Statistics Informed Decisions Using Data 5th edition Sullivan Test Bank

SKU: 9780134133539-TEST-BANK

Ch. 2 Organizing and Summarizing Data

2.1 Organizing Qualitative Data

1 Organize qualitative data in tables.

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Provide an appropriate response. Round relative frequencies to thousandths.

1) Scott Tarnowski owns a pet grooming shop. His prices for grooming dogs are based on the size of the dog. His records from last year are summarized below. Construct a frequency distribution and a relative frequency distribution. Show the percentage represented by each relative frequency.

Class	Frequency
Large	345
Medium	830
Small	645

2) The results of a survey about a recent judicial appointment are given in the table below. Construct a relative frequency distribution.

Response	Frequency
Strongly Favor	7
Favor	8
Neutral	18
Oppose	38
Strongly Oppose	129

3) The preschool children at Elmwood Elementary School were asked to name their favorite color. The results are listed below. Construct a frequency distribution and a relative frequency distribution.

purple	purple	green	red	blue
blue	blue	purple	blue	green
blue	green	red	red	red
green	blue	red	blue	yellow

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

4) True or False: The sum of all the relative frequencies of a distribution will always add up to 1.
A) False B) True

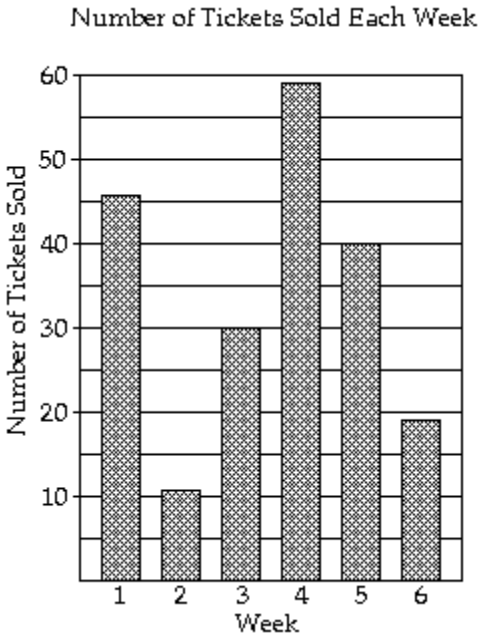
5) True or False: Relative frequency is the proportion (or percent) of observations within a category and is found using the formula: relative frequency $= \frac{\text{sum of all frequencies}}{\text{frequency}}$.
A) False B) True

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2 Construct bar graphs.

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

The bar graph shows the number of tickets sold each week by the garden club for their annual flower show.



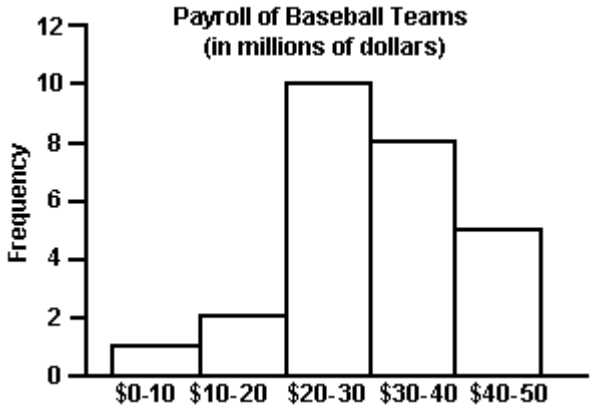
6) During which week was the most number of tickets sold?
A) week 4 B) week 5 C) week 2 D) week 1

7) During which week was the fewest number of tickets sold?
A) week 2 B) week 4 C) week 6 D) week 5

8) Approximately how many tickets were sold during week 2?
A) 11 tickets B) 30 tickets C) 59 tickets D) 40 tickets

Provide an appropriate response.

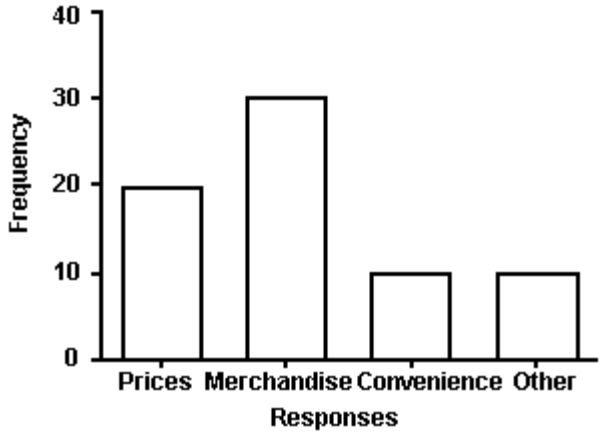
9) The payroll amounts for 26 major–league baseball teams are shown below. Aprroximately what percentage of the payrolls were in the $20–$30 million range? Round to the nearest whole percent.



A) 38% B) 10% C) 59% D) 11%

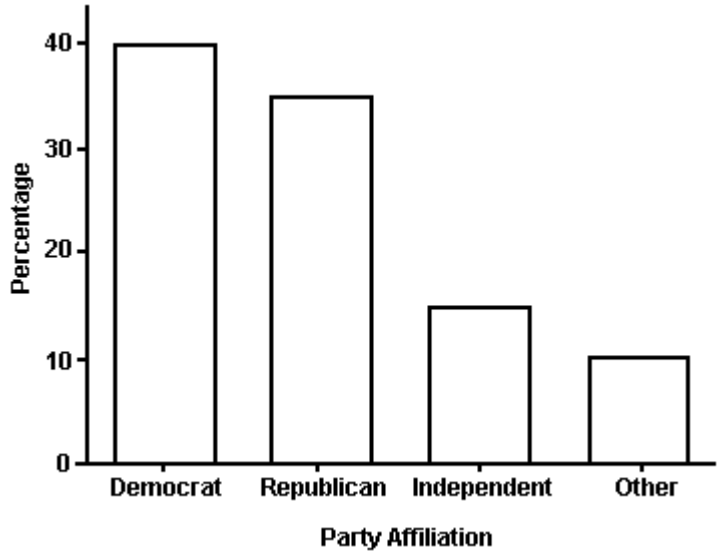
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10) Retailers are always interested in determining why a customer selected their store to make a purchase. A sporting goods retailer conducted a customer survey to determine why its customers shopped at the store. The results are shown below. What percentage of the customers responded that the merchandise was the reason they shopped at the store? Round to the nearest whole percent



