the monthly returns for 50 selected stocks.

Class (in percent)	Frequency
–10 up to 0	8
0 up to 10	25
10 up to 20	15
20 up to 30	2

The proportion of stocks with returns of less than 10% is _____.
A) 0.30
B) 0.50
C) 0.66
D) 0.80

62) Automobiles traveling on a road with a posted speed limit of 65 miles per hour are checked for speed by a state police radar system. The following table is a frequency distribution of speeds.

Speed (miles per hour)	Frequency
45 up to 55	50
55 up to 65	325
65 up to 75	275
75 up to 85	25

How many of the cars traveled less than 75 miles per hour?
A) 275
B) 325
C) 650
D) 675

63) Automobiles traveling on a road with a posted speed limit of 65 miles per hour are checked for speed by a state police radar system. The following table is a frequency distribution of speeds.

Speed (miles per hour)	Frequency
45 up to 55	50
55 up to 65	325
65 up to 75	275
75 up to 85	25

What proportion of the cars traveled at least 55 but less than 65 miles per hour?
A) 0.33
B) 0.48
C) 0.56
D) 0.80

64) When using a polygon to graph quantitative data, what does each point represent?
A) The lower limit of a particular class and its width
B) The midpoint of a particular class and its associated frequency or relative frequency
C) The midpoint of a particular class and its associated cumulative frequency or cumulative relative frequency
D) The upper limit of a particular class and its associated cumulative frequency or cumulative relative frequency

65) The accompanying table shows students' scores from the final exam in a history course.

Scores	Cumulative Frequency
50 up to 60	12
60 up to 70	33
70 up to 80	64
80 up to 90	88
90 up to 100	100

How many of the students scored at least 70 but less than 90?
A) 24
B) 31
C) 55
D) 88

66) The following table shows the number of payroll jobs the government added during the years it added jobs (since 1973). The jobs are in thousands.

Jobs Added	Frequency
100 up to 200	5
200 up to 300	8
300 up to 400	7
400 up to 500	5
500 up to 600	1

Approximately what percent of the time did the government add 200,000 or more jobs?
A) 19%
B) 50%
C) 77%
D) 81%

67) The accompanying relative frequency distribution represents the last year car sales for the sales force at Kelly's Mega Used Car Center.

Car Sales	Relative Frequency
35 up to 45	0.07
45 up to 55	0.15
55 up to 65	0.31
65 up to 75	0.22
75 up to 85	0.25

If Kelly's employs 100 salespeople, how many of these salespeople have sold at least 35 but fewer than 45 cars in the last year?
A) 5
B) 7
C) 10
D) 15

68) The accompanying relative frequency distribution represents the last year car sales for the sales force at Kelly's Mega Used Car Center.

Car Sales	Relative Frequency
35 up to 45	0.07
45 up to 55	0.15
55 up to 65	0.31
65 up to 75	0.22
75 up to 85	0.25

If Kelly's employs 100 salespeople, how many of these salespeople have sold at least 45 but fewer than 65 cars in the last year?
A) 15
B) 31
C) 40
D) 46

69) The accompanying relative frequency distribution represents the last year car sales for the sales force at Kelly's Mega Used Car Center.

Car Sales	Relative Frequency
35 up to 45	0.07
45 up to 55	0.15
55 up to 65	0.31
65 up to 75	0.22
75 up to 85	0.25

If Kelly's employs 100 salespeople, how many of these salespeople have sold at least 65 cars in the last year?
A) 22
B) 25
C) 31
D) 47

70) When displaying quantitative data, what is an ogive used to plot?
A) Frequency or relative frequency of each class against the midpoint of the corresponding class
B) Cumulative frequency or cumulative relative frequency of each class against the upper limit of the corresponding class
C) Frequency or relative frequency of each class against the midpoint of the corresponding class and cumulative frequency or cumulative relative frequency of each class against the upper limit of the corresponding class
D) None of the above

71) How does an ogive differ from a polygon?
A) An ogive is used for qualitative data, while a polygon is used for quantitative data.
B) An ogive is used for quantitative data, while a polygon is used for qualitative data.
C) An ogive is a graphical depiction of a frequency or relative distribution, while a polygon is a graphical depiction of a cumulative frequency or cumulative relative frequency distribution.
D) An ogive is a graphical depiction of a cumulative frequency or cumulative relative frequency distribution, while a polygon is a graphical depiction of a frequency or relative frequency distribution.

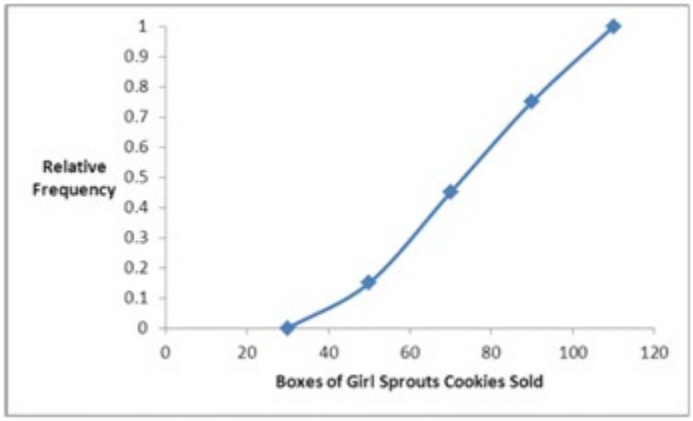
72) Recent home sales in a suburb of Washington, D.C., are shown in the accompanying ogive.

Approximate the percentage of houses that sold for less than $600,000.
A) 60%
B) 70%
C) 80%
D) 90%

73) Recent home sales in a suburb of Washington, D.C., are shown in the accompanying ogive.

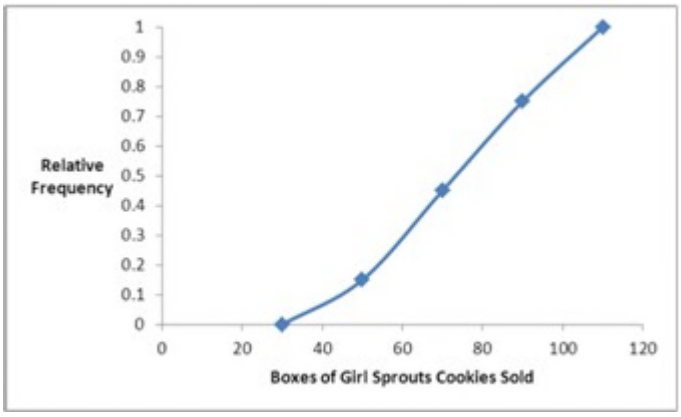
Approximate the percentage of houses that sold for more than $500,000.
A) 40%
B) 50%
C) 60%
D) 70%

74) The organization of the Girl Sprouts has completed its annual cookie drive. The sales are reported in the accompanying ogive.



Approximate the percentage of girls who sold less than 90 boxes of cookies.
A) 45%
B) 55%
C) 65%
D) 75%

75) The organization of the Girl Sprouts has completed its annual cookie drive. The sales are reported in the accompanying ogive.



Approximate the percentage of girls who sold more than 70 boxes of cookies.
A) 45%
B) 55%
C) 65%
D) 75%

76) A stem-and-leaf diagram is constructed by separating each value of a data set into two parts. What are these parts?
A) Stem consisting of the last digit and leaf consisting of the leftmost digits
B) Stem consisting of the leftmost digits and leaf consisting of the second digit
C) Stem consisting of the second digit and leaf consisting of the last digit
D) Stem consisting of the leftmost digits and the leaf consists of the remaining digits.

77) In the accompanying stem-and-leaf diagram, the values in the stem and leaf portions represent 10s and 1s digits, respectively.

Stem	Leaf
1	3 5 6 8 8 9
2	0 1 2 2 3 5 6 6 8 8 8 9
3	0 1 2 2 8
4	2 2

Which of the following numbers appears in the stem-and-leaf diagram?
A) 3800
B) 380
C) 38
D) 3.8

78) In the accompanying stem-and-leaf diagram, the values in the stem-and-leaf portions represent 10s and 1s digits, respectively.

Stem	Leaf
1	3 5 6 8 8 9
2	0 1 2 2 3 5 6 6 8 8 8 9
3	0 1 2 2 8
4	2 2

What would be the frequency of the class 35 up to 45, that is $\{x; 35 \leq x < 45\}$?
A) 0
B) 1
C) 2
D) 3

79) In the accompanying stem-and-leaf diagram, the values in the stem-and-leaf portions represent 10s and 1s digits, respectively.

Stem	Leaf
1	3 5 6 8 8 9
2	0 1 2 2 3 5 6 6 8 8 8 9
3	0 1 2 2 8
4	2 2

How many values are at least 25 but less than 35?
A) 10
B) 11
C) 12
D) 13

80) In the accompanying stem-and-leaf diagram, the values in the stem-and-leaf portions represent 10s and 1s digits, respectively.

Stem	Leaf
1	3 5 6 8 8 9
2	0 1 2 2 3 5 6 6 8 8 8 9
3	0 1 2 2 8
4	2 2

Find the frequency associated with data values that are more than 28.
A) 8
B) 9
C) 10
D) 11

81) In the accompanying stem-and-leaf diagram, the values in the stem-and-leaf portions represent 10s and 1s digits, respectively.

Stem	Leaf
1	3 5 6 8 8 9
2	0 1 2 2 3 5 6 6 8 8 8 9
3	0 1 2 2 8
4	2 2

The stem-and-leaf diagram shows that the distribution is _____.
A) symmetric
B) positively skewed
C) negatively skewed
D) None of the above

82) The following stem-and-leaf diagram shows the speeds in miles per hour (mph) of 14 cars approaching a toll booth on a bridge in Oakland, California.

Stem	Leaf
2	5 6 6 7 9
3	4 7 7 8 9
4	0 0 2 3

How many of the cars were traveling faster than 25 mph but slower than 40 mph?
A) 8
B) 9
C) 10
D) 12

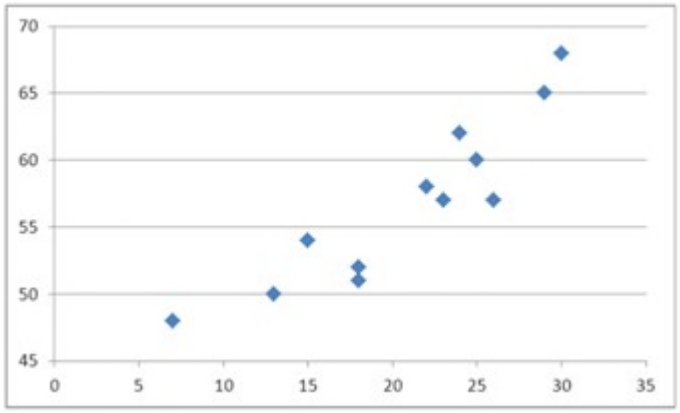
83) The following stem-and-leaf diagram shows the last 20 dividend payments (in cents) paid by Procter and Gamble.

Stem	Leaf
3	1 5 5 5 5
4	0 0 0 0 4 4 4 4 4 8 8 8
5	3 3 3

The most common dividend payment is _____.
A) 0.35
B) 0.40
C) 0.44
D) 0.48

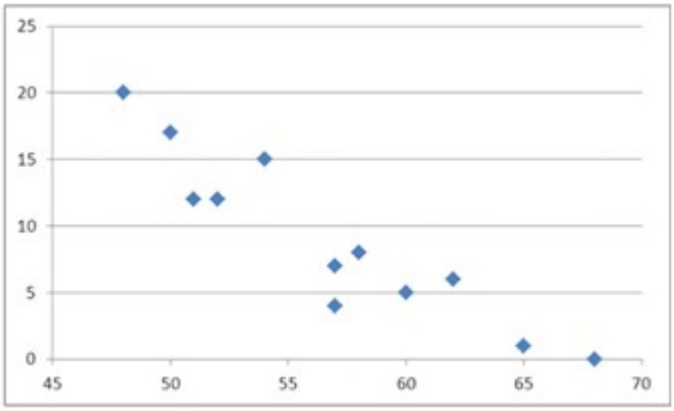
84) What may be revealed from a scatterplot?
A) No relationship between two variables
B) A linear relationship between two variables
C) A curvilinear relationship between two variables
D) All of the above

85) What type of relationship is indicated in the scatterplot?



A) No relationship
B) A negative linear relationship
C) A negative curvilinear relationship
D) A positive linear or curvilinear relationship

86) What type of relationship is indicated in the scatterplot?



A) No relationship
B) A negative linear relationship
C) A positive linear relationship
D) A positive curvilinear relationship

87) Use the following data to construct a scatterplot. What type of relationship is implied?

x	3	6	10	14	18	23
y	34	28	20	12	5	0

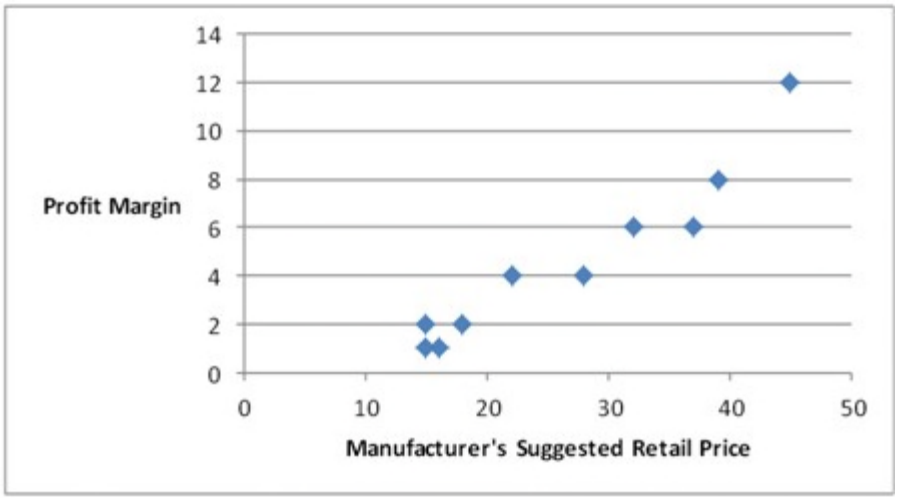
(See the Excel Data File.)
A) No relationship
B) A positive relationship
C) A negative relationship
D) There is not enough information to answer

88) Use the following data to construct a scatterplot. What type of relationship is implied?

x	1	5	9	14	18	23
y	2	4	15	12	15	20

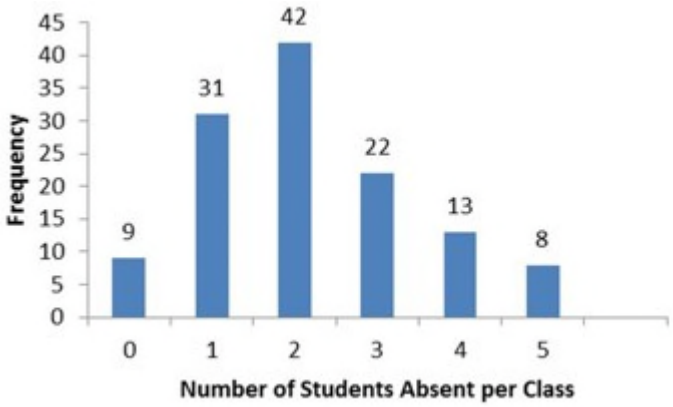
(See the Excel Data File.)
A) No relationship
B) A positive relationship
C) A negative relationship
D) Not enough information to answer

89) A car dealership created a scatterplot showing the manufacturer's retail price and profit margin for the cars they have on their lot.



As the manufacturer's suggested retail price increases, the profit margin tends to _____.
A) increase
B) decrease
C) stay the same
D) None of the above

90) The statistics professor has kept attendance records and recorded the number of absent students per class. The recorded data is displayed in the following bar chart with the frequency of each number of absent students shown above the bars.



How many statistics classes had three or more students absent?
A) 8
B) 13
C) 22
D) 43

91) The following table shows the percentage of e-mail that is sent each day of the business week according to an Intermedia survey.

Day	Percentage
Monday	15%
Tuesday	23%
Wednesday	22%
Thursday	21%
Friday	19%

Which of the following best displays this data?
A) Horizontal bar chart
B) Vertical bar chart
C) Pie chart
D) Histogram

92) The following frequency distribution displays the weekly sales of a certain brand of television at an electronics store.

Number Sold	Frequency
01-05	3
06-10	7
11-15	14
16-20	22
21-25	4

How many weeks of data are included in this frequency distribution?
A) 25
B) 50
C) 75
D) 100

93) The following frequency distribution shows the frequency of the asking price, in thousands of dollars, for current homes on the market in a particular city.

Asking Price	Frequency
$350 up to $400	12
$400 up to $450	9
$450 up to $500	17
$500 up to $550	11
$550 up to $600	6

What percentage of houses has an asking price between $350,000 and under $400,000?
A) 16.4%
B) 21.8%
C) 30.9%
D) 33.3%

94) The following frequency distribution shows the frequency of the asking price, in thousands of dollars, for current homes on the market in a particular city.

Asking Price	Frequency
$350 up to $400	12
$400 up to $450	9
$450 up to $500	17
$500 up to $550	11
$550 up to $600	6

What percentage of houses has an asking price under $550,000?
A) 50.5%
B) 69.1%
C) 89.1%
D) 95.0%

95) A survey conducted by CBS news asked 1,026 respondents: "What would you do with an unexpected tax refund?" The responses are summarized in the following table.

Category	Percentage
Pay off debts	47%
Put it in the bank	30%
Spend it	11%
I never get a refund	10%
Other	2%

How many people will either put it in the bank or spend it?
A) 421
B) 411
C) 113
D) 482

96) The manager at a water park constructed the following frequency distribution to summarize attendance in July and August.

Attendance	Frequency
1,000 up to 1,250	5
1,250 up to 1,500	6
1,500 up to 1,750	10
1,750 up to 2,000	20
2,000 up to 2,250	15
2,250 up to 2,500	4

What of the following is the most likely attendance range?
A) 2,000 up to 2,500
B) 1,000 up to 1,750
C) 1,250 up to 1,750

97) The Statistical Abstract of the United States provided the following frequency distribution of the number of people who live below the poverty level by region.

Region	Number of People (in 1000s)
Northeast	6,166
Midwest	7,237
South	15,501
West	8,372

What is the percentage of people who live below the poverty level in the West or Midwest?
A) 35.96%
B) 41.87%
C) 41.58%
D) 31.96%

98) Consider the following stem-and-leaf diagram.

Stem	Leaf
3	1 1 1 4 5
4	4 6 7
5	0 0 4 5 6 6 8 9
6	1 3 3 6

Which data value occurs most often?
A) 1
B) 56
C) 31
D) 63

99) Consider the following stem-and-leaf diagram.

Stem	Leaf
3	1 1 1 4 5
4	4 6 7
5	0 0 4 5 6 6 8 9
6	1 3 3 6

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

100) For qualitative data, a frequency distribution groups data into _____ and records the number of _____.

101) Graphically, we can show a(n) _____ _____ for qualitative data by constructing a pie chart or a bar chart.

102) When constructing a frequency distribution for quantitative data classes are mutually _____ and _____.

103) A _____ _____ is a table that shows the number of data observations that fall into specific interval.

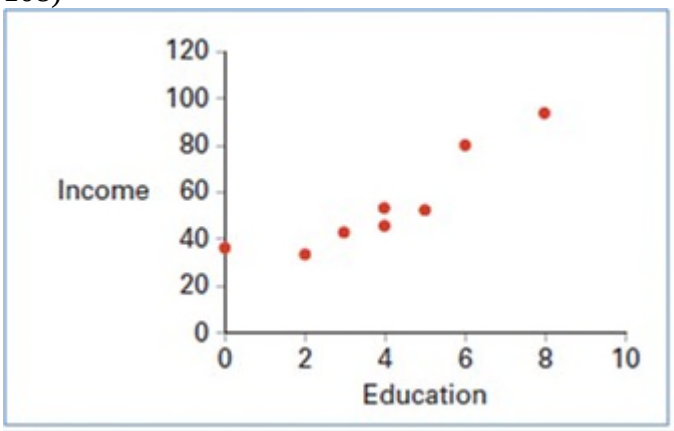
104) The shape of most data distributions can be categorized as either _____ or _____.

105) A stem-and-leaf diagram most resembles a(n) _____.

106) Which of the following is *not* a graphical technique to display quantitative data?
A) Stem-and-leaf
B) histogram
C) scatterplot
D) bar chart

107) A scatterplot depicts a positive _____ relationship, if as *x* increases, *y* tends to increase at an increasing rate.

108)



Using a scatterplot above we observe a _____ linear relationship between two variables: Education and Income.

109) A survey of 400 unemployed people was completed at a job fair. Each person was asked to categorize his or her job interests. The accompanying relative frequency distribution was constructed.

Field	Relative Frequency
Management	0.15
Business and financial operations	0.20
Computer and mathematical	0.10
Life, physical, and social science	0.30
Community and social service	0.25

a. Construct the corresponding frequency distribution. How many of these people designated that the computer and mathematical industry was their job interest?
b. Construct a pie chart.

110) A hair stylist records the hair color of her 25 most recent appointments, classifying the color as blonde, brown, black, or red. Her data set is displayed next.

Red	Blonde	Black	Red	Blonde
Blonde	Black	Blonde	Red	Blonde
Brown	Black	Red	Blonde	Brown
Brown	Red	Black	Black	Red
Brown	Black	Brown	Blonde	Blonde

(See the Excel Data File.)

a. Construct a frequency and relative frequency distribution of the hair color of the stylist's customers.
b. Construct a pie chart. Which hair color is the most common among the stylist's customers?
c. Create a bar chart to display the frequency distribution. How many customers had black hair?

111) The following table lists some of the busiest ports in the world based on the number of containers in Year 1.

Location of Port	Number of Containers (in millions)
Shanghai	29
Singapore	28
Hong Kong	24
Rotterdam	11
Los Angeles	7
New York	5

Construct a pie chart to summarize the data. Approximately what percent of the total number of containers go through Hong Kong?

112) Johnson and Johnson (JNJ) is a consumer staples company. Consumer staples are products people need and buy even during times of financial hardship. Do you think JNJ will have a volatile stock price? Does the accompanying graph accurately depict the volatility of JNJ stock? Explain.

113) Each month the Bureau of Labor Statistics reports the number of people (in thousands) employed in the United States by age. The accompanying frequency distribution shows the results for August.

Age	Frequency
16 to 19	4,794
20 to 24	13,273
25 to 34	30,789
35 to 44	30,021
45 to 54	32,798
55 and over	28,660

a. Construct a relative frequency distribution. What proportion of workers is between 20 and 24 years old?
b. Construct a cumulative relative frequency distribution. What proportion of workers is younger than 35 years old?
c. Construct a relative frequency histogram.

114) The following table displays the top 40 American League batting averages of the last season.

Player	Batting Average	Player	Batting Average
Miguel Cabrera	0.344	Yunel Escobar	0.290
Adrian Gonzalez	0.338	Vladimir Guerrero	0.290
Michael Young	0.338	Alberto Callaspo	0.288
Victor Martinez	0.33	Howard Kendrick	0.285
Jacoby Ellsbury	0.321	Jeff Francoeur	0.285
David Ortiz	0.309	Nick Markakis	0.284
Dustin Pedroia	0.307	Michael Cuddyer	0.284
Casey Kotchman	0.306	Adam Jones	0.280
Melky Cabrera	0.305	Elvis Andrus	0.279
Alex Gordon	0.303	Erick Aybar	0.279
Jose Bautista	0.302	Juan Pierre	0.279
Robinson Cano	0.302	Matt Joyce	0.277
Paul Konerko	0.300	Asdrubal Cabrera	0.273
Jhonny Peralta	0.299	Edwin Encarnacion	0.272
Josh Hamilton	0.298	Ichiro Suzuki	0.272
Derek Jeter	0.297	Peter Bourjos	0.271
Adrian Beltre	0.296	J.J. Hardy	0.269
Alex Avila	0.295	Alexei Ramirez	0.269
Eric Hosmer	0.293	Ben Zobrist	0.269
Billy Butler	0.291	Delmon Young	0.268

(See the Excel Data File.)

a. Construct frequency, relative frequency, and cumulative relative frequency distributions that group the data in classes of 0.265 up to 0.280, 0.280 up to 0.295, 0.295 up to 0.310, and so on.
b. How many of these players have a batting average above 0.340? What proportion of these players has a batting average of at least 0.280 but below 0.295? What percentage of these players has a batting average below 0.325?
c. Construct a relative frequency histogram. Is the distribution symmetric? If not, is it positively or negatively skewed?
d. Construct an ogive.
e. Using the ogive, approximately what proportion of the players in this group has a batting average above 0.290?

115) The following table shows analyst sentiment ratings for the 30 stocks listed in the Dow Jones Industrial Average.

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

(See the Excel Data File.)

a. Construct a frequency distribution, relative frequency distribution, cumulative frequency distribution and relative cumulative frequency distribution using classes of 2 up to 4, 4 up to 6, 6 up to 8, and 8 up to 10.
b. Construct a histogram that summarizes the data.
c. What percentage of the stocks in the Dow Jones Industrial Average received a sentiment rating less than 8?
d. What percentage of the stocks in the Dow Jones Industrial Average received a sentiment rating of 6 or more?

116) The accompanying cumulative relative frequency distribution shows a summary of the scores from an Algebra II exam at a local high school. Twenty students took the exam.

Class	Cumulative Relative Frequency
51 - 60	0.05
61 - 70	0.20
71 - 80	0.45
81 - 90	0.80
91 - 100	1.00

a. Construct the relative frequency distribution. What proportion of students scored between 81 and 90?
b. Construct the frequency distribution. How many students scored between 71 and 80?
c. Construct an ogive. What is the approximate percentage of students that scored less than 85?

117) The dividend yields of the stocks in an investor's portfolio are shown in the following cumulative relative frequency distribution.

Dividend Yields	Cumulative Relative Frequency
0% up to 2%	0.55
2% up to 4%	0.85
4% up to 6%	0.90
6% up to 8%	0.96
8% up to 10%	1.00

a. Construct an ogive.
b. Approximately what percent of the stocks had a dividend yield of 3% or larger?

118) Construct a stem-and-leaf diagram with the following data set.

3.2	1.3	2.1	2.4	4.3	3.1	3.2	1.1	1.4	2.5
2.4	2.9	3.8	1.7	2.3	1.2	3.2	1.4	1.5	2.6

(See the Excel Data File.)

Is the distribution symmetric?

Stem	Leaf
1	1 2 3 4 4 5 7
2	1 3 4 4 5 6 9
3	1 2 2 2 8
4	3

119) Construct a stem-and-leaf diagram for the following data set.

74	75	63	62	56	79	58	79	53	49
78	69	74	72	53	72	64	65	67	77

(See the Excel Data File.)

Is the distribution symmetric?

Stem	Leaf
4	9
5	3 3 6 8
6	2 3 4 5 7 9
7	2 2 4 4 5 7 8 9 9

120) The following table shows average wind speeds (in miles per hour) during 15 major fires in California.

44	55	22	32	29	24	47	33	32	27	58	39	38	51	41

(See the Excel Data File.)

Construct a stem-and-leaf diagram. Were most of these storms fueled by 45+ mile-per-hour winds? Explain.

121) The following table shows the prices (in $1,000s) of the last 15 trucks sold at a Toyota dealership.

32	21	26	33	23	24	31	22	17	25	18	23	22	19	35

(See the Excel Data File.)

Construct a stem-and-leaf diagram. Given this diagram, estimate the price that a potential buyer would likely pay for a Toyota truck.

122) The following data represent the ages of patients in the cardiac section of the local hospital. Construct a stem-and-leaf diagram. Comment on whether or not the distribution is symmetric.

48	53	60	61	62	63	70	70	72	77	78	79	80	82	87	88	90

(See the Excel Data File.)

123) A high school football league recorded the average points scored per game, as well as the winning percentage, for the 10 teams in the league.

Points per Game	Winning Percentage
24	88%
21	66%
27	78%
13	28%
16	32%
18	52%
15	30%
17	44%
19	32%
22	50%

(See the Excel Data File.)

Construct a scatterplot. Does scoring more points appear to be associated with a higher winning percentage?

124) A statistics instructor computes the grade and percentage of classes that each of his students attends. Construct a scatterplot from the data displayed next. Does a relationship exist between attendance and grade?

Attendance	47	60	75	86	95	98	100
Grade	58	72	85	84	90	97	92

(See the Excel Data File.)

***Business Statistics: Communicating with Numbers, 3e* (Jaggia)**
Chapter 2 Tabular and Graphical Methods

1) A frequency distribution for qualitative data groups these data into classes called intervals and records the total number of observations in each class.

Answer: FALSE
Explanation: A frequency distribution for qualitative data groups these data into categories and records the number of observations that fall into each category.
Difficulty: 1 Easy
Topic: Summarizing Qualitative Data
Learning Objective: 02-01 Summarize qualitative data by forming frequency distributions.
Bloom's: Remember
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

2) The relative frequency of a category is calculated by dividing the category's frequency by the total number of observations.

Answer: TRUE
Explanation: The relative frequency of each category equals the proportion of observations in each category and is calculated by dividing the frequency by the total number of observations.
Difficulty: 1 Easy
Topic: Summarizing Qualitative Data
Learning Objective: 02-01 Summarize qualitative data by forming frequency distributions.
Bloom's: Remember
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

3) The percent frequency of a category equals the frequency of the category multiplied by 100%.

Answer: FALSE
Explanation: The percent frequency of a category equals the relative frequency of the category multiplied by 100%.
Difficulty: 1 Easy
Topic: Summarizing Qualitative Data
Learning Objective: 02-01 Summarize qualitative data by forming frequency distributions.
Bloom's: Remember
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

4) A pie chart is a segmented circle that portrays the categories and relative sizes of some quantitative variable.

Answer: FALSE
Explanation: A pie chart is a segmented circle whose segments portray the relative (or percent) frequencies of the categories of some qualitative variable.
Difficulty: 1 Easy
Topic: Summarizing Qualitative Data
Learning Objective: 02-02 Construct and interpret pie charts and bar charts.
Bloom's: Remember
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

5) A bar chart depicts the frequency or relative frequency of each category of qualitative data as a bar rising vertically from the horizontal axis. It is also acceptable for the bar to extend horizontally from the vertical axis.

Answer: TRUE
Explanation: A bar chart depicts the frequency or the relative frequency for each category as a series of horizontal or vertical bars.
Difficulty: 1 Easy
Topic: Summarizing Qualitative Data
Learning Objective: 02-02 Construct and interpret pie charts and bar charts.
Bloom's: Remember
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

6) A bar chart may be displayed horizontally.

Answer: TRUE
Explanation: A bar chart depicts the frequency or the relative frequency for each category as a series of horizontal or vertical bars.
Difficulty: 2 Medium
Topic: Summarizing Qualitative Data
Learning Objective: 02-02 Construct and interpret pie charts and bar charts.
Bloom's: Understand
Accessibility: Keyboard Navigation

7) To approximate the width of a class in the creation of a bar chart, we may use this formula:

$$\frac{\text{Maximum value} - \text{Minimum value}}{\text{Number of classes}}$$

Answer: FALSE
Explanation: This formula is used when we construct a frequency distribution or a histogram for quantitative data. The number of classes typically ranges from 5-20.
Difficulty: 1 Easy
Topic: Summarizing Quantitative Data
Learning Objective: 02-03 Summarize quantitative data by forming frequency distributions.
Bloom's: Remember
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

8) For quantitative data, a relative frequency distribution identifies the proportion of observations that fall into each class.

Answer: TRUE
Explanation: Class relative frequency = Class frequency / Total number of observations.
Difficulty: 1 Easy
Topic: Summarizing Quantitative Data
Learning Objective: 02-03 Summarize quantitative data by forming frequency distributions.
Bloom's: Remember
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

9) For quantitative data, a cumulative relative frequency distribution records the proportion (fraction) of values that fall below the upper limit of each class.

Answer: TRUE
Explanation: A cumulative relative frequency distribution represents the proportion of values that fall below the upper limit of each class.
Difficulty: 1 Easy
Topic: Summarizing Quantitative Data
Learning Objective: 02-03 Summarize quantitative data by forming frequency distributions.
Bloom's: Remember
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

10) A histogram is a series of rectangles where the width and height of each rectangle represent the frequency (or relative frequency) and the width of the respective class.

Answer: FALSE
Explanation: A histogram is a series of rectangles where the width and height of each rectangle represent the class width and frequency (or relative frequency) of the class, respectively.
Difficulty: 1 Easy
Topic: Summarizing Quantitative Data
Learning Objective: 02-04 Construct and interpret histograms, polygons, and ogives.
Bloom's: Remember
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

11) A polygon connects a series of neighboring points where each point represents the midpoint of a particular class and its associated frequency or relative frequency.

Answer: TRUE
Explanation: A polygon is graphical depiction of frequency and relative frequency distributions. It connects a series of neighboring points where each point represents the midpoint of a particular class and its associated frequency or relative frequency.
Difficulty: 1 Easy
Topic: Summarizing Quantitative Data
Learning Objective: 02-04 Construct and interpret histograms, polygons, and ogives.
Bloom's: Remember
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

12) An ogive is a graph that plots the cumulative frequency (or the cumulative relative frequency) of each class above the lower limit of the corresponding class.

Answer: FALSE
Explanation: An ogive is a graph that plots the cumulative frequency (or the cumulative relative frequency) of each class against the upper limit of the corresponding class.
Difficulty: 1 Easy
Topic: Summarizing Quantitative Data
Learning Objective: 02-04 Construct and interpret histograms, polygons, and ogives.
Bloom's: Remember
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

13) A stem-and-leaf diagram is useful in that it gives an overall picture of where quantitative data are centered and how the data are dispersed from the center.

Answer: TRUE
Explanation: A stem-and-leaf diagram is a visual method for displaying quantitative data and gives an idea how data are centered and dispersed from the center. It also maintains the original data values in the chart.
Difficulty: 1 Easy
Topic: Stem-and-Leaf Diagrams
Learning Objective: 02-05 Construct and interpret a stem-and-leaf diagram.
Bloom's: Remember
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

14) A scatterplot is a graphical tool that helps determine whether or not two quantitative variables are related.

Answer: TRUE
Explanation: A scatterplot illustrates whether two quantitative variables are related or not.
Difficulty: 1 Easy
Topic: Scatterplots
Learning Objective: 02-06 Construct and interpret a scatterplot.
Bloom's: Remember
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

15) When constructing a scatterplot for two quantitative variables, we usually refer to one variable as x and another one as y. Typically, we graph x on the vertical axis and y on the horizontal axis.

Answer: FALSE
Explanation: When constructing a scatterplot for two quantitative variables, we usually refer to one variable as x and another one as y. Typically, we graph x on the horizontal axis and y on the vertical axis.
Difficulty: 1 Easy
Topic: Scatterplots
Learning Objective: 02-06 Construct and interpret a scatterplot.
Bloom's: Remember
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

16) When constructing a pie chart, only a few, the most frequent, categories must be included in the pie.