A) 43% B) 30% C) 50% D) 29%

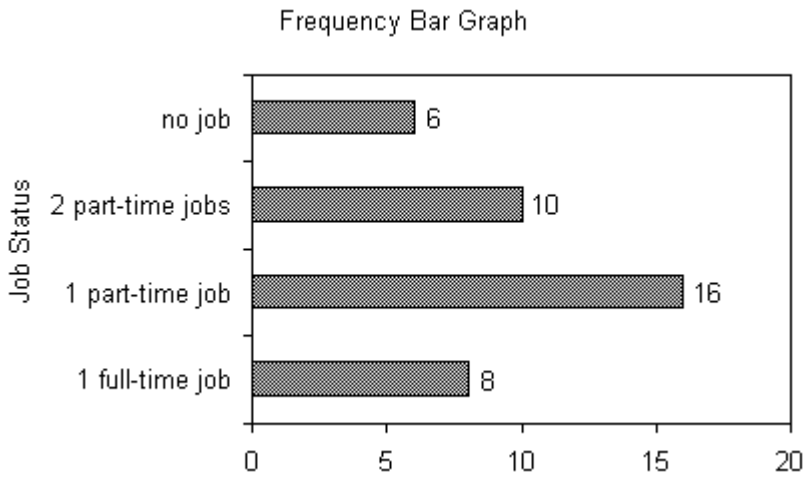
11) The bar graph below shows the political party affiliation of 1000 registered U.S. voters. What percentage of the 1000 registered U.S. voters belonged to one of the traditional two parties (Democratic and Republican)?



A) 75% B) 40% C) 35% D) 25%

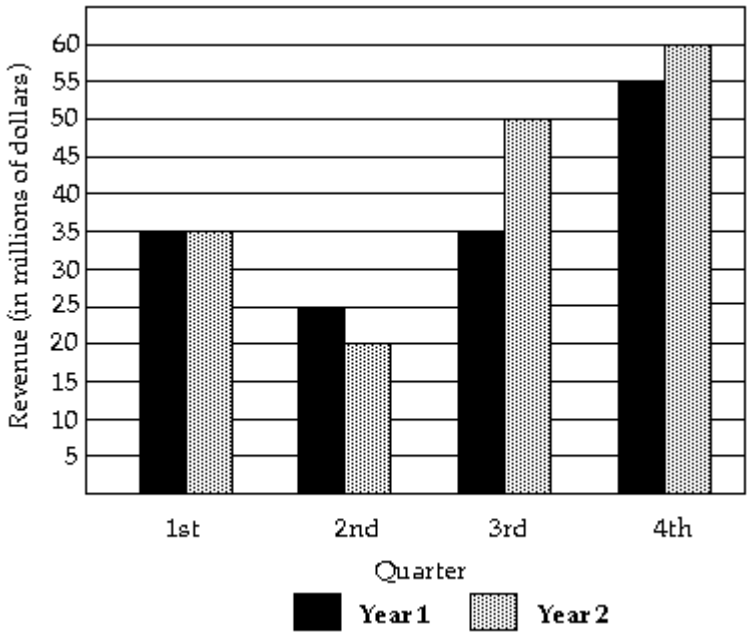
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12) The Excel frequency bar graph below describes the employment status of a random sample of U.S. adults. What is the percentage of those having no job?



A) 15% B) 20% C) 40% D) cannot determine

The following double–bar graph illustrates the revenue for a company for the four quarters of the year for two different years. Use the graph to answer the question.



13) In what quarter was the revenue the greatest for Year 1?
A) fourth quarter B) first quarter C) second quarter D) third quarter

14) In what quarter was the revenue the least for Year 1?
A) second quarter B) first quarter C) fourth quarter D) third quarter

15) What was the revenue for the third quarter of Year 2?
A) $50 million B) $10 million C) $35 million D) $7 million

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SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Provide an appropriate response.

16) The grade point averages for 40 evening students are listed below. Construct a frequency bar graph and a relative frequency bar graph.

Grade Point Average	Frequency
0.5–0.9	4
1.0–1.4	2
1.5–1.9	7
2.0–2.4	9
2.5–2.9	2
3.0–3.4	10
3.5–3.9	2
4.0–4.4	4

17) The local police, using radar, checked the speeds (in mph) of 30 motorists in a construction area. The results are listed below. Construct a frequency bar graph and a relative frequency bar graph.

Speed	Frequency
33–35	3
36–38	6
39–41	6
42–44	6
45–47	3
48–50	6

18) Listed below are the ACT scores of 40 randomly selected students at a major university.

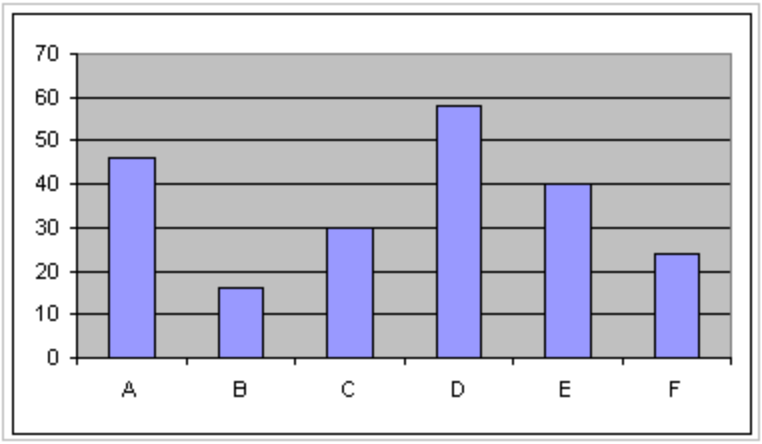
18	22	13	15	24	24	20	19	19	12
16	25	14	19	21	23	25	18	18	13
26	26	25	25	19	17	18	15	13	21
19	19	14	24	20	21	23	22	19	17

a) Construct a relative frequency bar graph of the data, using eight classes.
b) If the university wants to accept the top 90% of the applicants, what should the minimum score be?
c) If the university sets the minimum score at 17, what percent of the applicants will be accepted?

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MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

19) Given the bar graph shown below, the Pareto chart that would best represent the data should have the bars in the following order.



A) D A E C F B B) B F C E A D C) C A D E F B D) B F E D A C

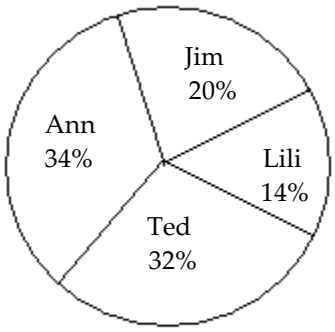
3 Construct pie charts.

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

The pie chart shows the percentage of votes received by each candidate in the student council presidential election. Use the pie chart to answer the question.

20)

Student Council President



500 total votes

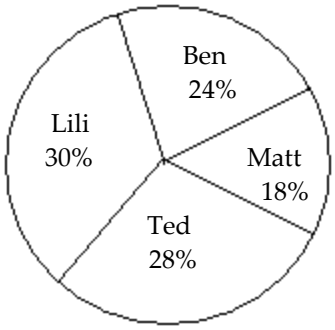
Who got the most votes?

A) Ann B) Ted C) Jim D) Lili

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21)

Student Council President



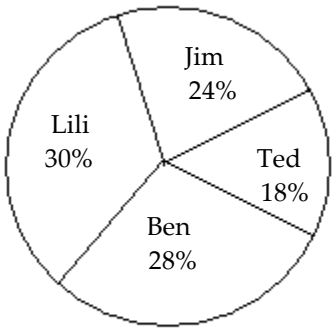
200 total votes

Who got the fewest votes?

A) Matt B) Ted C) Ben D) Lili

22)

Student Council President



200 total votes

What percent of the votes did Ted and Jim receive together?

A) 42% B) 58% C) 18% D) 24%

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Construct a pie chart for the data. Label each category with its percentage.

23) A study was conducted to determine how people get jobs. Four hundred subjects were randomly selected and the results are listed below. Round percents to whole numbers.

Job Sources of Survey Respondents	Frequency
Newspaper want ads	72
Online services	124
Executive search firms	69
Mailings	32
Networking	103

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24) Scott Tarnowski owns a pet grooming shop. His prices for grooming dogs are based on the size of the dog. His records from last year are summarized below. Round percents to whole numbers.

Class	Frequency
Large	345
Medium	830
Small	645

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Provide an appropriate response.

25) A two–pound bag of assorted candy contained 100 caramels, 83 mint patties, 93 chocolate squares, 80 nut clusters, and 79 peanut butter taffy pieces. To create a pie chart of this data, the angle for the slice representing each candy type must be computed. What is the degree measure of the slice representing the mint patties rounded to the nearest degree?

A) 69° B) 19° C) 5° D) 52°

2.2 Organizing Quantitative Data: The Popular Displays

1 Organize discrete data in tables.

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Construct a frequency distribution for the data.

1) A random sample of 30 high school students is selected. Each student is asked how much time he or she spent on the Internet during the previous week. The following times (in hours) are obtained:

4 12 6 9 6 4 6 5 3 9
7 5 5 4 7 6 3 3 8 5
3 5 12 7 4 8 4 7 6 5

Construct a frequency distribution for the data.

2) A sample of 25 service project scores is taken and is recorded below. Construct a frequency distribution for this data.

97 96 96 95 96
99 97 97 100 99
95 98 95 96 100
95 98 96 96 100
95 97 99 97 98

2 Construct histograms of discrete data.

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Construct the specified histogram.

3) A random sample of 30 high school students is selected. Each student is asked how much time he or she spent on the Internet during the previous week. The following times (in hours) are recorded:

6 14 8 11 8 6 8 7 5 11
9 7 7 6 9 8 5 5 10 7
5 7 14 9 6 10 6 9 8 7

Construct a frequency histogram for this data.

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4) A sample of 25 community service projects is obtained and the scores are recorded. The results are shown below. Construct a frequency histogram for this data.

97	96	96	95	96
99	97	97	100	99
95	98	95	96	100
95	98	96	96	100
95	97	99	97	98

3 Organize continuous data in tables.

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Provide an appropriate response.

5) The class width is the difference between
A) Two successive lower class limits
B) The high and the low data values
C) The upper class limit and the lower class limit of a class
D) The largest frequency and the smallest frequency

6) Determine the number of classes in the frequency table below.

Class	Frequency
42–43	7
44–45	2
46–47	6
48–49	4
50–51	1

A) 5 B) 6 C) 20 D) 2

7) Find the class width for the frequency table below.

Class	Frequency
35–36	3
37–38	1
39–40	3
41–42	6
43–44	2

A) 2 B) 1 C) 1.5 D) 2.5

8) Use the following frequency distribution to determine the class limits of the third class.

Class	Frequency
10–13	6
14–17	10
18–21	7
22–25	4
26–29	8
30–33	5

A) lower limit: 18; upper limit: 21
B) lower limit: 17.5; upper limit: 21.5
C) lower limit: 18; upper limit: 22
D) lower limit: 17; upper limit: 22

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9) A researcher records the number of employees of each of the IT companies in the town of Westmoore. The results are summarized in the table.