Answer: FALSE
Explanation: A pie chart is a segmented circle whose segments portray the relative frequencies of all categories.
Difficulty: 1 Easy
Topic: Summarizing Qualitative Data
Learning Objective: 02-02 Construct and interpret pie charts and bar charts.
Bloom's: Remember
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

17) When summarizing quantitative data it is always better to have up to 30 classes in a frequency distribution.

Answer: FALSE
Explanation: It depends on the size of the data set. The total number of classes usually ranges from 5 to 20.
Difficulty: 1 Easy
Topic: Summarizing Quantitative Data
Learning Objective: 02-03 Summarize quantitative data by forming frequency distributions.
Bloom's: Remember
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

18) Scatterplot is a graphical tool that is focused on describing one variable.

Answer: FALSE
Explanation: A scatterplot helps to determine whether or not two quantitative variables are related in some systemic way.
Difficulty: 1 Easy
Topic: Scatterplots
Learning Objective: 02-06 Construct and interpret a scatterplot.
Bloom's: Remember
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

19) Frequency distributions may be used to describe which of the following types of data?
A) Nominal and ordinal data only
B) Nominal and interval data only
C) Nominal, ordinal, and interval data only
D) Nominal, ordinal, interval, and ratio data

Answer: D
Explanation: Frequency distributions may be used to describe all types of data.
Difficulty: 2 Medium
Topic: Summarizing Quantitative Data
Learning Objective: 02-03 Summarize quantitative data by forming frequency distributions.
Bloom's: Understand
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

20) In order to summarize qualitative data, a useful tool is a _____.
A) histogram
B) frequency distribution
C) stem-and-leaf diagram
D) All of the above

Answer: B
Explanation: Histograms and stem-and-leaf diagrams describe quantitative data.
Difficulty: 2 Medium
Topic: Summarizing Qualitative Data
Learning Objective: 02-01 Summarize qualitative data by forming frequency distributions.
Bloom's: Understand
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

21) For both qualitative and quantitative data, what is the difference between the relative frequency and the percent frequency?
A) The relative frequency equals the percent frequency multiplied by 100.
B) The percent frequency equals the relative frequency multiplied by 100.
C) As opposed to the relative frequency, the percent frequency is divided by the number of observations in the data set.
D) As opposed to the percent frequency, the relative frequency is divided by the number of observations in the data set.

Answer: B
Explanation: The percent frequency is defined as a relative frequency multiplied by 100.
Difficulty: 2 Medium
Topic: Summarizing Qualitative Data
Learning Objective: 02-01 Summarize qualitative data by forming frequency distributions.
Bloom's: Understand
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

22) For which of the following data sets will a pie chart be *most* useful?
A) Heights of high school freshmen
B) Ambient temperatures in the U.S. Capitol Building
C) Percentage of net sales by product for Lenovo in Year 1
D) Growth rates of firms in a particular industry

Answer: C
Explanation: Only percentage of net sales by product for Lenovo in Year 1 looks at multiple categories of a single qualitative variable, in which the percentage of net sales by product may be meaningfully displayed.
Difficulty: 2 Medium
Topic: Summarizing Qualitative Data
Learning Objective: 02-02 Construct and interpret pie charts and bar charts.
Bloom's: Understand
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

23) An auto parts chain asked customers to complete a survey rating the chain's customer service as average, above average, or below average. The following shows the results from the survey:

Average	Below Average	Average
Above Average	Above Average	Above Average
Below Average	Average	Average
Below Average	Average	Below Average
Below Average	Below Average	Below Average

(See the Excel Data File.)

The proportion of customers who felt the customer service was Average is the closest to _____.
A) 0.20
B) 0.33
C) 0.46
D) 0.53

Answer: B
Explanation: Five of the 15 customers responded with a rating of Average. Thus, 5/15 = 0.33.
Difficulty: 2 Medium
Topic: Summarizing Qualitative Data
Learning Objective: 02-01 Summarize qualitative data by forming frequency distributions.
Bloom's: Understand
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

24) An auto parts chain asked customers to complete a survey rating the chain's customer service as average, above average, or below average. The following table shows the results from the survey.

Average	Below Average	Average
Above Average	Above Average	Above Average
Below Average	Average	Average
Below Average	Average	Below Average
Below Average	Below Average	Below Average

(See the Excel Data File.)

A rating of Average or Above Average accounted for what number of responses to the survey?
A) 3
B) 7
C) 8
D) 10

Answer: C
Explanation: Five of the customers responded with a rating of Average, while three responded with a rating of Above Average.
Difficulty: 2 Medium
Topic: Summarizing Qualitative Data
Learning Objective: 02-01 Summarize qualitative data by forming frequency distributions.
Bloom's: Understand
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

25) The following is a list of five of the world's busiest airports by passenger traffic for Year 1.

Name	Location	# of Passengers (in millions)
Hartsfield-Jackson	Atlanta, Georgia, United States	89
Capital International	Beijing, China	74
London Heathrow	London, United Kingdom	67
O'Hare	Chicago, Illinois, United States	66
Tokyo	Tokyo, Japan	64

The percentage of passenger traffic in the five busiest airports that occurred in Asia is the closest to _____.
A) 18%
B) 21%
C) 25%
D) 38%

Answer: D
Explanation: Seventy-four million passengers flew out of Beijing, 64 million passengers flew out of Tokyo, and there is a total of 360 million passengers: (74 + 64)/360 = 38.33%. Wrong answers include the percent frequencies for Tokyo or Beijing individually.
Difficulty: 2 Medium
Topic: Summarizing Qualitative Data
Learning Objective: 02-01 Summarize qualitative data by forming frequency distributions.
Bloom's: Understand
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

26) The following is a list of five of the world's busiest airports by passenger traffic for Year 1.

Name	Location	# of Passengers (in millions)
Hartsfield-Jackson	Atlanta, Georgia, United States	89
Capital International	Beijing, China	74
London Heathrow	London, United Kingdom	67
O'Hare	Chicago, Illinois, United States	66
Tokyo	Tokyo, Japan	64

How many more millions of passengers flew out of Atlanta than flew out of Chicago?
A) 13
B) 21
C) 23
D) 25

Answer: C
Explanation: Eighty-nine million passengers flew out of Atlanta and 66 million passengers flew out of Chicago: $89 - 66 = 23$ million.
Difficulty: 2 Medium
Topic: Summarizing Qualitative Data
Learning Objective: 02-01 Summarize qualitative data by forming frequency distributions.
Bloom's: Understand
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

27) A city in California spent $6 million repairing damage to its public buildings in Year 1. The following table shows the categories where the money was directed.

Cause	Percent
Termites	22%
Water Damage	6%
Mold	12%
Earthquake	27%
Other	33%

How much did the city spend to fix damage caused by mold?
A) $360,000
B) $720,000
C) $1,440,000
D) $1,800,000

Answer: B
Explanation: Six million dollars was spent in total and 12% of the $6 million was spent on mold: $6,000,000 × 0.12 = $720,000.
Difficulty: 2 Medium
Topic: Summarizing Qualitative Data
Learning Objective: 02-01 Summarize qualitative data by forming frequency distributions.
Bloom's: Understand
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

28) A city in California spent $6 million repairing damage to its public buildings in Year 1. The following table shows the categories where the money was directed.

Cause	Percent
Termites	22%
Water Damage	6%
Mold	12%
Earthquake	27%
Other	33%

How much more did the city spend to fix damage caused by termites compared to the damage caused by water?
A) $360,000
B) $720,000
C) $960,000
D) $1,320,000

Answer: C
Explanation: The city spent 22% on termite damage and 6% on water damage. The difference is 16%. The total dollar value spent on the difference is 16% of $6 million—that is, $6,000,000 × 0.16 = $960,000.
Difficulty: 2 Medium
Topic: Summarizing Qualitative Data
Learning Objective: 02-01 Summarize qualitative data by forming frequency distributions.
Bloom's: Understand
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

29) Students in Professor Smith's business statistics course have evaluated the overall effectiveness of the professor's instruction on a five-point scale, where a score of 1 indicates very poor performance and a score of 5 indicates outstanding performance. The raw scores are displayed in the accompanying table:

1	4	4	5	5	3	4	3	4	1
5	5	4	4	2	3	3	2	3	3
4	5	5	5	5	3	2	3	3	2

(See the Excel Data File.)

What is the most common score given in the evaluations?
A) 2
B) 3
C) 4
D) 5

Answer: B
Explanation: Three occurred nine times and the second-most frequent number was 5 with eight occurrences.
Difficulty: 2 Medium
Topic: Summarizing Qualitative Data
Learning Objective: 02-01 Summarize qualitative data by forming frequency distributions.
Bloom's: Understand
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

30) Students in Professor Smith's business statistics course have evaluated the overall effectiveness of the professor's instruction on a five-point scale, where a score of 1 indicates very poor performance and a score of 5 indicates outstanding performance. The raw scores are displayed in the accompanying table.

1	4	4	5	5	3	4	3	4	1
5	5	4	4	2	3	3	2	3	3
4	5	5	5	5	3	2	3	3	2

(See the Excel Data File.)

What percentage of students gave professor Smith an evaluation higher than 3?
A) 20%
B) 30%
C) 50%
D) 80%

Answer: C
Explanation: Fifteen of the 30 students, or 50%, gave an evaluation of 4 or 5.
Difficulty: 2 Medium
Topic: Summarizing Qualitative Data
Learning Objective: 02-01 Summarize qualitative data by forming frequency distributions.
Bloom's: Understand
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

31) Students in Professor Smith's business statistics course have evaluated the overall effectiveness of the professor's instruction on a five-point scale, where a score of 1 indicates very poor performance and a score of 5 indicates outstanding performance. The raw scores are displayed in the accompanying table.

1	4	4	5	5	3	4	3	4	1
5	5	4	4	2	3	3	2	3	3
4	5	5	5	5	3	2	3	3	2

TBChap002-fixed:/api/caa/media/13570164443477258/1excel.png Click here for the Excel Data File

What percentage of students gave Professor Smith an evaluation of 2 or less?
A) 6.7%
B) 13.3%
C) 20%
D) 80%

Answer: C
Explanation: Six of the 30 students, or 20%, gave an evaluation of 1 or 2.
Difficulty: 2 Medium
Topic: Summarizing Qualitative Data
Learning Objective: 02-01 Summarize qualitative data by forming frequency distributions.
Bloom's: Understand
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

32) Students in Professor Smith's business statistics course have evaluated the overall effectiveness of the professor's instruction on a five-point scale, where a score of 1 indicates very poor performance and a score of 5 indicates outstanding performance. The raw scores are displayed in the accompanying table:

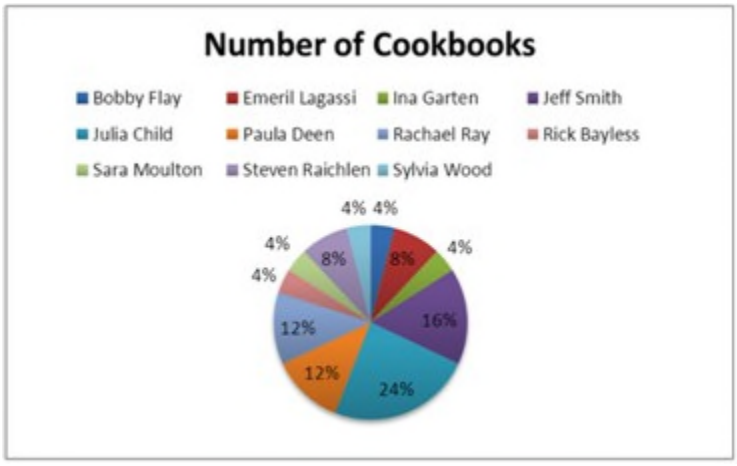
1	4	4	5	5	3	4	3	4	1
5	5	4	4	2	3	3	2	3	3
4	5	5	5	5	3	2	3	3	2

(See the Excel Data File.)

What is the relative frequency of the students who gave Professor Smith an evaluation of 3?
A) 0.3
B) 0.5
C) 9
D) 15

Answer: A
Explanation: Nine of the 30 students gave Professor Smith a 3. The relative frequency is thus 9/30 = 0.3.
Difficulty: 2 Medium
Topic: Summarizing Qualitative Data
Learning Objective: 02-01 Summarize qualitative data by forming frequency distributions.
Bloom's: Understand
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

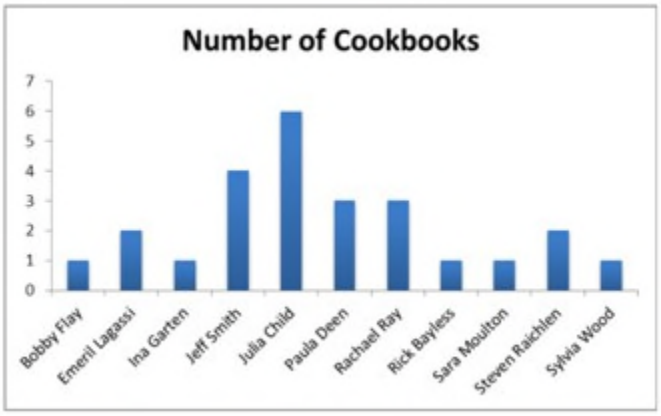
33) In the following pie chart representing a collection of cookbooks, which author has more titles?



A) Jeff Smith
B) Julia Child
C) Rachael Ray
D) Paula Deen

Answer: B
Explanation: The color corresponding to Julia Child has the largest segment in the pie chart.
Difficulty: 1 Easy
Topic: Summarizing Qualitative Data
Learning Objective: 02-02 Construct and interpret pie charts and bar charts.
Bloom's: Remember
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

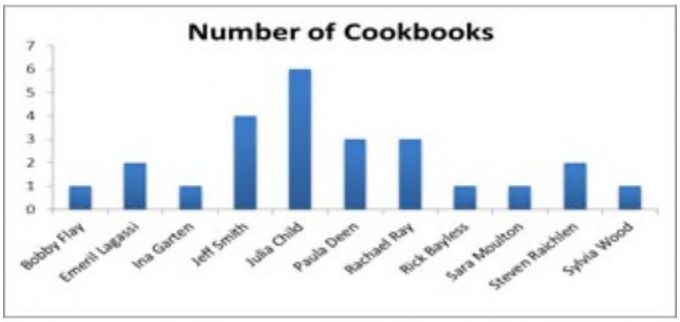
34) The accompanying chart shows the numbers of books written by each author in a collection of cookbooks. What type of chart is this?



A) Bar chart for qualitative data
B) Bar chart for quantitative data
C) Frequency histogram for qualitative data
D) Frequency histogram for quantitative data

Answer: A
Explanation: The data are qualitative and the chart is a bar chart.
Difficulty: 1 Easy
Topic: Summarizing Qualitative Data
Learning Objective: 02-02 Construct and interpret pie charts and bar charts.
Bloom's: Remember
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

35) The accompanying chart shows the number of books written by each author in a collection of cookbooks. What type of data is being represented?



A) Quantitative, ordinal
B) Quantitative, ratio
C) Qualitative, nominal
D) Qualitative, ordinal

Answer: C
Explanation: The data are qualitative and nominal (no ordering is present in the categories).
Difficulty: 2 Medium
Topic: Summarizing Qualitative Data
Learning Objective: 02-02 Construct and interpret pie charts and bar charts.
Bloom's: Understand
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

36) Horizontal bar charts are constructed by placing _____.
A) each category on the vertical axis and the appropriate range of values on the horizontal axis
B) each category on the horizontal axis and the appropriate range of values on the vertical axis
C) each interval of values on the vertical axis and the appropriate range of values on the horizontal axis
D) None of the above

Answer: A
Explanation: The category is on the vertical axis and the range of values is on the horizontal axis.
Difficulty: 2 Medium
Topic: Summarizing Qualitative Data
Learning Objective: 02-02 Construct and interpret pie charts and bar charts.
Bloom's: Understand
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

37) When constructing a frequency distribution for quantitative data, it is important to remember that _____.
A) classes are mutually exclusive
B) classes are collectively exhaustive
C) the total number of classes usually ranges from 5 to 20
D) All of the above

Answer: D
Explanation: Check the guidelines for constructing a frequency distribution: classes should be mutually exclusive, exhaustive, and the total number of classes should be between 5 and 20.
Difficulty: 2 Medium
Topic: Summarizing Quantitative Data
Learning Objective: 02-03 Summarize quantitative data by forming frequency distributions.
Bloom's: Understand
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

38) Which of the following best describes a frequency distribution for qualitative data?
A) It groups data into histograms and records the proportion (fraction) of observations in each histogram.
B) It groups data into categories and records the number of observations in each category.
C) It groups data into intervals called classes and records the proportion (fraction) of observations in each class.
D) It groups data into intervals called classes and records the number of observations in each class.

Answer: B
Explanation: A frequency distribution for qualitative data groups data into categories and records the number of observations in each category.
Difficulty: 2 Medium
Topic: Summarizing Qualitative Data
Learning Objective: 02-01 Summarize qualitative data by forming frequency distributions.
Bloom's: Understand
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

39) What graphical tool is *best* used to display the relative frequency of grouped quantitative data?
A) Ogive
B) Pie chart
C) Bar chart
D) Histogram

Answer: D
Explanation: Histograms are used to display the relative frequency of quantitative data. An ogive is used to display the cumulative frequency, while the bar chart and pie chart display qualitative data.
Difficulty: 1 Easy
Topic: Summarizing Quantitative Data
Learning Objective: 02-04 Construct and interpret histograms, polygons, and ogives.
Bloom's: Remember
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

40) The following data represent scores on a pop quiz in a statistics section.

45	66	74	72	62	44	55	70	33	82
56	56	84	16	16	47	32	32	17	37

(See the Excel Data File.)

Suppose the data on quiz scores will be grouped into five classes. The width of the classes for a frequency distribution or histogram is the closest to _____.
A) 10
B) 12
C) 14
D) 16

Answer: C
Explanation: Class width = (Max −Min)/(# of classes) = (84 −16)/5 = 13.6 ≈ 14 (We always round up.)
Difficulty: 1 Easy
Topic: Summarizing Quantitative Data
Learning Objective: 02-03 Summarize quantitative data by forming frequency distributions.
Bloom's: Remember
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

41) The following data represent scores on a pop quiz in a statistics section:

45	66	74	72	62	44	55	70	33	82
56	56	84	16	16	47	32	32	17	37

(See the Excel Data File.)e

Suppose the data are grouped into five classes, and one of them will be "30 up to 44"—that is, $\{x; 30 \leq x < 44\}$. The frequency of this class is _____.
A) 0.20
B) 0.25
C) 4
D) 5

Answer: C
Explanation: There are four data values that are at least 30 but less than 44. They are 32, 32, 33, and 37.
Difficulty: 2 Medium
Topic: Summarizing Quantitative Data
Learning Objective: 02-03 Summarize quantitative data by forming frequency distributions.
Bloom's: Understand
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

42) The following data represent scores on a pop quiz in a statistics section.

45	66	74	72	62	44	55	70	33	82
56	56	84	16	16	47	32	32	17	37

(See the Excel Data File.)

Suppose the data are grouped into five classes, and one of them will be "30 up to 44"—that is, $\{x; 30 \leq x < 44\}$. The relative frequency of this class is _____.
A) 0.20
B) 0.25
C) 4
D) 5

Answer: A
Explanation: There are four data values that are at least 30 but less than 44. They are 32, 32, 33, and 37. So the relative frequency is 4/20 = 0.20.
Difficulty: 2 Medium
Topic: Summarizing Quantitative Data
Learning Objective: 02-03 Summarize quantitative data by forming frequency distributions.
Bloom's: Understand
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

43) The following data represent the recent sales price (in $1,000s) of 24 homes in a Midwestern city.

187	125	165	170	230	139	195	229
239	135	188	210	228	172	127	139
122	181	196	237	115	199	170	239

(See the Excel Data File.)

Suppose the data on house prices will be grouped into five classes. The width of the classes for a frequency distribution or histogram is the closest to _____.
A) 15
B) 20
C) 25
D) 30

Answer: C
Explanation: Width of class = (max value − min value)/(# of classes) Width = (239 − 115)/5 = 24.8; so round up to 25.
Difficulty: 2 Medium
Topic: Summarizing Quantitative Data
Learning Objective: 02-03 Summarize quantitative data by forming frequency distributions.
Bloom's: Understand
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

44) The following data represent the recent sales price (in $1,000s) of 24 homes in a Midwestern city

187	125	165	170	230	139	195	229
239	135	188	210	228	172	127	139
122	181	196	237	115	199	170	23

(See the Excel Data File.)

Suppose the data are grouped into five classes, and one of them will be "115 up to 140"—that is, $\{x; 115 \leq x < 140\}$. The relative frequency of this class is _____.
A) 6/24
B) 7/24
C) 6
D) 7

Answer: B
Explanation: There are seven data values that are at least 115 but less than 140. They are 115, 122, 125, 127, 135, 139, and 139. So the relative frequency of this class is 7/24.
Difficulty: 2 Medium
Topic: Summarizing Quantitative Data
Learning Objective: 02-03 Summarize quantitative data by forming frequency distributions.
Bloom's: Understand
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

45) The following data represent the recent sales price (in $1,000s) of 24 homes in a Midwestern city.

187	125	165	170	230	139	195	229
239	135	188	210	228	172	127	139
122	181	196	237	115	199	170	239

(See the Excel Data File.)

Suppose the data are grouped into five classes, and one of them will be "165 up to 190"—that is, $\{x; 165 \leq x < 190\}$. The frequency of this class is _____.
A) 6/24
B) 7/24
C) 6
D) 7

Answer: D
Explanation: There are seven data values that are at least 165 but less than 190. They are 165, 170, 170, 172, 181, 187, and 188.
Difficulty: 2 Medium
Topic: Summarizing Quantitative Data
Learning Objective: 02-03 Summarize quantitative data by forming frequency distributions.
Bloom's: Understand
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

46) Thirty students at Eastside High School took the SAT on the same Saturday. Their raw scores are given next.

1,450	1,620	1,800	1,740	1,650	1,710	1,900	1,910	1,950	1,820
1,800	2,010	1,780	1,840	1,490	1,590	2,350	2,260	1,870	1,530
1,620	1,480	2,390	1,640	1,830	1,950	2,000	1,830	1,980	2,100

(See the Excel Data File.)

Consider a frequency distribution of the data that groups the data in classes of 1400 up to 1600, 1600 up to 1800, 1800 up to 2000, and so on. How many students scored at least 1800 but less than 2000?
A) 3
B) 7
C) 12
D) 18

Answer: C
Explanation: Twelve students are in the 1800 up to 2000 class.
Difficulty: 1 Easy
Topic: Summarizing Quantitative Data
Learning Objective: 02-03 Summarize quantitative data by forming frequency distributions.
Bloom's: Remember
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

47) Thirty students at Eastside High School took the SAT on the same Saturday. Their raw scores are given next.

1,450	1,620	1,800	1,740	1,650	1,710	1,900	1,910	1,950	1,820
1,800	2,010	1,780	1,840	1,490	1,590	2,350	2,260	1,870	1,530
1,620	1,480	2,390	1,640	1,830	1,950	2,000	1,830	1,980	2,100

(See the Excel Data File.)

Consider a frequency distribution of the data that groups the data in classes of 1400 up to 1600, 1600 up to 1800, 1800 up to 2000, and so on. What percent of students scored less than 2200?
A) 10%
B) 20%
C) 80%
D) 90%

Answer: D
Explanation: Twenty-seven of the 30 students, or 90%, scored less than 2200.
Difficulty: 3 Hard
Topic: Summarizing Quantitative Data
Learning Objective: 02-03 Summarize quantitative data by forming frequency distributions.
Bloom's: Apply
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

48) Thirty students at Eastside High School took the SAT on the same Saturday. Their raw scores are given next.

1,450	1,620	1,800	1,740	1,650	1,710	1,900	1,910	1,950	1,820
1,800	2,010	1,780	1,840	1,490	1,590	2,350	2,260	1,870	1,530
1,620	1,480	2,390	1,640	1,830	1,950	2,000	1,830	1,980	2,100

(See the Excel Data File.)

Consider a frequency distribution of the data that groups the data in classes of 1400 up to 1600, 1600 up to 1800, 1800 up to 2000, and so on. What is the approximate relative frequency of students who scored more than 1600 but less than 1800?
A) 0.17
B) 0.23
C) 0.40
D) 0.77

Answer: B
Explanation: Seven of the 30 students, or about 0.23, scored between 1600 and 1800.
Difficulty: 3 Hard
Topic: Summarizing Quantitative Data
Learning Objective: 02-03 Summarize quantitative data by forming frequency distributions.
Bloom's: Apply
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

49) Thirty students at Eastside High School took the SAT on the same Saturday. Their raw scores are given next.

1,450	1,620	1,800	1,740	1,650	1,710	1,900	1,910	1,950	1,820
1,800	2,010	1,780	1,840	1,490	1,590	2,350	2,260	1,870	1,530
1,620	1,480	2,390	1,640	1,830	1,950	2,000	1,830	1,980	2,100

(See the Excel Data File.)

Consider a frequency distribution of the data that groups the data in classes of 1400 up to 1600, 1600 up to 1800, 1800 up to 2000, and so on. What graphical tool would you use to display the cumulative relative frequency of the grouped data?
A) Ogive
B) Polygon
C) Pie chart
D) Bar chart

Answer: A
Explanation: Ogives are used to display cumulative measures of quantitative data. Polygons are used to display the frequency and relative frequency of quantitative data, while pie charts and bar charts are used to display qualitative data.
Difficulty: 1 Easy
Topic: Summarizing Quantitative Data
Learning Objective: 02-04 Construct and interpret histograms, polygons, and ogives.
Bloom's: Remember
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

50) Consider the following frequency distribution.

Class	Frequency
12 up to 15	3
15 up to 18	6
18 up to 21	3
21 up to 24	4
24 up to 27	4

The total number of observations in the frequency distribution is _____.
A) 5
B) 6
C) 20
D) 24

Answer: C
Explanation: Sum the frequency column to obtain the total number of observations in the frequency distribution, or 20.
Difficulty: 1 Easy
Topic: Summarizing Quantitative Data
Learning Objective: 02-03 Summarize quantitative data by forming frequency distributions.
Bloom's: Remember
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

51) Consider the following frequency distribution.

Class	Frequency
12 up to 15	3
15 up to 18	6
18 up to 21	3
21 up to 24	4
24 up to 27	4

How many observations are at least 15 but less than 18?
A) 3
B) 4
C) 5
D) 6

Answer: D
Explanation: There are six observations in the class 15 up to 18.
Difficulty: 1 Easy
Topic: Summarizing Quantitative Data
Learning Objective: 02-03 Summarize quantitative data by forming frequency distributions.
Bloom's: Remember
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

52) Consider the following frequency distribution.

Class	Frequency
12 up to 15	3
15 up to 18	6
18 up to 21	3
21 up to 24	4
24 up to 27	4

How many observations are less than 21?
A) 6
B) 12
C) 18
D) 24

Answer: B
Explanation: We sum the frequencies in the first three columns: 3 + 6 + 3 = 12.
Difficulty: 2 Medium
Topic: Summarizing Quantitative Data
Learning Objective: 02-03 Summarize quantitative data by forming frequency distributions.
Bloom's: Understand
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

53) Consider the following frequency distribution.

Class	Frequency
12 up to 15	3
15 up to 18	6
18 up to 21	3
21 up to 24	4
24 up to 27	4

What proportion of the observations are at least 15 but less than 18?
A) 0.20
B) 0.25
C) 0.30
D) 0.35

Answer: C
Explanation: Six observations of the 20 total observations fall in the class of 15 up to 18: 6/20 = 0.30.
Difficulty: 2 Medium
Topic: Summarizing Quantitative Data
Learning Objective: 02-03 Summarize quantitative data by forming frequency distributions.
Bloom's: Understand
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

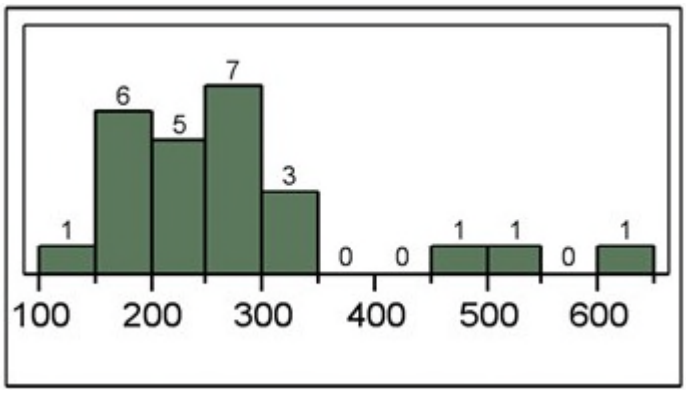
54) Consider the following frequency distribution.

Class	Frequency
12 up to 15	3
15 up to 18	6
18 up to 21	3
21 up to 24	4
24 up to 27	4

What proportion of the observations are less than 21?
A) 0.30
B) 0.60
C) 0.90
D) 1.00

Answer: B
Explanation: We sum the frequencies in the first three columns and then divide by 20: (3 + 6 + 3)/20.
Difficulty: 2 Medium
Topic: Summarizing Quantitative Data
Learning Objective: 02-03 Summarize quantitative data by forming frequency distributions.
Bloom's: Understand
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

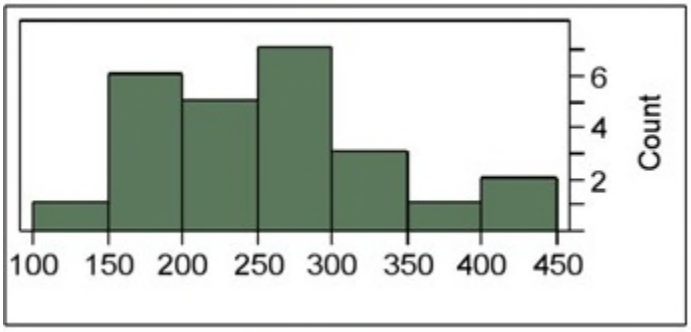
55) The following histogram represents the number of pages in each book within a collection. What is the frequency of books containing at least 250 but fewer than 300 pages?



A) 5
B) 6
C) 7
D) 12

Answer: C
Explanation: Use frequencies shown on the histogram for different number of pages in the book.
Difficulty: 2 Medium
Topic: Summarizing Quantitative Data
Learning Objective: 02-03 Summarize quantitative data by forming frequency distributions.
Bloom's: Understand
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

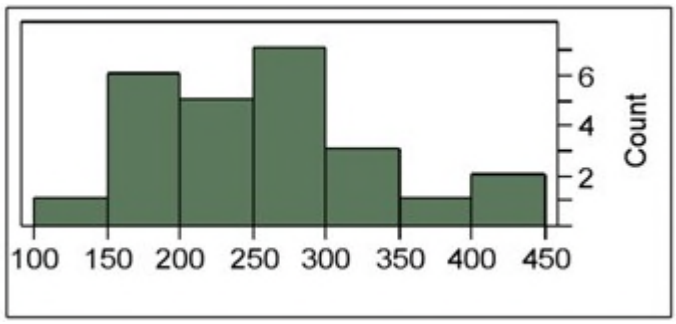
56) The following histogram represents the number of pages in each book within a collection. What is the frequency of books containing at least 200 but fewer than 250 pages?



A) 4
B) 5
C) 6
D) 7

Answer: B
Explanation: Check the frequency for 200-250 pages interval.
Difficulty: 2 Medium
Topic: Summarizing Quantitative Data
Learning Objective: 02-03 Summarize quantitative data by forming frequency distributions.
Bloom's: Understand
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

57) The following histogram represents the number of pages in each book within a collection. What is the frequency of books containing at least 250 but fewer than 400 pages?



A) 7
B) 10
C) 11
D) 12

Answer: C
Explanation: Add the frequencies, 7, 3, and 1, for the classes 250 up to 300, 300 up to 350, and 350 up to 400.
Difficulty: 2 Medium
Topic: Summarizing Quantitative Data
Learning Objective: 02-03 Summarize quantitative data by forming frequency distributions.
Bloom's: Understand
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

58) An analyst constructed the following frequency distribution on the monthly returns for 50 selected stocks.

Class (in percent)	Frequency
–10 up to 0	8
0 up to 10	25
10 up to 20	15
20 up to 30	2

The number of stocks with returns of 0% up to 10% is _____.
A) 2
B) 8
C) 15
D) 25

Answer: D
Explanation: Wrong answers include the frequencies in the other classes.
Difficulty: 2 Medium
Topic: Summarizing Quantitative Data
Learning Objective: 02-03 Summarize quantitative data by forming frequency distributions.
Bloom's: Understand
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

59) An analyst constructed the following frequency distribution on the monthly returns for 50 selected stocks.

Class (in percent)	Frequency
–10 up to 0	8
0 up to 10	25
10 up to 20	15
20 up to 30	2

The number of stocks with returns of less than 10% is _____.
A) 8
B) 25
C) 33
D) 48

Answer: C
Explanation: 8 + 25 = 33. Wrong answers include the frequencies in preceding class and frequency in relevant class.
Difficulty: 2 Medium
Topic: Summarizing Quantitative Data
Learning Objective: 02-03 Summarize quantitative data by forming frequency distributions.
Bloom's: Understand
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

60) An analyst constructed the following frequency distribution on the monthly returns for 50 selected stocks:

Class (in percent)	Frequency
–10 up to 0	8
0 up to 10	25
10 up to 20	15
20 up to 30	2

The proportion of stocks with returns of 0% up to 10% is _____.
A) 0.30
B) 0.50
C) 0.66
D) 0.80

Answer: B
Explanation: 25/50 = 0.50. Wrong answers include the relative frequency in the preceding class and the cumulative relative frequency of the respective class.
Difficulty: 2 Medium
Topic: Summarizing Quantitative Data
Learning Objective: 02-03 Summarize quantitative data by forming frequency distributions.
Bloom's: Understand
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

61) An analyst constructed the following frequency distribution on the monthly returns for 50 selected stocks.

Class (in percent)	Frequency
–10 up to 0	8
0 up to 10	25
10 up to 20	15
20 up to 30	2

The proportion of stocks with returns of less than 10% is _____.
A) 0.30
B) 0.50
C) 0.66
D) 0.80

Answer: C
Explanation: (8 + 25)/50 = 0.66. Wrong answers include the relative frequencies in the preceding class and the respective class.
Difficulty: 2 Medium
Topic: Summarizing Quantitative Data
Learning Objective: 02-03 Summarize quantitative data by forming frequency distributions.
Bloom's: Understand
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

62) Automobiles traveling on a road with a posted speed limit of 65 miles per hour are checked for speed by a state police radar system. The following table is a frequency distribution of speeds.

Speed (miles per hour)	Frequency
45 up to 55	50
55 up to 65	325
65 up to 75	275
75 up to 85	25

How many of the cars traveled less than 75 miles per hour?
A) 275
B) 325
C) 650
D) 675

Answer: C
Explanation: 275 + 325 + 50 = 650. Wrong answers include the frequency in the respective class, the frequency in the preceding class, and the total number of observations.
Difficulty: 2 Medium
Topic: Summarizing Quantitative Data
Learning Objective: 02-03 Summarize quantitative data by forming frequency distributions.
Bloom's: Understand
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

63) Automobiles traveling on a road with a posted speed limit of 65 miles per hour are checked for speed by a state police radar system. The following table is a frequency distribution of speeds.