Number of Employees	Number of IT Companies
0 – 249	33
250 – 499	22
500 – 749	8
750 – 999	7
1000 – 1249	7

Find the class width.

A) 250 B) 1249 C) 249.5 D) 5

10) A researcher records the number of employees of each of the IT companies in the town of Westmoore. The results are summarized in the table.

Number of Employees	Number of IT Companies
0 – 749	39
750 – 1499	22
1500 – 2249	5
2250 – 2999	7
3000 – 3749	5

Find the class limits of the third class.

A) lower limit: 1500; upper limit: 2249
B) lower limit: 1500; upper limit: 2250
C) lower limit: 1499.5; upper limit: 2249.5
D) lower limit: 1499; upper limit: 2250

11) The weights (in pounds) of babies born at St Mary's hospital last month are summarized in the table.

Weight (lb)	Number of Babies
5.0 – 6	7
6.1 – 7.1	19
7.2 – 8.2	20
8.3 – 9.3	10
9.4 – 10.4	3

Find the class width.

A) 1.1 lb B) 1 lb C) 1.15 lb D) 1.05 lb

12) The weights (in pounds) of babies born at St Mary's hospital last month are summarized in the table.

Weight (lb)	Number of Babies
5.0 – 5.8	7
5.9 – 6.7	18
6.8 – 7.6	18
7.7 – 8.5	8
8.6 – 9.4	3

Find the class limits for the second class.

A) lower limit: 5.9; upper limit: 6.7
B) lower limit: 5.9; upper limit: 6.8
C) lower limit: 5.85; upper limit:6.75
D) lower limit: 5.8; upper limit: 6.8

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13) The table below summarizes the weights of the almonds (in grams) in a one-pound bag. What is the class width?

Weight (g)	Frequency
0.7585–0.8184	1
0.8185–0.8784	1
0.8785–0.9384	1
0.9385–0.9984	3
0.9985–1.0584	157
1.0585–1.1184	171
1.1185–1.1784	8

A) 0.06 B) 0.059 C) 0.408 D) 0.4

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Construct the requested frequency distribution.

14) The June precipitation amounts (in inches) for 40 cites are listed below. Construct a frequency distribution and a relative frequency distribution using eight classes.

2.0 3.2 1.8 2.9 0.9 4.0 3.3 2.9 3.6 0.8
3.1 2.4 2.4 2.3 1.6 1.6 4.0 3.1 3.2 1.8
2.2 2.2 1.7 0.5 3.6 3.4 1.9 2.0 3.0 1.1
3.0 4.0 4.0 2.1 1.9 1.1 0.5 3.2 3.0 2.2

15) The commute times (in minutes) of 30 executives are listed below. Construct a frequency distribution and a relative frequency distribution using five classes. Round relative frequency values to three decimal places.

70 72 71 70 69 73 69 68 70 71
67 71 70 74 69 68 71 71 71 72
69 71 68 67 73 74 70 71 69 68

16) The March utility bills (in dollars) of 30 homeowners are listed below. Construct a frequency distribution and a relative frequency distribution using six classes.

44 38 41 50 36 36 43 42 49 48
35 40 37 41 43 50 45 45 39 38
50 41 47 36 35 40 42 43 48 33

Provide an appropriate response.

17) A sample of 15 Boy Scouts was selected and their weights (in pounds) were recorded as follows:

97 120 137 124 117
108 134 126 123 106
130 110 100 120 140

a. Using a class width of 10, give the upper and lower limits for five classes, starting with a lower limit of 95 for the first class.

b. Construct a frequency distribution for the data

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4 Construct histograms of continuous data.

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Construct the specified histogram.

18) For the data below, construct a frequency distribution and a relative frequency distribution.

Height (in inches)	Frequency
50 – 52	5
53 – 55	8
56 – 58	12
59 – 61	13
62 – 64	11

19) For the data below, construct a frequency histogram and a relative frequency histogram.

Weight (in pounds)	Frequency
135 – 139	6
140 – 144	4
145 – 149	11
150 – 154	15
155 – 159	8

20) The 30 students in Mrs Harrison's literature class were asked how many cousins they had. The results are shown below. Create a frequency histogram for the data using a class width of 2.

10	1	3	5	4	7
5	1	0	9	11	1
5	4	1	7	7	11
0	6	6	1	5	7
10	1	1	5	6	0

21) The 30 students in Mrs Harrison's literature class were asked how many cousins they had. The results are shown below. Construct a relative–frequency histogram using a class width of 2.

10	1	3	5	4	7
5	1	0	9	11	1
5	4	1	7	7	11
0	6	6	1	5	7
10	1	1	5	6	0

22) A sample of 15 Girl Scouts was selected and their weights (in pounds) were recorded. The results are listed below. Construct a frequency histogram for the data using a class width of 10 and using 95 as the lower limit of the first class.

97	120	137	124	117
108	134	126	123	106
130	110	100	120	140

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Provide an appropriate response.

23) What is the difference between a bar chart and a histogram?

A) The bars on a bar chart do not touch while the bars of a histogram do touch.
B) The bars in a bar chart may be of various widths while the bars of a histogram are all the same width.
C) The bars in a bar chart are all the same width while the bars of a histogram may be of various widths.
D) There is no difference between these two graphical displays.

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5 Draw stem–and–leaf plots.

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Provide an appropriate response.

24) For the stem–and–leaf plot below, what are the maximum and minimum entries?

```
1 | 7 8
1 | 6 6 6 7 8 9
2 | 0 1 1 2 3 4 4 5 6 6
2 | 7 7 7 8 8 9 9 9
3 | 0 1 1 2 3 4 4 5 5
3 | 6 6 6 7 8 8 9 9
4 | 5 8
```

A) max: 48; min: 17 B) max: 38; min: 7 C) max: 47; min: 18 D) max: 45; min: 17

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Determine the original set of data.

25)

Stem	Leaves
7	5
8	3
9	0 2
10	6
11	6 7
12	6 9
13	6 7 9
14	2 3 8 9
15	8 9

Legend: 5|5 represents 55

26)

Stem	Leaves
5	3
6	4
7	0 9
8	3
9	1 7
10	6 9
11	6 7 9
12	2 3 8 9
13	1 9

Legend: 5|3 represents 5.3

Construct a stem–and–leaf plot for the data.

27) The number of home runs that Mark McGwire hit in the first 13 years of his major league baseball career are listed below. (Source: Major League Handbook) Construct a stem–and–leaf plot for this data.

3 49 32 33 39 22 42 9 9 39 52 58 70

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28) The numbers of runs batted in by Mark McLemore in the first 13 years of his major league baseball career are listed below. (Source: Major League Handbook) Construct a stem–and–leaf plot for this data.

0 102 56 25 9 9 56 165 88 122 150 91 114

29) The heights (in inches) of 30 mechanics are listed below. Construct a stem–and–leaf plot for the data.

70 72 71 70 69 73 69 68 70 71
67 71 70 74 69 68 71 71 71 72
69 71 68 67 73 74 70 71 69 68

30) The March utility bills (in dollars) of 30 homeowners are listed below. Construct a stem–and–leaf plot for the data.

44 38 41 50 36 36 43 42 49 48
35 40 37 41 43 50 45 45 39 38
50 41 47 36 35 40 42 43 48 33

31) The scores for an economics test are listed below. Create a stem–and–leaf plot for the data.

87 76 98 77 90 95 88 85 66 89
79 93 50 96 83 88 82 52 11 69

6 Draw dot plots.

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Construct a dot plot for the data.

32) The local police, using radar, checked the speeds (in mph) of 30 motorists at a busy intersection. The results are listed below. Construct a dot plot for the data.

44 38 41 50 36 36 43 42 49 48
35 40 37 41 43 50 45 45 39 38
50 41 47 36 35 40 42 43 48 33

33) The heights (in inches) of 30 mechanics are listed below. Construct a dot plot for the data.

70 72 71 70 69 73 69 68 70 71
67 71 70 74 69 68 71 71 71 72
69 71 68 67 73 74 70 71 69 68

7 Identify the shape of a distribution.

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Construct a frequency distribution for the data using five classes. Describe the shape of the distribution.

34) The data set: Pick Three Lottery Outcomes for 10 Consecutive Weeks

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

A) uniform
B) bell shaped
C) skewed to the left
D) skewed to the right

35) The data set: ages of dishwashers (in years) in 20 randomly selected households

12 6 4 9 11 1 7 8 9 8
9 13 5 15 7 6 8 8 2 1

A) bell shaped
B) uniform
C) skewed to the left
D) skewed to the right

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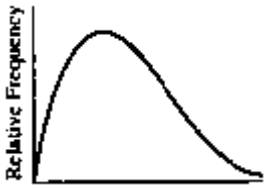
36) The data set: weekly grocery bills (in dollars) for 20 randomly selected households

135 120 115 132 136 124 119 145 98 110
125 120 115 130 140 105 116 121 125 108

A) bell shaped
B) uniform
C) skewed to the left
D) skewed to the right

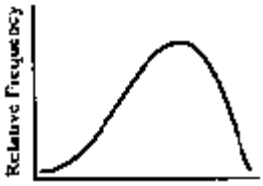
Describe the shape of the distribution.

37)



A) skewed to the right
B) skewed to the left
C) uniform
D) bell shaped

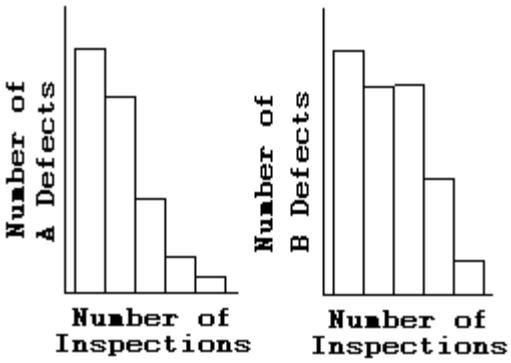
38)



A) skewed to the left
B) skewed to the right
C) uniform
D) bell shaped

Use the histograms shown to answer the question.

39)



Is either histogram symmetric?

A) Neither is symmetric.
B) The first is symmetric, but the second is not symmetric.
C) The second is symmetric, but the first is not symmetric.
D) Both are symmetric.

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SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Describe the shape of the distribution.

40) A sample of 15 Little League players was selected and their weights (in pounds) were recorded as follows:

97	120	137	124	117
108	134	126	123	106
130	110	100	120	140

2.3 Additional Displays of Quantitative Data

1 Construct frequency polygons.

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Construct a frequency polygon for the data.

1)

Height (in inches)	Frequency
50 – 52	5
53 – 55	8
56 – 58	12
59 – 61	13
62 – 64	11

2)

Weight (in pounds)	Frequency
135 – 139	6
140 – 144	4
145 – 149	11
150 – 154	15
155 – 159	8

3) The grade point averages for 40 evening students are listed below. Construct a frequency polygon using eight classes.

2.0	3.2	1.8	2.9	0.9	4.0	3.3	2.9	3.6	0.8
3.1	2.4	2.4	2.3	1.6	1.6	4.0	3.1	3.2	1.8
2.2	2.2	1.7	0.5	3.6	3.4	1.9	2.0	3.0	1.1
3.0	4.0	4.0	2.1	1.9	1.1	0.5	3.2	3.0	2.2

4) The local police, using radar, checked the speeds (in mph) of 30 motorists in a construction area. The results are listed below. Construct a frequency polygon using six classes and a class width of 3.