Speed (miles per hour)	Frequency
45 up to 55	50
55 up to 65	325
65 up to 75	275
75 up to 85	25

What proportion of the cars traveled at least 55 but less than 65 miles per hour?
A) 0.33
B) 0.48
C) 0.56
D) 0.80

Answer: B
Explanation: 325/675 = 0.48. Wrong answers include the relative frequency in the preceding class and the cumulative relative frequency of the relevant class.
Difficulty: 2 Medium
Topic: Summarizing Quantitative Data
Learning Objective: 02-03 Summarize quantitative data by forming frequency distributions.
Bloom's: Understand
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

64) When using a polygon to graph quantitative data, what does each point represent?
A) The lower limit of a particular class and its width
B) The midpoint of a particular class and its associated frequency or relative frequency
C) The midpoint of a particular class and its associated cumulative frequency or cumulative relative frequency
D) The upper limit of a particular class and its associated cumulative frequency or cumulative relative frequency

Answer: B
Explanation: Polygon shows the midpoints of each class and its associated frequency or relative frequency.
Difficulty: 1 Easy
Topic: Summarizing Quantitative Data
Learning Objective: 02-04 Construct and interpret histograms, polygons, and ogives.
Bloom's: Remember
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

65) The accompanying table shows students' scores from the final exam in a history course.

Scores	Cumulative Frequency
50 up to 60	12
60 up to 70	33
70 up to 80	64
80 up to 90	88
90 up to 100	100

How many of the students scored at least 70 but less than 90?
A) 24
B) 31
C) 55
D) 88

Answer: C
Explanation: Eighty-eight students scored less than 90, and 33 students scored less than 70. The total that scored at least 70 but less than 90 equals the number that scored less than 90 minus the number that scored less than 70: $88 - 33 = 55$.
Difficulty: 2 Medium
Topic: Summarizing Quantitative Data
Learning Objective: 02-03 Summarize quantitative data by forming frequency distributions.
Bloom's: Understand
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

66) The following table shows the number of payroll jobs the government added during the years it added jobs (since 1973). The jobs are in thousands.

Jobs Added	Frequency
100 up to 200	5
200 up to 300	8
300 up to 400	7
400 up to 500	5
500 up to 600	1

Approximately what percent of the time did the government add 200,000 or more jobs?
A) 19%
B) 50%
C) 77%
D) 81%

Answer: D
Explanation: Sum the frequency of the intervals 200 up to 300, 300 up to 400, and so on, and divide by the total of 26: $(8 + 7 + 5 + 1)/26 = 21/26 \approx 0.81$, or 81%.
Difficulty: 2 Medium
Topic: Summarizing Quantitative Data
Learning Objective: 02-03 Summarize quantitative data by forming frequency distributions.
Bloom's: Understand
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

67) The accompanying relative frequency distribution represents the last year car sales for the sales force at Kelly's Mega Used Car Center.

Car Sales	Relative Frequency
35 up to 45	0.07
45 up to 55	0.15
55 up to 65	0.31
65 up to 75	0.22
75 up to 85	0.25

If Kelly's employs 100 salespeople, how many of these salespeople have sold at least 35 but fewer than 45 cars in the last year?
A) 5
B) 7
C) 10
D) 15

Answer: B
Explanation: 0.07(100) = 7 employees
Difficulty: 2 Medium
Topic: Summarizing Quantitative Data
Learning Objective: 02-03 Summarize quantitative data by forming frequency distributions.
Bloom's: Understand
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

68) The accompanying relative frequency distribution represents the last year car sales for the sales force at Kelly's Mega Used Car Center.

Car Sales	Relative Frequency
35 up to 45	0.07
45 up to 55	0.15
55 up to 65	0.31
65 up to 75	0.22
75 up to 85	0.25

If Kelly's employs 100 salespeople, how many of these salespeople have sold at least 45 but fewer than 65 cars in the last year?
A) 15
B) 31
C) 40
D) 46

Answer: D
Explanation: (0.15 + 0.31)100 = 46 employees.
Difficulty: 2 Medium
Topic: Summarizing Quantitative Data
Learning Objective: 02-03 Summarize quantitative data by forming frequency distributions.
Bloom's: Understand
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

69) The accompanying relative frequency distribution represents the last year car sales for the sales force at Kelly's Mega Used Car Center.

Car Sales	Relative Frequency
35 up to 45	0.07
45 up to 55	0.15
55 up to 65	0.31
65 up to 75	0.22
75 up to 85	0.25

If Kelly's employs 100 salespeople, how many of these salespeople have sold at least 65 cars in the last year?
A) 22
B) 25
C) 31
D) 47

Answer: D
Explanation: (0.22 + 0.25)100 = 47 employees.
Difficulty: 2 Medium
Topic: Summarizing Quantitative Data
Learning Objective: 02-03 Summarize quantitative data by forming frequency distributions.
Bloom's: Understand
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

70) When displaying quantitative data, what is an ogive used to plot?
A) Frequency or relative frequency of each class against the midpoint of the corresponding class
B) Cumulative frequency or cumulative relative frequency of each class against the upper limit of the corresponding class
C) Frequency or relative frequency of each class against the midpoint of the corresponding class and cumulative frequency or cumulative relative frequency of each class against the upper limit of the corresponding class
D) None of the above

Answer: B
Explanation: An ogive shows cumulative frequency or cumulative relative frequency.
Difficulty: 1 Easy
Topic: Summarizing Quantitative Data
Learning Objective: 02-04 Construct and interpret histograms, polygons, and ogives.
Bloom's: Remember
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

71) How does an ogive differ from a polygon?
A) An ogive is used for qualitative data, while a polygon is used for quantitative data.
B) An ogive is used for quantitative data, while a polygon is used for qualitative data.
C) An ogive is a graphical depiction of a frequency or relative distribution, while a polygon is a graphical depiction of a cumulative frequency or cumulative relative frequency distribution.
D) An ogive is a graphical depiction of a cumulative frequency or cumulative relative frequency distribution, while a polygon is a graphical depiction of a frequency or relative frequency distribution.

Answer: D
Explanation: An ogive is used to show cumulative frequencies and polygon is graphical depiction of just a frequency.
Difficulty: 2 Medium
Topic: Summarizing Qualitative Data
Learning Objective: 02-04 Construct and interpret histograms, polygons, and ogives.
Bloom's: Understand
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

72) Recent home sales in a suburb of Washington, D.C., are shown in the accompanying ogive.

Approximate the percentage of houses that sold for less than $600,000.
A) 60%
B) 70%
C) 80%
D) 90%

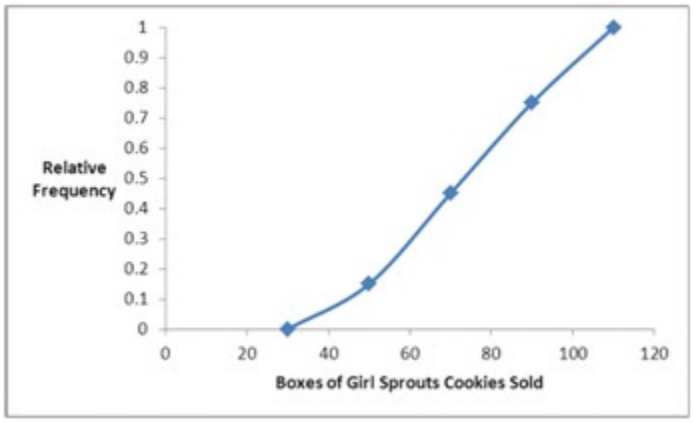
Answer: C
Explanation: Draw a vertical line from the tick mark for 600 on the *x* axis; this crosses the ogive at approximately 0.8.
Difficulty: 2 Medium
Topic: Summarizing Quantitative Data
Learning Objective: 02-04 Construct and interpret histograms, polygons, and ogives.
Bloom's: Understand
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

73) Recent home sales in a suburb of Washington, D.C., are shown in the accompanying ogive.

Approximate the percentage of houses that sold for more than $500,000.
A) 40%
B) 50%
C) 60%
D) 70%

Answer: C
Explanation: Draw a vertical line from about 500 on the *x* axis; this crosses the ogive at approximately 0.4. So about 40% of the houses sold for less than $500,000, which implies that about 60% sold for more than $500,000.
Difficulty: 2 Medium
Topic: Summarizing Quantitative Data
Learning Objective: 02-04 Construct and interpret histograms, polygons, and ogives.
Bloom's: Understand
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

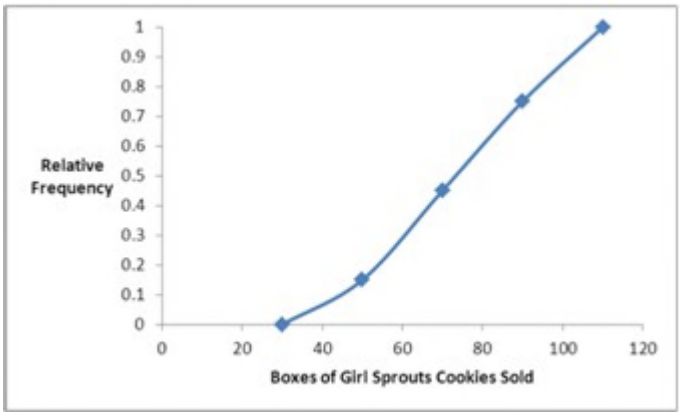
74) The organization of the Girl Sprouts has completed its annual cookie drive. The sales are reported in the accompanying ogive.



Approximate the percentage of girls who sold less than 90 boxes of cookies.
A) 45%
B) 55%
C) 65%
D) 75%

Answer: D
Explanation: Draw a vertical line from the approximate location for 90 on the *x* axis; this crosses the ogive at approximately 0.75.
Difficulty: 2 Medium
Topic: Summarizing Quantitative Data
Learning Objective: 02-04 Construct and interpret histograms, polygons, and ogives.
Bloom's: Understand
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

75) The organization of the Girl Sprouts has completed its annual cookie drive. The sales are reported in the accompanying ogive.



Approximate the percentage of girls who sold more than 70 boxes of cookies.
A) 45%
B) 55%
C) 65%
D) 75%

Answer: B
Explanation: Draw a vertical line from the approximate location for 70 on the *x* axis; this crosses the ogive at approximately 0.45, so about 45% of the Girl Sprouts sold fewer than 70 boxes, which implies that about 55% of the Girl Sprouts sold more than 70 boxes.
Difficulty: 2 Medium
Topic: Summarizing Quantitative Data
Learning Objective: 02-04 Construct and interpret histograms, polygons, and ogives.
Bloom's: Understand
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

76) A stem-and-leaf diagram is constructed by separating each value of a data set into two parts. What are these parts?
A) Stem consisting of the last digit and leaf consisting of the leftmost digits
B) Stem consisting of the leftmost digits and leaf consisting of the second digit
C) Stem consisting of the second digit and leaf consisting of the last digit
D) Stem consisting of the leftmost digits and the leaf consists of the remaining digits.

Answer: D
Explanation: Stem in the stem-and-leaf diagrams consists of the leftmost digits. Leaf consists of the last digit(s).
Difficulty: 1 Easy
Topic: Stem-and-Leaf Diagrams
Learning Objective: 02-05 Construct and interpret a stem-and-leaf diagram.
Bloom's: Remember
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

77) In the accompanying stem-and-leaf diagram, the values in the stem and leaf portions represent 10s and 1s digits, respectively.

Stem	Leaf
1	3 5 6 8 8 9
2	0 1 2 2 3 5 6 6 8 8 8 9
3	0 1 2 2 8
4	2 2

Which of the following numbers appears in the stem-and-leaf diagram?
A) 3800
B) 380
C) 38
D) 3.8

Answer: C
Explanation: Stem in the stem-and-leaf diagrams consists of the leftmost digits, and the leaf consists of the last digit(s).
Difficulty: 1 Easy
Topic: Stem-and-Leaf Diagrams
Learning Objective: 02-05 Construct and interpret a stem-and-leaf diagram.
Bloom's: Remember
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

78) In the accompanying stem-and-leaf diagram, the values in the stem-and-leaf portions represent 10s and 1s digits, respectively.

Stem	Leaf
1	3 5 6 8 8 9
2	0 1 2 2 3 5 6 6 8 8 8 9
3	0 1 2 2 8
4	2 2

What would be the frequency of the class 35 up to 45, that is $\{x; 35 \leq x < 45\}$?
A) 0
B) 1
C) 2
D) 3

Answer: D
Explanation: The observations in this class would be 38, 42, and 42.
Difficulty: 2 Medium
Topic: Stem-and-Leaf Diagrams
Learning Objective: 02-05 Construct and interpret a stem-and-leaf diagram.
Bloom's: Understand
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

79) In the accompanying stem-and-leaf diagram, the values in the stem-and-leaf portions represent 10s and 1s digits, respectively.

Stem	Leaf
1	3 5 6 8 8 9
2	0 1 2 2 3 5 6 6 8 8 8 9
3	0 1 2 2 8
4	2 2

How many values are at least 25 but less than 35?
A) 10
B) 11
C) 12
D) 13

Answer: B
Explanation: These values are 25, 26, 26, 28, 28, 28, 29, 30, 31, 32, and 32.
Difficulty: 2 Medium
Topic: Stem-and-Leaf Diagrams
Learning Objective: 02-05 Construct and interpret a stem-and-leaf diagram.
Bloom's: Understand
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

80) In the accompanying stem-and-leaf diagram, the values in the stem-and-leaf portions represent 10s and 1s digits, respectively.

Stem	Leaf
1	3 5 6 8 8 9
2	0 1 2 2 3 5 6 6 8 8 8 9
3	0 1 2 2 8
4	2 2

Find the frequency associated with data values that are more than 28.
A) 8
B) 9
C) 10
D) 11

Answer: A
Explanation: These values are 29, 30, 31, 32, 32, 38, 42, and 42.
Difficulty: 2 Medium
Topic: Stem-and-Leaf Diagrams
Learning Objective: 02-05 Construct and interpret a stem-and-leaf diagram.
Bloom's: Understand
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

81) In the accompanying stem-and-leaf diagram, the values in the stem-and-leaf portions represent 10s and 1s digits, respectively.

Stem	Leaf
1	3 5 6 8 8 9
2	0 1 2 2 3 5 6 6 8 8 8 9
3	0 1 2 2 8
4	2 2

The stem-and-leaf diagram shows that the distribution is _____.
A) symmetric
B) positively skewed
C) negatively skewed
D) None of the above

Answer: B
Explanation: A stem-and-leaf diagram is basically a histogram on its side. When turned, it reveals a distribution with a few extreme values to the right. Thus, it is positively skewed.
Difficulty: 2 Medium
Topic: Stem-and-Leaf Diagrams
Learning Objective: 02-05 Construct and interpret a stem-and-leaf diagram.
Bloom's: Understand
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

82) The following stem-and-leaf diagram shows the speeds in miles per hour (mph) of 14 cars approaching a toll booth on a bridge in Oakland, California.

Stem	Leaf
2	5 6 6 7 9
3	4 7 7 8 9
4	0 0 2 3

How many of the cars were traveling faster than 25 mph but slower than 40 mph?
A) 8
B) 9
C) 10
D) 12

Answer: B
Explanation: 26, 26, 27, 29, 34, 37, 37, 38, and 39.
Difficulty: 2 Medium
Topic: Stem-and-Leaf Diagrams
Learning Objective: 02-05 Construct and interpret a stem-and-leaf diagram.
Bloom's: Understand
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

83) The following stem-and-leaf diagram shows the last 20 dividend payments (in cents) paid by Procter and Gamble.

Stem	Leaf
3	1 5 5 5 5
4	0 0 0 0 4 4 4 4 4 8 8 8
5	3 3 3

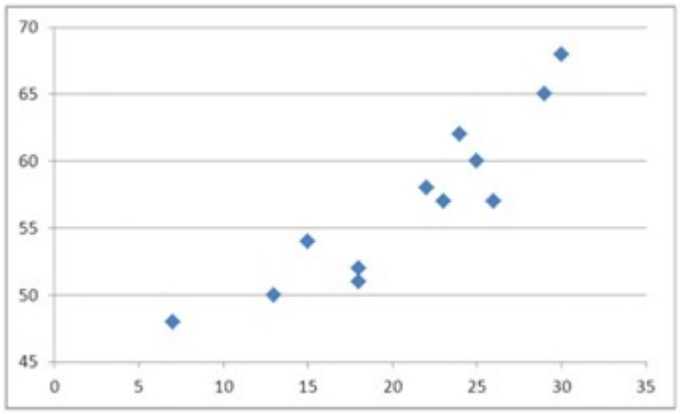
The most common dividend payment is _____.
A) 0.35
B) 0.40
C) 0.44
D) 0.48

Answer: C
Explanation: Procter and Gamble paid dividend payments of 0.44 five times.
Difficulty: 2 Medium
Topic: Stem-and-Leaf Diagrams
Learning Objective: 02-05 Construct and interpret a stem-and-leaf diagram.
Bloom's: Understand
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

84) What may be revealed from a scatterplot?
A) No relationship between two variables
B) A linear relationship between two variables
C) A curvilinear relationship between two variables
D) All of the above

Answer: D
Explanation: All of the relationships mentioned may be seen in a scatterplot. The relationships can also be categorized as positive or negative.
Difficulty: 2 Medium
Topic: Scatterplots
Learning Objective: 02-06 Construct and interpret a scatterplot.
Bloom's: Understand
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

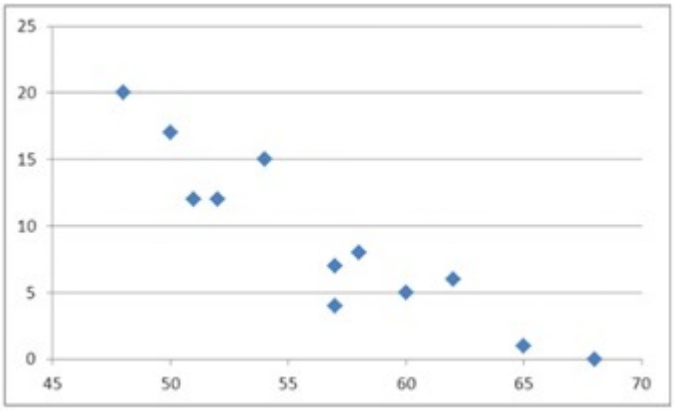
85) What type of relationship is indicated in the scatterplot?