44	38	41	50	36	36	43	42	49	48
35	40	37	41	43	50	45	45	39	38
50	41	47	36	35	40	42	43	48	33

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Determine whether the statement is true or false.

5) A frequency polygon always begins and ends with a frequency of zero.

A) True B) False

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6) The class midpoint can be determined by adding to the lower class limit one-half of the class width.
A) True B) False

2 Create cumulative frequency and relative frequency tables.

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Construct the requested frequency distribution.

7) The April precipitation amounts (in inches) for 40 cities are listed below. Construct a frequency distribution, a relative frequency distribution, a cumulative frequency distribution, and a relative cumulative frequency distribution using eight classes.

2.0	3.2	1.8	2.9	0.9	4.0	3.3	2.9	3.6	0.8
3.1	2.4	2.4	2.3	1.6	1.6	4.0	3.1	3.2	1.8
2.2	2.2	1.7	0.5	3.6	3.4	1.9	2.0	3.0	1.1
3.0	4.0	4.0	2.1	1.9	1.1	0.5	3.2	3.0	2.2

8) The commute time (in minutes) of 30 executives are listed below. Construct a frequency distribution, a relative frequency distribution, a cumulative frequency distribution, and a relative cumulative frequency distribution using five classes.

70	72	71	70	69	73	69	68	70	71
67	71	70	74	69	68	71	71	71	72
69	71	68	67	73	74	70	71	69	68

9) The local police, using radar, checked the speeds (in mph) of 30 motorists in a construction area. The results are listed below. Construct a frequency distribution, a relative frequency distribution, a cumulative frequency distribution, and a relative cumulative frequency distribution using six classes.

44	38	41	50	36	36	43	42	49	48
35	40	37	41	43	50	45	45	39	38
50	41	47	36	35	40	42	43	48	33

3 Construct frequency and relative frequency ogives.

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Construct the requested ogive.

10) The grade point averages for 40 evening students are listed below. Construct a frequency ogive using eight classes.

2.0	3.2	1.8	2.9	0.9	4.0	3.3	2.9	3.6	0.8
3.1	2.4	2.4	2.3	1.6	1.6	4.0	3.1	3.2	1.8
2.2	2.2	1.7	0.5	3.6	3.4	1.9	2.0	3.0	1.1
3.0	4.0	4.0	2.1	1.9	1.1	0.5	3.2	3.0	2.2

11) The heights (in inches) of 30 lawyers are listed below. Construct a frequency ogive using five classes.

70	72	71	70	69	73	69	68	70	71
67	71	70	74	69	68	71	71	71	72
69	71	68	67	73	74	70	71	69	68

12) The local police, using radar, checked the speeds (in mph) of 30 motorists on a rural road. The results are listed below. Construct a frequency ogive using six classes.

44	38	41	50	36	36	43	42	49	48
35	40	37	41	43	50	45	45	39	38
50	41	47	36	35	40	42	43	48	33

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13) The grade point averages for 40 evening students are listed below. Construct a relative frequency ogive using eight classes.

2.0	3.2	1.8	2.9	0.9	4.0	3.3	2.9	3.6	0.8
3.1	2.4	2.4	2.3	1.6	1.6	4.0	3.1	3.2	1.8
2.2	2.2	1.7	0.5	3.6	3.4	1.9	2.0	3.0	1.1
3.0	4.0	4.0	2.1	1.9	1.1	0.5	3.2	3.0	2.2

14) The heights (in inches) of 30 lawyers are listed below. Construct a relative frequency ogive using five classes.

70	72	71	70	69	73	69	68	70	71
67	71	70	74	69	68	71	71	71	72
69	71	68	67	73	74	70	71	69	68

15) The local police, using radar, checked the speeds (in mph) of 30 motorists on a rural road. The results are listed below. Construct a relative frequency ogive using six classes.

44	38	41	50	36	36	43	42	49	48
35	40	37	41	43	50	45	45	39	38
50	41	47	36	35	40	42	43	48	33

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Provide an appropriate response.

16) An ogive is a graph that represents cumulative frequencies or cumulative relative frequencies. The points labeled on the horizontal axis are the

A) Upper class limits B) Lower class limits C) Midpoints D) Frequencies

4 Draw time–series graphs.

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Use a time series plot to display the data. Comment on the trend,

17) The data below represent the consumption of high–energy drinks (in gallons) by adult Americans over a nine–year period.

Year	1	2	3	4	5	6	7	8	9
Consumption (gal)	10	11	11	12	13	14	15	15	13

18) A transportation engineer wishes to use the following data to illustrate the number of deaths from the collision of passenger cars with motorcycles on a particular highway.

Year	Number of Deaths
1	12
2	17
3	22
4	21
5	16
6	13
7	11

19) Women were allowed to enter the Boston Marathon for the first time in 1972. Listed below are the winning women's times (in minutes) for the first 10 years.

Year	1	2	3	4	5	6	7	8	9	10
Time	190	186	167	162	167	168	165	155	154	147

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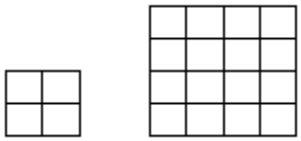
2.4 Graphical Misrepresentations of Data

1 Describe what can make a graph misleading or deceptive.

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Explain what is misleading about the graphic.

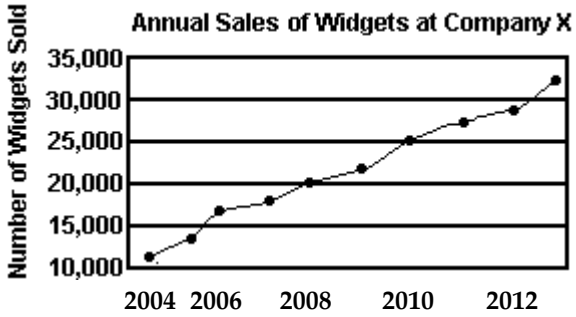
1)



The volume of our sales has doubled!!!

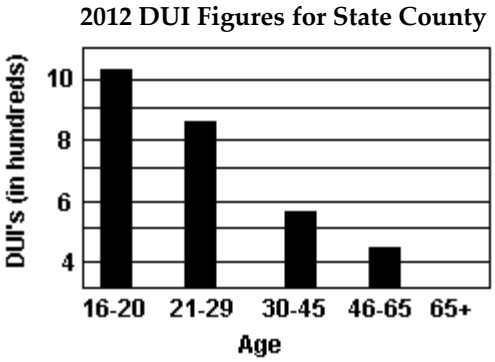
A) The length of a side has doubled, but the area has been multiplied by 4.
B) The length of a side has doubled, but the area has been multiplied by 8.
C) The length of a side has doubled, but the area has been unchanged.
D) The graphic is not misleading.

2)



A) The vertical scale does not begin at zero.
B) The horizontal label is incomplete.
C) The trend is depicted in the wrong direction.
D) The graphic is not misleading.

3)



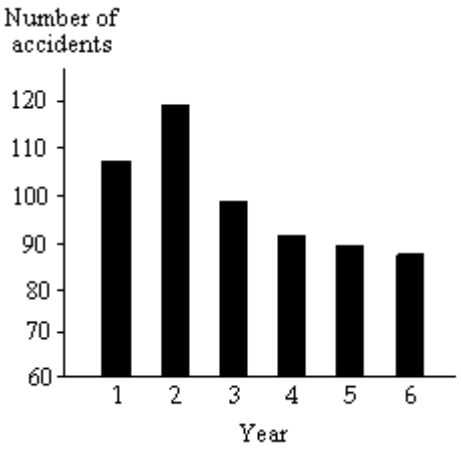
A) The graphic may give the impression that drivers over age 65 had no DUI's in 2012.
B) The graphic only includes information for one year.
C) The horizontal scale does not begin at zero.
D) The graphic is not misleading.

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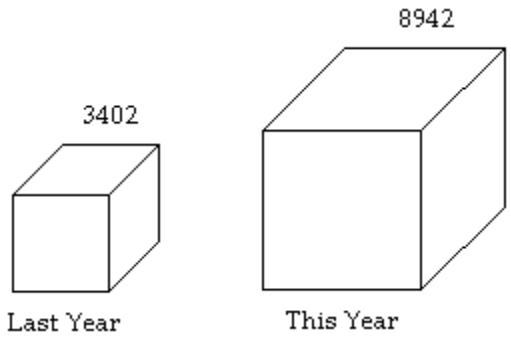
SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Provide an appropriate response.

4) The following graph shows the number of car accidents occurring in one city in each of the years 2006 through 2011 (Year 1 = 2006, Year 2 = 2007 etc). The number of accidents dropped in 2008 after a new speed limit was imposed. How is the bar graph misleading? How would you redesign the graph to be less misleading?



5) A parcel delivery store finds that their delivery rates increased over the past year. Last year it delivered 3402 parcels. This year it delivered 8942 parcels.



How many times larger should the graphic for this year be than the graphic for last year?

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Ch. 2 Organizing and Summarizing Data
Answer Key

2.1 Organizing Qualitative Data

1 Organize qualitative data in tables.

1)

Class	Frequency	Relative Frequency	Percentage
Large	345	0.190	19.0
Medium	830	0.456	45.6
Small	645	0.354	35.4
Total	1820	1.000	100.0

2)

Response	Frequency	Relative Frequency
Strongly Favor	7	0.035
Favor	8	0.04
Neutral	18	0.09
Oppose	38	0.19
Strongly Oppose	129	0.645

3)

Color	Frequency	Relative Frequency
purple	3	0.15
green	4	0.20
red	5	0.25
blue	7	0.35
yellow	1	0.05

4) A

5) A

2 Construct bar graphs.

6) A

7) A

8) A

9) A

10) A

11) A

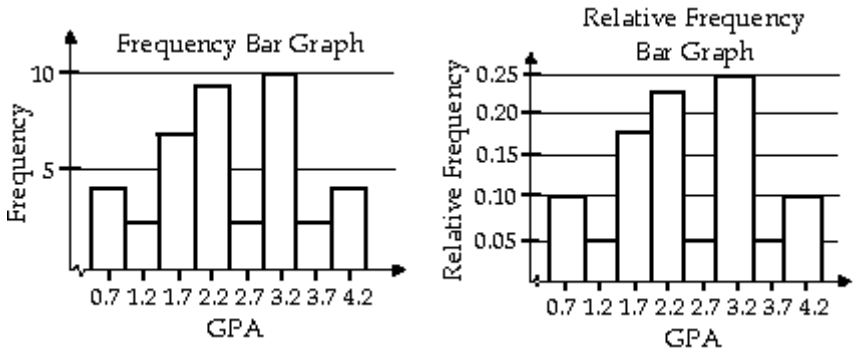
12) A

13) A

14) A

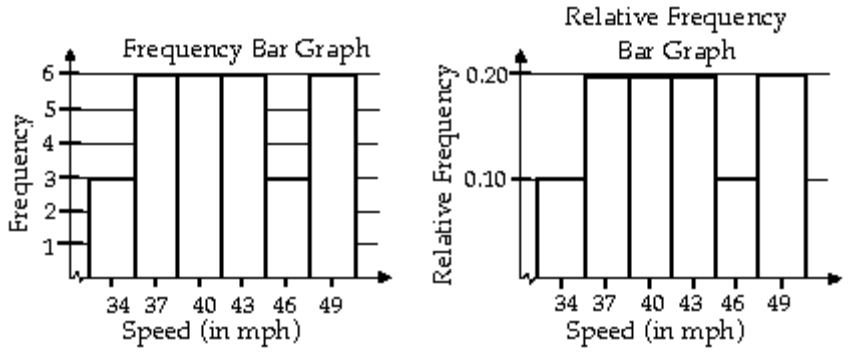
15) A

16)