A) No relationship
B) A negative linear relationship
C) A negative curvilinear relationship
D) A positive linear or curvilinear relationship

Answer: D
Explanation: When looking at the plotted points, the variables have a positive relationship (*y* tends to increase as *x* increases), and the relationship appears linear or slightly curvilinear.
Difficulty: 2 Medium
Topic: Scatterplots
Learning Objective: 02-06 Construct and interpret a scatterplot.
Bloom's: Understand
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

86) What type of relationship is indicated in the scatterplot?



A) No relationship
B) A negative linear relationship
C) A positive linear relationship
D) A positive curvilinear relationship

Answer: B
Explanation: When looking at the plotted points, the variables have a negative relationship (*y* tends to decrease as *x* increases), and the relationship appears linear or possible curvilinear.
Difficulty: 2 Medium
Topic: Scatterplots
Learning Objective: 02-06 Construct and interpret a scatterplot.
Bloom's: Understand
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

87) Use the following data to construct a scatterplot. What type of relationship is implied?

x	3	6	10	14	18	23
y	34	28	20	12	5	0

(See the Excel Data File.)
A) No relationship
B) A positive relationship
C) A negative relationship
D) There is not enough information to answer

Answer: C
Explanation: As x increases, y decreases. Therefore, the data have a negative relationship.
Difficulty: 3 Hard
Topic: Scatterplots
Learning Objective: 02-06 Construct and interpret a scatterplot.
Bloom's: Analyze
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

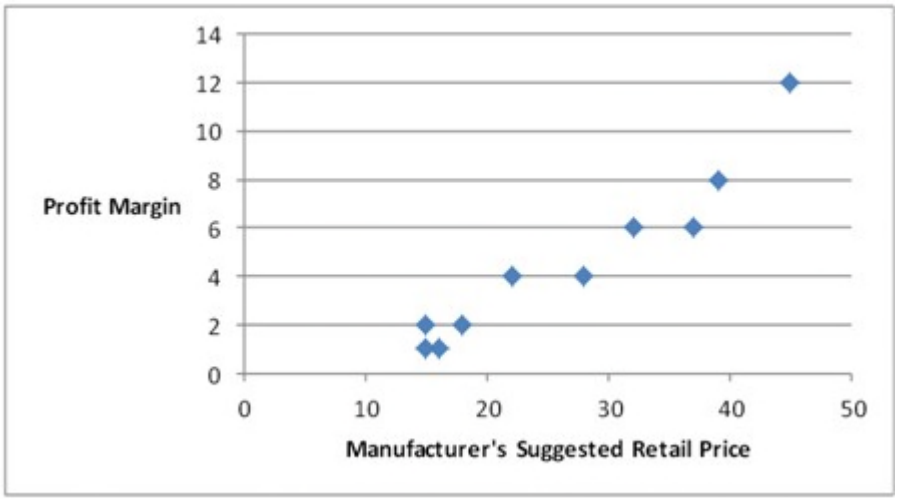
88) Use the following data to construct a scatterplot. What type of relationship is implied?

x	1	5	9	14	18	23
y	2	4	15	12	15	20

(See the Excel Data File.)
A) No relationship
B) A positive relationship
C) A negative relationship
D) Not enough information to answer

Answer: B
Explanation: As x increases, y increases. Therefore, the data have a positive relationship. Even though the point (9,20) is not in line with the rest of the points, overall it shows an increasing positive relationship.
Difficulty: 3 Hard
Topic: Scatterplots
Learning Objective: 02-06 Construct and interpret a scatterplot.
Bloom's: Analyze
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

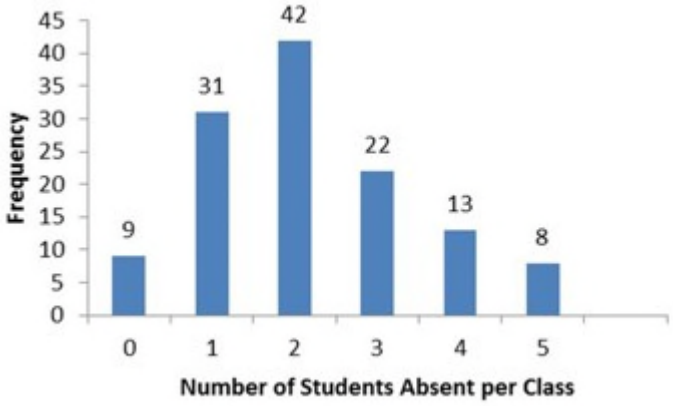
89) A car dealership created a scatterplot showing the manufacturer's retail price and profit margin for the cars they have on their lot.



As the manufacturer's suggested retail price increases, the profit margin tends to _____.
A) increase
B) decrease
C) stay the same
D) None of the above

Answer: A
Explanation: The graph shows that the higher the MSRP, the higher the profit margin.
Difficulty: 1 Easy
Topic: Scatterplots
Learning Objective: 02-06 Construct and interpret a scatterplot.
Bloom's: Remember
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

90) The statistics professor has kept attendance records and recorded the number of absent students per class. The recorded data is displayed in the following bar chart with the frequency of each number of absent students shown above the bars.



How many statistics classes had three or more students absent?
A) 8
B) 13
C) 22
D) 43

Answer: D
Explanation: A frequency distribution for qualitative data groups data into categories and records the number of observations that fall into each category. Bars 3, 4, & 5 gives you 22 + 13 + 8 = 43.
Difficulty: 2 Medium
Topic: Summarizing Qualitative Data
Learning Objective: 02-02 Construct and interpret pie charts and bar charts.
Bloom's: Understand
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

91) The following table shows the percentage of e-mail that is sent each day of the business week according to an Intermedia survey.

Day	Percentage
Monday	15%
Tuesday	23%
Wednesday	22%
Thursday	21%
Friday	19%

Which of the following best displays this data?
A) Horizontal bar chart
B) Vertical bar chart
C) Pie chart
D) Histogram

Answer: C
Explanation: A pie chart is the best to display these data – it shows segments that portray the relative frequencies presented as percentages.
Difficulty: 1 Easy
Topic: Summarizing Qualitative Data
Learning Objective: 02-02 Construct and interpret pie charts and bar charts.
Bloom's: Remember
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

92) The following frequency distribution displays the weekly sales of a certain brand of television at an electronics store.

Number Sold	Frequency
01-05	3
06-10	7
11-15	14
16-20	22
21-25	4

How many weeks of data are included in this frequency distribution?
A) 25
B) 50
C) 75
D) 100

Answer: B
Explanation: If we sum the frequency column, we obtain the sample size.
Difficulty: 1 Easy
Topic: Summarizing Qualitative Data
Learning Objective: 02-01 Summarize qualitative data by forming frequency distributions.
Bloom's: Remember
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

93) The following frequency distribution shows the frequency of the asking price, in thousands of dollars, for current homes on the market in a particular city.

Asking Price	Frequency
$350 up to $400	12
$400 up to $450	9
$450 up to $500	17
$500 up to $550	11
$550 up to $600	6

What percentage of houses has an asking price between $350,000 and under $400,000?
A) 16.4%
B) 21.8%
C) 30.9%
D) 33.3%

Answer: B
Explanation: For quantitative data, a relative frequency distribution identifies the proportion of observations that falls into each class: class relative frequency is equal to the class frequency divided by total number of observations.
12 / (12 + 9 + 17 + 11 + 6) = 12 / 55 = 21.8%
Difficulty: 3 Hard
Topic: Summarizing Quantitative Data
Learning Objective: 02-03 Summarize quantitative data by forming frequency distributions.
Bloom's: Apply
AACSB: Knowledge Application
Accessibility: Keyboard Navigation

94) The following frequency distribution shows the frequency of the asking price, in thousands of dollars, for current homes on the market in a particular city.

Asking Price	Frequency
$350 up to $400	12
$400 up to $450	9
$450 up to $500	17
$500 up to $550	11
$550 up to $600	6

What percentage of houses has an asking price under $550,000?
A) 50.5%
B) 69.1%
C) 89.1%
D) 95.0%

Answer: C
Explanation: For quantitative data, a relative frequency distribution identifies the proportion of observations that falls into each class: class relative frequency is equal to the class frequency divided by total number of observations.
(12 + 9 + 17 + 11) / (12 + 9 + 17 + 11 + 6) = 49 / 55 = 89.1%
Difficulty: 3 Hard
Topic: Summarizing Quantitative Data
Learning Objective: 02-03 Summarize quantitative data by forming frequency distributions.
Bloom's: Apply
AACSB: Knowledge Application
Accessibility: Keyboard Navigation

95) A survey conducted by CBS news asked 1,026 respondents: "What would you do with an unexpected tax refund?" The responses are summarized in the following table.

Category	Percentage
Pay off debts	47%
Put it in the bank	30%
Spend it	11%
I never get a refund	10%
Other	2%

How many people will either put it in the bank or spend it?
A) 421
B) 411
C) 113
D) 482

Answer: A
Explanation: The percent frequency is the percent of observations in a category. To get a frequency the percent frequency should be multiplied by the number of observations. (30% + 11%) * 1026 = 421
Difficulty: 2 Medium
Topic: Summarizing Qualitative Data
Learning Objective: 02-01 Summarize qualitative data by forming frequency distributions.
Bloom's: Understand
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

96) The manager at a water park constructed the following frequency distribution to summarize attendance in July and August.

Attendance	Frequency
1,000 up to 1,250	5
1,250 up to 1,500	6
1,500 up to 1,750	10
1,750 up to 2,000	20
2,000 up to 2,250	15
2,250 up to 2,500	4

What of the following is the most likely attendance range?
A) 2,000 up to 2,500
B) 1,000 up to 1,750
C) 1,250 up to 1,750

Answer: B
Explanation: For quantitative data, a relative frequency distribution identifies the proportion of observations that falls into each class: class relative frequency is equal to the class frequency divided by total number of observations.
Difficulty: 3 Hard
Topic: Summarizing Quantitative Data
Learning Objective: 02-03 Summarize quantitative data by forming frequency distributions.
Bloom's: Apply
AACSB: Knowledge Application
Accessibility: Keyboard Navigation

97) The Statistical Abstract of the United States provided the following frequency distribution of the number of people who live below the poverty level by region.

Region	Number of People (in 1000s)
Northeast	6,166
Midwest	7,237
South	15,501
West	8,372

What is the percentage of people who live below the poverty level in the West or Midwest?
A) 35.96%
B) 41.87%
C) 41.58%
D) 31.96%

Answer: B
Explanation: The percent frequency is the percent of observations in a category (or categories), and it equals the frequency divided by the total number of observations and multiplied by 100.
(7237 + 8372) / 37276 = 41.87%
Difficulty: 2 Medium
Topic: Summarizing Qualitative Data
Learning Objective: 02-01 Summarize qualitative data by forming frequency distributions.
Bloom's: Understand
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

98) Consider the following stem-and-leaf diagram.

Stem	Leaf
3	1 1 1 4 5
4	4 6 7
5	0 0 4 5 6 6 8 9
6	1 3 3 6

Which data value occurs most often?
A) 1
B) 56
C) 31
D) 63

Answer: C
Explanation: A stem-and-leaf diagram is constructed by separating each value of dataset into two parts: a stem, which consists of the leftmost digits, and a leaf, which consists of the last digit(s).
Difficulty: 2 Medium
Topic: Stem-and-Leaf Diagrams
Learning Objective: 02-05 Construct and interpret a stem-and-leaf diagram.
Bloom's: Understand
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

99) Consider the following stem-and-leaf diagram.

Stem	Leaf
3	1 1 1 4 5
4	4 6 7
5	0 0 4 5 6 6 8 9
6	1 3 3 6

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

Answer: D
Explanation: A stem-and-leaf diagram is constructed by separating each value of dataset into two parts: a stem, which consists of the leftmost digits, and a leaf, which consists of the last digit(s).
Difficulty: 2 Medium
Topic: Stem-and-Leaf Diagrams
Learning Objective: 02-05 Construct and interpret a stem-and-leaf diagram.
Bloom's: Understand
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

100) For qualitative data, a frequency distribution groups data into _____ and records the number of _____.

Answer: categories; observations
Explanation: For qualitative data, a frequency distribution groups data into categories and records the number of observations that fall into each category.
Difficulty: 1 Easy
Topic: Summarizing Qualitative Data
Learning Objective: 02-01 Summarize qualitative data by forming frequency distributions.
Bloom's: Remember
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

101) Graphically, we can show a(n) _____ _____ for qualitative data by constructing a pie chart or a bar chart.

Answer: frequency distribution
Explanation: Graphically, we can show a frequency distribution for qualitative data by constructing a pie chart or a bar chart.
Difficulty: 1 Easy
Topic: Summarizing Qualitative Data
Learning Objective: 02-02 Construct and interpret pie charts and bar charts.
Bloom's: Remember
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

102) When constructing a frequency distribution for quantitative data classes are mutually _____ and _____.

Answer: exclusive; exhaustive
Explanation: Each group for quantitative data may not overlap another group (mutually exclusive) and every observation has to fit into one of the groups (exhaustive).
Difficulty: 2 Medium
Topic: Summarizing Quantitative Data
Learning Objective: 02-03 Summarize quantitative data by forming frequency distributions.
Bloom's: Understand
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

103) A _____ _____ is a table that shows the number of data observations that fall into specific interval.

Answer: frequency distribution
Explanation: Check the guidelines for constructing frequency distribution.
Difficulty: 2 Medium
Topic: Summarizing Quantitative Data
Learning Objective: 02-03 Summarize quantitative data by forming frequency distributions.
Bloom's: Understand
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

104) The shape of most data distributions can be categorized as either _____ or _____.

Answer: symmetric; skewed
Difficulty: 2 Medium
Topic: Summarizing Quantitative Data
Learning Objective: 02-04 Construct and interpret histograms, polygons, and ogives.
Bloom's: Understand
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

105) A stem-and-leaf diagram most resembles a(n) _____.

Answer: histogram
Explanation: Like histograms, stem-and-leaf diagrams give an overall picture of where the data are centered, how data are dispersed, and the overall shape of the data.
Difficulty: 2 Medium
Topic: Stem-and-Leaf Diagrams
Learning Objective: 02-05 Construct and interpret a stem-and-leaf diagram.
Bloom's: Understand
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

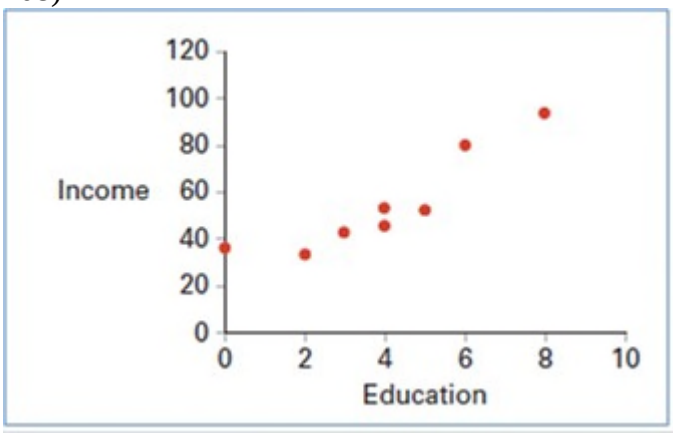
106) Which of the following is *not* a graphical technique to display quantitative data?
A) Stem-and-leaf
B) histogram
C) scatterplot
D) bar chart

Answer: D
Explanation: A bar chart is used to display qualitative data.
Difficulty: 2 Medium
Topic: Stem-and-Leaf Diagrams
Learning Objective: 02-05 Construct and interpret a stem-and-leaf diagram.
Bloom's: Understand
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

107) A scatterplot depicts a positive _____ relationship, if as *x* increases, *y* tends to increase at an increasing rate.

Answer: curvilinear
Explanation: A positive curvilinear relationship exists between variables *x* and *y*, when *y* tends to increase in increasing rate as *x* increases.
Difficulty: 2 Medium
Topic: Scatterplots
Learning Objective: 02-06 Construct and interpret a scatterplot.
Bloom's: Understand
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

108)



Using a scatterplot above we observe a _____ linear relationship between two variables: Education and Income.

Answer: positive
Explanation: A positive linear relationship exists between variables *x* and *y*, when *y* tends to increase as *x* increases.
Difficulty: 2 Medium
Topic: Scatterplots
Learning Objective: 02-06 Construct and interpret a scatterplot.
Bloom's: Understand
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

109) A survey of 400 unemployed people was completed at a job fair. Each person was asked to categorize his or her job interests. The accompanying relative frequency distribution was constructed.

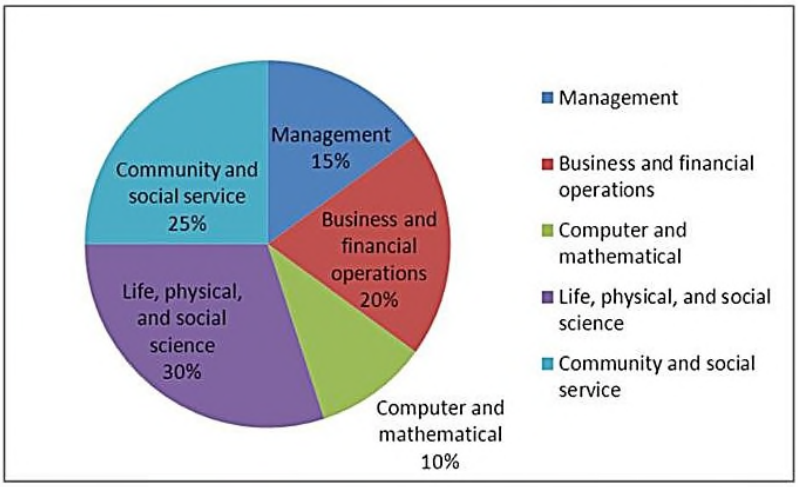
Field	Relative Frequency
Management	0.15
Business and financial operations	0.20
Computer and mathematical	0.10
Life, physical, and social science	0.30
Community and social service	0.25

a. Construct the corresponding frequency distribution. How many of these people designated that the computer and mathematical industry was their job interest?
b. Construct a pie chart.

Answer:
a. See the table below for the frequency distribution. Forty people designated that the computer and mathematical field was their job interest.

Field	Relative Frequency	Frequency
Management	0.15	60
Business and financial operations	0.20	80
Computer and mathematical	0.10	40
Life, physical, and social science	0.30	120
Community and social service	0.25	100

b.



Explanation: In order to construct the frequency distribution, multiply each relative frequency by 400, the sample size. For the pie chart, each segment corresponds to the relative frequency for each job category.
Difficulty: 1 Easy
Topic: Summarizing Qualitative Data
Learning Objective: 02-01 Summarize qualitative data by forming frequency distributions.; 02-02 Construct and interpret pie charts and bar charts.
Bloom's: Remember
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

110) A hair stylist records the hair color of her 25 most recent appointments, classifying the color as blonde, brown, black, or red. Her data set is displayed next.

Red	Blonde	Black	Red	Blonde
Blonde	Black	Blonde	Red	Blonde
Brown	Black	Red	Blonde	Brown
Brown	Red	Black	Black	Red
Brown	Black	Brown	Blonde	Blonde

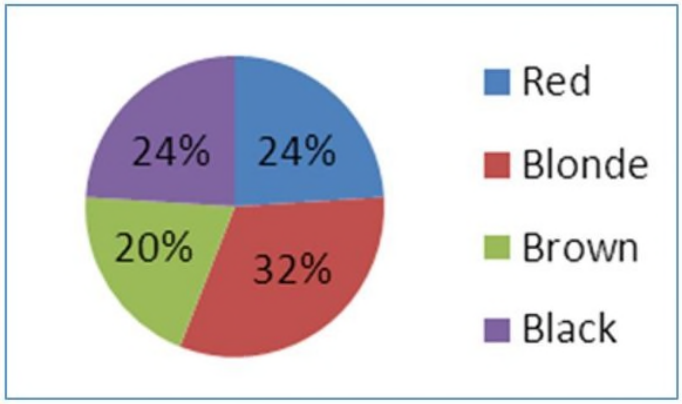
(See the Excel Data File.)

a. Construct a frequency and relative frequency distribution of the hair color of the stylist's customers.
b. Construct a pie chart. Which hair color is the most common among the stylist's customers?
c. Create a bar chart to display the frequency distribution. How many customers had black hair?

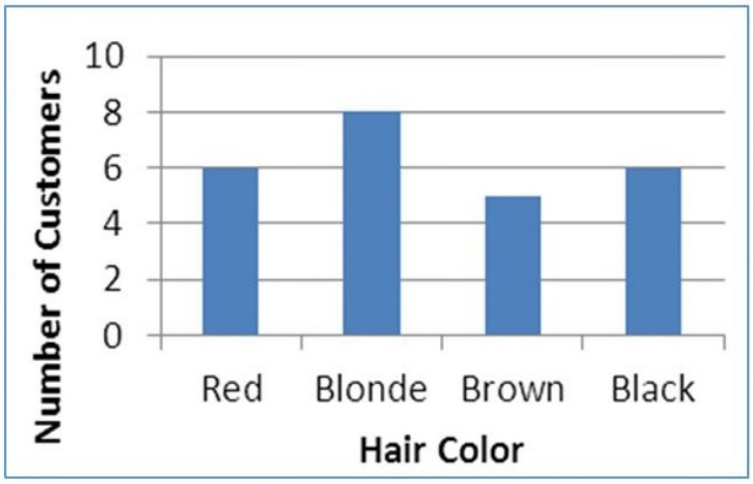
Answer:
a.

Hair Color	Frequency	Relative Frequency
Black	6	0.24
Blonde	8	0.32
Brown	5	0.20
Red	6	0.24

b. The most common hair color is Blonde.



c. Six customers have black hair.



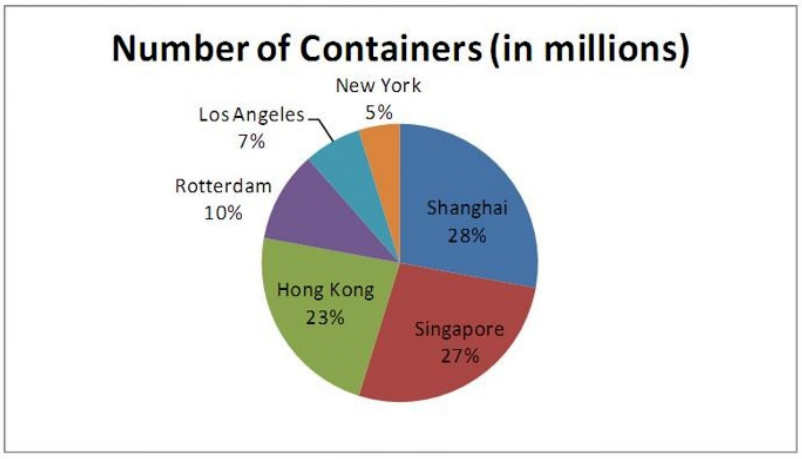
Explanation: To construct a pie chart in Excel, select both columns of data, and then select **Insert > Pie > 2-D Pie**. Choose the option at the top left. To construct a bar chart in Excel, select both columns of data, and then select **Insert > Column > 2-D Column**. Choose the option at the top left. See instructions in text for other formatting options.
Difficulty: 2 Medium
Topic: Summarizing Qualitative Data
Learning Objective: 02-02 Construct and interpret pie charts and bar charts.
Bloom's: Understand
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

111) The following table lists some of the busiest ports in the world based on the number of containers in Year 1.

Location of Port	Number of Containers (in millions)
Shanghai	29
Singapore	28
Hong Kong	24
Rotterdam	11
Los Angeles	7
New York	5

Construct a pie chart to summarize the data. Approximately what percent of the total number of containers go through Hong Kong?

Answer: Twenty-three percent of the containers traveled through Hong Kong.



Explanation: To construct a pie chart in Excel, select both columns of data, and then select **Insert > Pie > 2-D Pie**. Choose the option at the top left. See instructions in the text for other formatting options. Twenty-four million out of 104 million containers went through Hong Kong: 24/104 = 23%.
Difficulty: 2 Medium
Topic: Summarizing Qualitative Data
Learning Objective: 02-02 Construct and interpret pie charts and bar charts.
Bloom's: Understand
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

112) Johnson and Johnson (JNJ) is a consumer staples company. Consumer staples are products people need and buy even during times of financial hardship. Do you think JNJ will have a volatile stock price? Does the accompanying graph accurately depict the volatility of JNJ stock? Explain.

Answer: Consumer staples companies tend to have stable stocks. No, the graph does not accurately depict the volatility of JNJ stock. The vertical axis starts at 54 and should start at zero.
Explanation: The scale on the vertical axis should begin at zero. Refer to Figure 2.4, where graphs with misleading scales are shown.
Difficulty: 2 Medium
Topic: Summarizing Qualitative Data
Learning Objective: 02-02 Construct and interpret pie charts and bar charts.
Bloom's: Understand
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

113) Each month the Bureau of Labor Statistics reports the number of people (in thousands) employed in the United States by age. The accompanying frequency distribution shows the results for August.

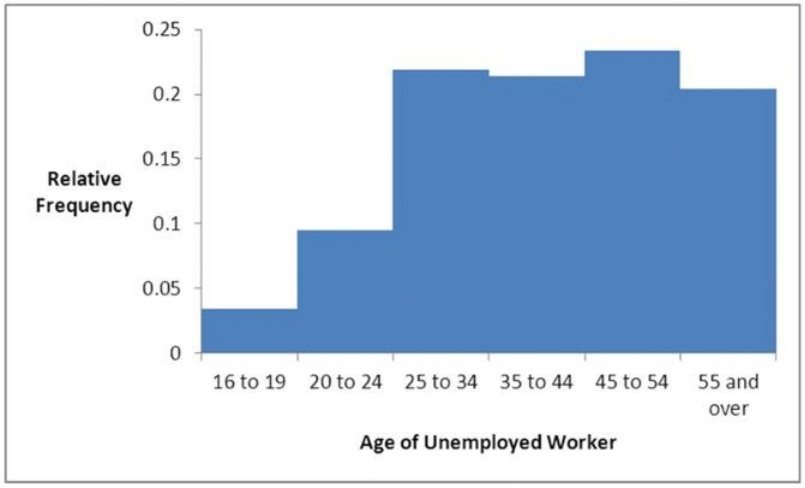
Age	Frequency
16 to 19	4,794
20 to 24	13,273
25 to 34	30,789
35 to 44	30,021
45 to 54	32,798
55 and over	28,660

a. Construct a relative frequency distribution. What proportion of workers is between 20 and 24 years old?
b. Construct a cumulative relative frequency distribution. What proportion of workers is younger than 35 years old?
c. Construct a relative frequency histogram.

Answer:
a. 0.095.
b. 0.348.

Age	Frequency	Relative Frequency	Cumulative Relative Frequency
16 to 19	4,794	0.034	0.034
20 to 24	13,273	0.095	0.129
25 to 34	30,789	0.219	0.348
35 to 44	30,021	0.214	0.562
45 to 54	32,798	0.234	0.796
55 and over	28,660	0.204	1.000

c.



Explanation: First find the total number of people surveyed by summing the frequency column (n = 140,335).
a. To find the relative frequency for each class, divide each class's frequency by n; so the proportion of workers that are between 20 and 24 years old is 13,273/140,335 = 0.095.
b. To find the cumulative relative frequency for each class, take each class's relative frequency and add it to the preceding relative frequencies. So the proportion of workers that are younger than 35 years old is 0.034 + 0.095 + 0.219 = 0.348.
c. To construct a relative frequency histogram by hand, let the width of each rectangle equal the width of the class, and its height equal the corresponding relative frequency. In order to construct a relative frequency histogram in Excel, put the class column and the relative frequency column next to one another in the spreadsheet. Select both columns simultaneously and then choose **Insert > Column > 2-D Column**. Choose the option at the top left. See instructions in the text for other formatting options.
Difficulty: 2 Medium
Topic: Summarizing Quantitative Data
Learning Objective: 02-03 Summarize quantitative data by forming frequency distributions.; 02-04 Construct and interpret histograms, polygons, and ogives.
Bloom's: Understand
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

114) The following table displays the top 40 American League batting averages of the last season.

Player	Batting Average	Player	Batting Average
Miguel Cabrera	0.344	Yunel Escobar	0.290
Adrian Gonzalez	0.338	Vladimir Guerrero	0.290
Michael Young	0.338	Alberto Callaspo	0.288
Victor Martinez	0.33	Howard Kendrick	0.285
Jacoby Ellsbury	0.321	Jeff Francoeur	0.285
David Ortiz	0.309	Nick Markakis	0.284
Dustin Pedroia	0.307	Michael Cuddyer	0.284
Casey Kotchman	0.306	Adam Jones	0.280
Melky Cabrera	0.305	Elvis Andrus	0.279
Alex Gordon	0.303	Erick Aybar	0.279
Jose Bautista	0.302	Juan Pierre	0.279
Robinson Cano	0.302	Matt Joyce	0.277
Paul Konerko	0.300	Asdrubal Cabrera	0.273
Jhonny Peralta	0.299	Edwin Encarnacion	0.272
Josh Hamilton	0.298	Ichiro Suzuki	0.272
Derek Jeter	0.297	Peter Bourjos	0.271
Adrian Beltre	0.296	J.J. Hardy	0.269
Alex Avila	0.295	Alexei Ramirez	0.269
Eric Hosmer	0.293	Ben Zobrist	0.269
Billy Butler	0.291	Delmon Young	0.268

(See the Excel Data File.)

a. Construct frequency, relative frequency, and cumulative relative frequency distributions that group the data in classes of 0.265 up to 0.280, 0.280 up to 0.295, 0.295 up to 0.310, and so on.
b. How many of these players have a batting average above 0.340? What proportion of these players has a batting average of at least 0.280 but below 0.295? What percentage of these players has a batting average below 0.325?
c. Construct a relative frequency histogram. Is the distribution symmetric? If not, is it positively or negatively skewed?
d. Construct an ogive.
e. Using the ogive, approximately what proportion of the players in this group has a batting average above 0.290?

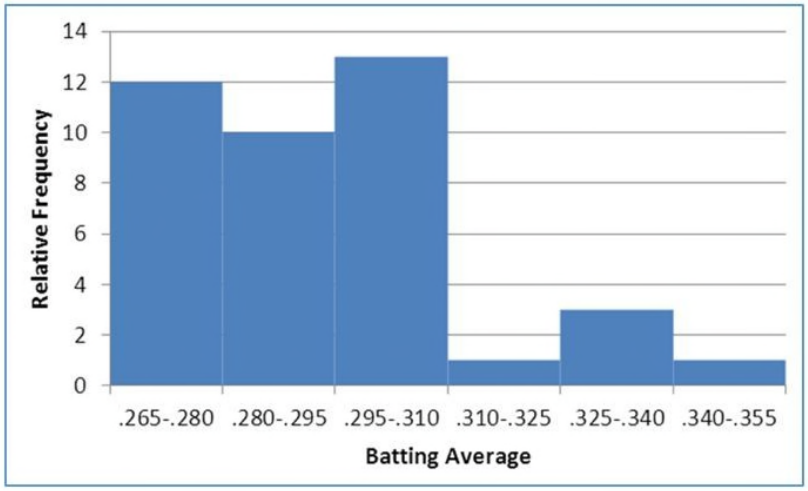
Answer:

a.

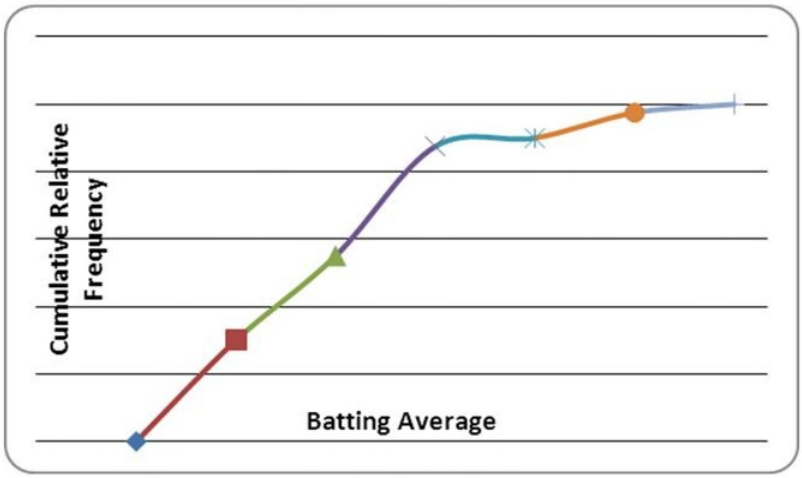
Batting Average	Frequency	Relative Frequency	Cumulative Relative Frequency
0.265 – 0.280	12	0.300	0.300
0.280 – 0.295	10	0.250	0.550
0.295 – 0.310	13	0.325	0.875
0.310 – 0.325	1	0.025	0.900
0.325 – 0.340	3	0.075	0.975
0.340 – 0.355	1	0.025	1.000

b. One player has a batting average above 0.340; 25% of the players have a batting average of at least 0.280 but less than 0.295; 90% of the players have batting averages below 0.325.

c. The distribution is not symmetric; it is positively skewed.



d.



e. Approximately 0.55
Explanation:
a. To construct the frequency distribution, count the number of players whose batting average falls in each class. To construct a relative frequency distribution, divide the frequency of each class by the total number of observations (in this case, 40). To construct the cumulative relative frequency distribution, take the relative distribution and add it to the preceding class's cumulative relative frequency. For the lowest class, the cumulative relative frequency is simply the relative frequency of that class.
b. Use the distributions computed in part a. to answer these questions.
c. Because the distribution has a tail toward the right, we are able to say that it is positively skewed. To construct a relative frequency histogram by hand, let the width of each rectangle equal the width of the class, and its height equal the corresponding relative frequency. To construct a relative frequency histogram in Excel, put the class column and the relative frequency column next to one another in the spreadsheet. Select both columns simultaneously and then choose **Insert > Column > 2-D Column**. Choose the option at the top left. See instructions in the text for other formatting options.
d. To construct an ogive in Excel, create a table with two columns. In the left column, put the upper limit of each class, and in the right column put the cumulative relative frequency or cumulative percent frequency. In the first row of this table, insert the lower bound of the first class in the left column and a 0 in the right column. Select both columns simultaneously and then choose **Insert > Scatter** and pick the option given at the top right (a scatterplot with a smooth line connecting the points).
e. Draw a vertical line up from 0.290 on the horizontal axis of the ogive. This intersects the ogive at about 0.45, so about 45% of this group of players have a batting average less than 0.290. Therefore, about 55% have a batting average greater than 0.290.
Difficulty: 3 Hard
Topic: Summarizing Quantitative Data
Learning Objective: 02-04 Construct and interpret histograms, polygons, and ogives.
Bloom's: Apply
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

115) The following table shows analyst sentiment ratings for the 30 stocks listed in the Dow Jones Industrial Average.