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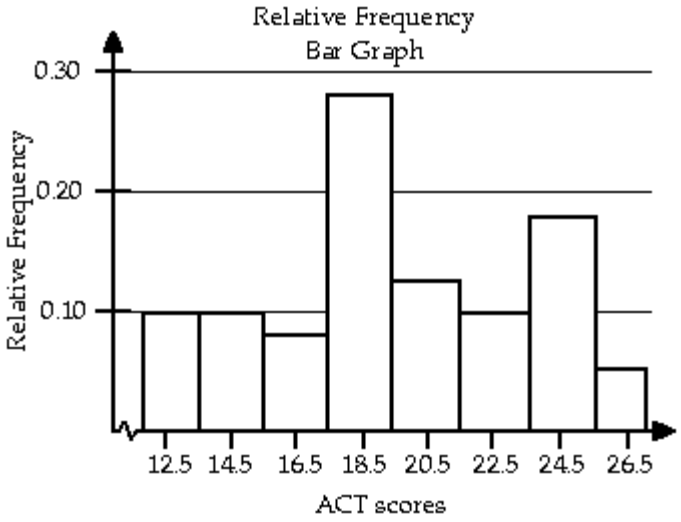
17)



18) a) See graph below

b) The minimum score = 14

c) The university will accept 76.57% of the applicants.



19) A

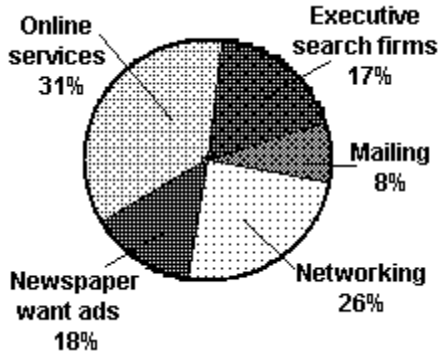
3 Construct pie charts.

20) A

21) A

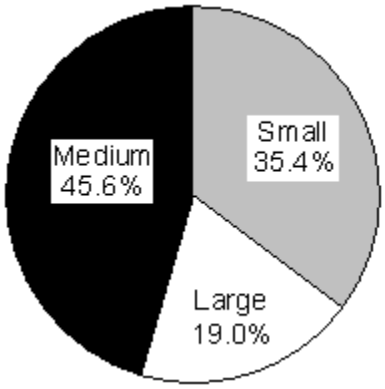
22) A

23)



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24)



25) A

2.2 Organizing Quantitative Data: The Popular Displays

1 Organize discrete data in tables.

1)

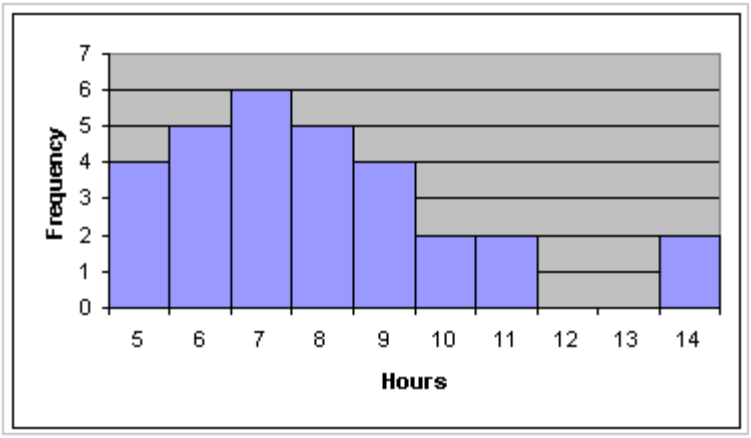
Hours On Net	Number of HS Students
3	4
4	5
5	6
6	5
7	4
8	2
9	2
12	2

2)

Measure	Frequency
95	5
96	6
97	5
98	3
99	3
100	3

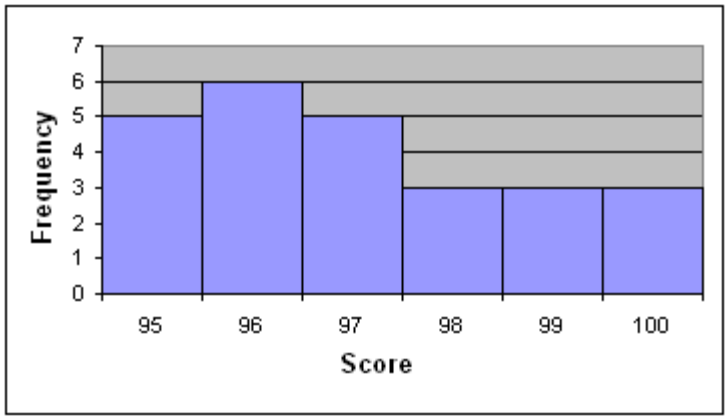
2 Construct histograms of discrete data.

3)



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4)



3 Organize continuous data in tables.

5) A
6) A
7) A
8) A
9) A
10) A
11) A
12) A
13) A
14)

Precip.	Frequency	Relative Frequency
0.5–0.9	4	0.10
1.0–1.4	2	0.05
1.5–1.9	7	0.175
2.0–2.4	9	0.225
2.5–2.9	2	0.05
3.0–3.4	10	0.25
3.5–3.9	2	0.05
4.0–4.4	4	0.10

15)

Commute Time (in min)	Frequency	Relative Frequency
67.0–68.4	6	0.200
68.5–69.9	5	0.167
70.0–71.4	13	0.433
71.5–72.9	2	0.067
73.0–74.4	4	0.133

16)