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

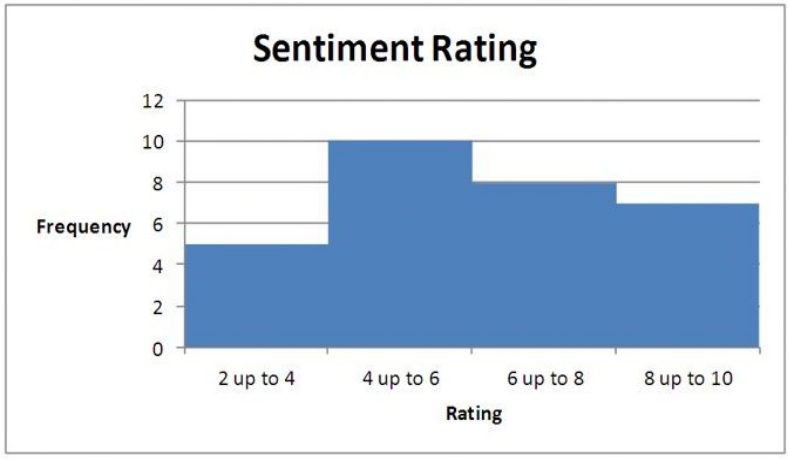
(See the Excel Data File.)

a. Construct a frequency distribution, relative frequency distribution, cumulative frequency distribution and relative cumulative frequency distribution using classes of 2 up to 4, 4 up to 6, 6 up to 8, and 8 up to 10.
b. Construct a histogram that summarizes the data.
c. What percentage of the stocks in the Dow Jones Industrial Average received a sentiment rating less than 8?
d. What percentage of the stocks in the Dow Jones Industrial Average received a sentiment rating of 6 or more?

Answer:
a.

Sentiment Rating	Frequency	Relative Frequency	Cumulative Frequency	Cumulative Relative Frequency
2 up to 4	5	0.1667	5	0.1667
4 up to 6	10	0.3333	15	0.5000
6 up to 8	8	0.2667	23	0.7667
8 up to 10	7	0.2333	30	1.0000
Total	30	1.000		

b.



c. About 77%.
d. 50%.

Explanation:
c. 23/30 ≈ 0.77 or about 77%. See cumulative relative frequency distribution in part a.
d. 15/30 = 0.5 or 50%. See cumulative relative frequency distribution in part a.
Difficulty: 3 Hard
Topic: Summarizing Quantitative Data
Learning Objective: 02-03 Summarize quantitative data by forming frequency distributions.; 02-04 Construct and interpret histograms, polygons, and ogives.
Bloom's: Apply
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

116) The accompanying cumulative relative frequency distribution shows a summary of the scores from an Algebra II exam at a local high school. Twenty students took the exam.

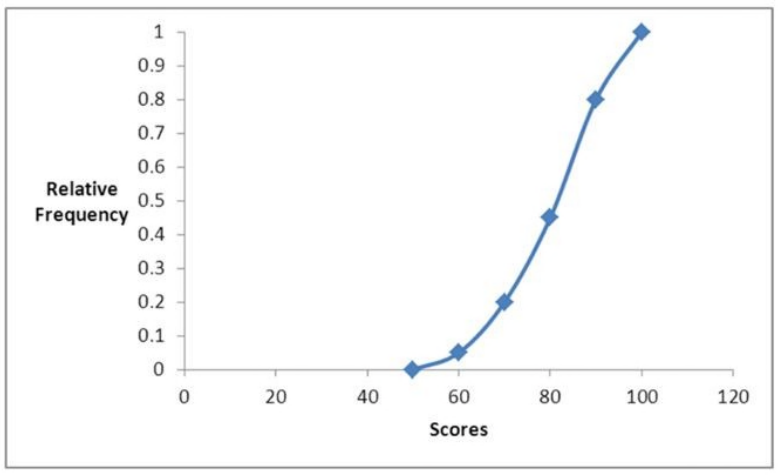
Class	Cumulative Relative Frequency
51 - 60	0.05
61 - 70	0.20
71 - 80	0.45
81 - 90	0.80
91 - 100	1.00

a. Construct the relative frequency distribution. What proportion of students scored between 81 and 90?
b. Construct the frequency distribution. How many students scored between 71 and 80?
c. Construct an ogive. What is the approximate percentage of students that scored less than 85?

Answer:
a. 0.35
b. 5

Class	Cumulative Relative Frequency	Relative Frequency	Frequency
51 - 60	0.05	0.05	1
61 - 70	0.20	0.15	3
71 - 80	0.45	0.25	5
81 - 90	0.80	0.35	7
91 - 100	1.00	0.20	4

c. Approximately 60% of students scored less than 85.



Explanation:
a. To find the relative frequency for each class, subtract each class's cumulative relative frequency from the preceding cumulative relative frequency; so the proportion of students that scored between 81 and 90 is 0.80 − 0.45 = 0.35.
b. To find the frequency for each class, multiply each class's relative frequency by N (N = 20); so the number of students that scored between 71 and 80 is 0.25 × 20 = 5.
c. To construct an ogive, we plot the five points corresponding to the upper class limits and their cumulative relative frequencies. In addition, we add one point being the first class lower limit with a zero value. See instructions in the text for plotting an ogive in Excel. We then draw a vertical line at the score 85 (not shown) until it intersects the curve. At the intersection, draw a horizontal line to the y axis—it intersects at approximately 0.60, or 60%.
Difficulty: 3 Hard
Topic: Summarizing Quantitative Data
Learning Objective: 02-04 Construct and interpret histograms, polygons, and ogives.
Bloom's: Apply
AACSB: Reflective Thinking
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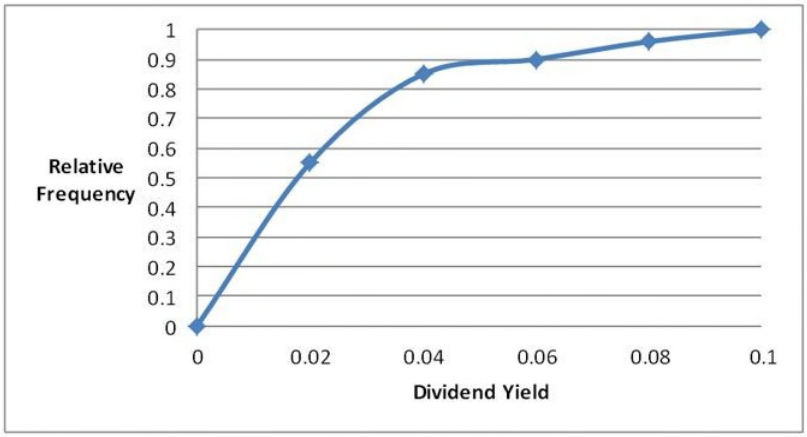
117) The dividend yields of the stocks in an investor's portfolio are shown in the following cumulative relative frequency distribution.

Dividend Yields	Cumulative Relative Frequency
0% up to 2%	0.55
2% up to 4%	0.85
4% up to 6%	0.90
6% up to 8%	0.96
8% up to 10%	1.00

a. Construct an ogive.
b. Approximately what percent of the stocks had a dividend yield of 3% or larger?

Answer:
a.



b. Approximately 30% of the stocks had a dividend yield of 3% or greater.
Explanation: To construct an ogive, we plot the five points corresponding to the upper class limits and their cumulative relative frequencies. In addition, we add one point being the first class lower limit with a zero value. See instructions in the text for plotting an ogive in Excel. We then draw a vertical line at the score .03 (not shown) until it intersects the curve. At the intersection, draw a horizontal line to the *y* axis—it intersects at approximately 0.70. One minus 0.7 equals 0.3, which is the approximate proportion with dividend yields of 3% or more.
Difficulty: 2 Medium
Topic: Summarizing Quantitative Data
Learning Objective: 02-04 Construct and interpret histograms, polygons, and ogives.
Bloom's: Understand
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

118) Construct a stem-and-leaf diagram with the following data set.

3.2	1.3	2.1	2.4	4.3	3.1	3.2	1.1	1.4	2.5
2.4	2.9	3.8	1.7	2.3	1.2	3.2	1.4	1.5	2.6

(See the Excel Data File.)

Is the distribution symmetric?

Stem	Leaf
1	1 2 3 4 4 5 7
2	1 3 4 4 5 6 9
3	1 2 2 2 8
4	3

Answer: No, the distribution is positively skewed.
Explanation: Sort the data from lowest value to highest value, grouping by the leftmost digit. Write the leftmost digit in the left-hand column. In the right column, write the right-most digit of each data point, separated by a space, in ascending order. By turning the stem-and-leaf diagram on its side, we notice that the distribution has a tail toward the right. The distribution is therefore positively skewed.
Difficulty: 2 Medium
Topic: Stem-and-Leaf Diagrams
Learning Objective: 02-05 Construct and interpret a stem-and-leaf diagram.
Bloom's: Understand
AACSB: Reflective Thinking
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119) Construct a stem-and-leaf diagram for the following data set.

74	75	63	62	56	79	58	79	53	49
78	69	74	72	53	72	64	65	67	77

(See the Excel Data File.)

Is the distribution symmetric?

Stem	Leaf
4	9
5	3 3 6 8
6	2 3 4 5 7 9
7	2 2 4 4 5 7 8 9 9

Answer: No, the distribution is negatively skewed.
Explanation: Sort the data from lowest value to highest value, grouping by the leftmost digit. Write the leftmost digit in the left-hand column. In the right column, write the right-most digit of each data point, separated by a space, in ascending order. By turning the stem-and-leaf diagram on its side, we notice that the distribution has a tail toward the left. The distribution is therefore negatively skewed.
Difficulty: 2 Medium
Topic: Stem-and-Leaf Diagrams
Learning Objective: 02-05 Construct and interpret a stem-and-leaf diagram.
Bloom's: Understand
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

120) The following table shows average wind speeds (in miles per hour) during 15 major fires in California.

44	55	22	32	29	24	47	33	32	27	58	39	38	51	41

(See the Excel Data File.)

Construct a stem-and-leaf diagram. Were most of these storms fueled by 45+ mile-per-hour winds? Explain.

Answer: No, most of the time the average wind speed was below 45 mph; only 4 out of the 15 storms had average wind speeds exceeding 45 mph.

Stem	Leaf
2	2 4 7 9
3	2 2 3 8 9
4	1 4 7
5	1 5 8

Explanation:
- Sort data, then group according to the 10s digit.
  20s 22, 24, 27, 29
  30s 32, 32, 33, 38, 39
  40s 41, 44, 47
  50s 51, 55, 58
- Write the 10s digits in the left-hand column.
- Draw a line next to the 10s digit.

On the right-hand side of the line, write the 1s digit for each number.
Difficulty: 2 Medium
Topic: Stem-and-Leaf Diagrams
Learning Objective: 02-05 Construct and interpret a stem-and-leaf diagram.
Bloom's: Understand
AACSB: Reflective Thinking
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121) The following table shows the prices (in $1,000s) of the last 15 trucks sold at a Toyota dealership.

32	21	26	33	23	24	31	22	17	25	18	23	22	19	35

(See the Excel Data File.)

Construct a stem-and-leaf diagram. Given this diagram, estimate the price that a potential buyer would likely pay for a Toyota truck.

Answer: A potential buyer of a Toyota truck is likely to pay in the low to mid $20s (in thousands).

Stem	Leaf
1	7 8 9
2	1 2 2 3 3 4 5 6
3	1 2 3 5

Explanation:
- Sort data, then group according to the 10s digit.
  10s 17, 18, 19
  20s 21, 22, 22, 23, 23, 24, 25, 26
  30s 31, 32, 33, 34
- Write the 10s digits in the left-hand column.
- Draw a line next to the 10s digit.

On the right-hand side of the line, write the 1s digit for each number.
Difficulty: 2 Medium
Topic: Stem-and-Leaf Diagrams
Learning Objective: 02-05 Construct and interpret a stem-and-leaf diagram.
Bloom's: Understand
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

122) The following data represent the ages of patients in the cardiac section of the local hospital. Construct a stem-and-leaf diagram. Comment on whether or not the distribution is symmetric.

48	53	60	61	62	63	70	70	72	77	78	79	80	82	87	88	90

(See the Excel Data File.)

Answer:

Stem	Leaf
4	8
5	3
6	0 1 2 3
7	0 0 2 7 8 9
8	0 2 7 8
9	0

The distribution is not symmetric; it is slightly negatively skewed due to patient who is 48 years old.

40s 48
50s 53
60s 60, 61, 62, 63
70s 70, 70, 72, 77, 78, 79
80s 80, 82, 87, 88
90s 90
Explanation: Because the numbers are already sorted, begin by grouping according to the 10s digit. Write the 10s digits in the left-hand column. Draw a line next to the 10s digit. On the right-hand side of the line, write the 1s digit for each number.
Difficulty: 2 Medium
Topic: Stem-and-Leaf Diagrams
Learning Objective: 02-05 Construct and interpret a stem-and-leaf diagram.
Bloom's: Understand
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

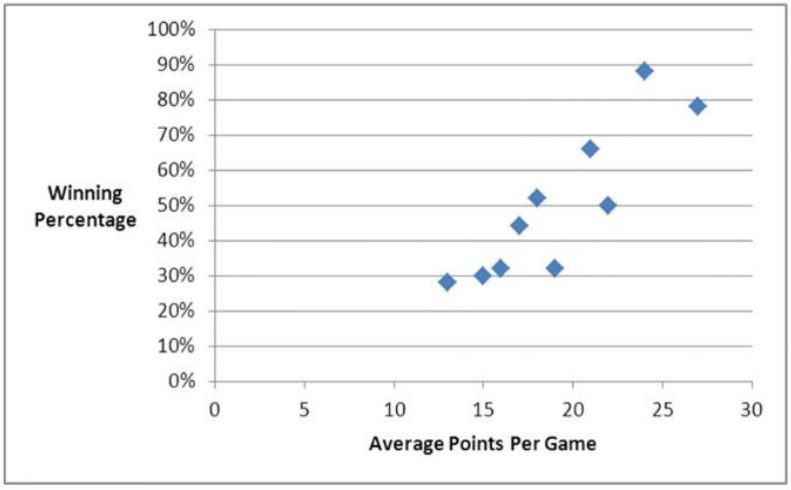
123) A high school football league recorded the average points scored per game, as well as the winning percentage, for the 10 teams in the league.

Points per Game	Winning Percentage
24	88%
21	66%
27	78%
13	28%
16	32%
18	52%
15	30%
17	44%
19	32%
22	50%

(See the Excel Data File.)

Construct a scatterplot. Does scoring more points appear to be associated with a higher winning percentage?

Answer: Teams with higher points per game tend to have a higher winning percentage.



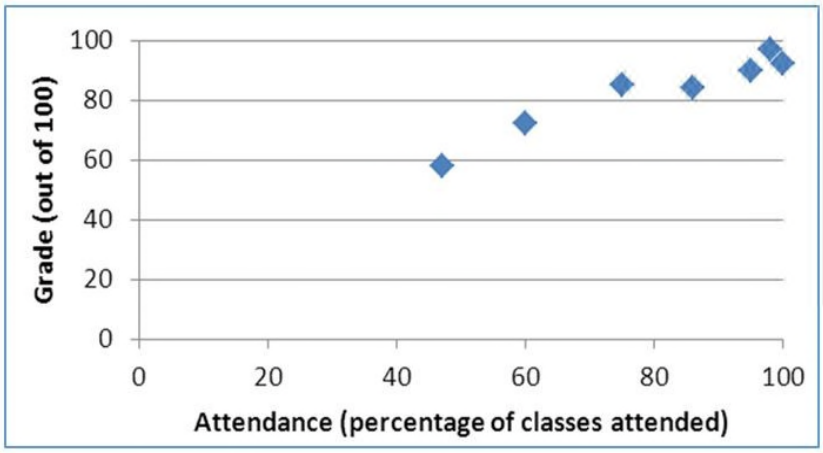
Explanation: To construct the scatterplot, plot each team's points per game-winning percentage combination, where, in our answer key, the points per game correspond to the value on the horizontal axis, and the winning percentage corresponds to the value on the vertical axis. Since the relationship is clearly positive (as one variable gets larger, the other tends to get larger as well), teams that score more points tend to have a higher winning percentage.
Difficulty: 2 Medium
Topic: Scatterplots
Learning Objective: 02-06 Construct and interpret a scatterplot.
Bloom's: Understand
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

124) A statistics instructor computes the grade and percentage of classes that each of his students attends. Construct a scatterplot from the data displayed next. Does a relationship exist between attendance and grade?

Attendance	47	60	75	86	95	98	100
Grade	58	72	85	84	90	97	92

(See the Excel Data File.)

Answer:



Yes, there appears to be a positive relationship.
Explanation: To construct the scatterplot, plot each attendance-grade combination, where, in our answer key, the attendance corresponds to the value on the horizontal axis and the grade corresponds to the value on the vertical axis. Since a clear positive relationship exists, we are able to say that the two variables are related.
Difficulty: 2 Medium
Topic: Scatterplots
Learning Objective: 02-06 Construct and interpret a scatterplot.
Bloom's: Understand
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation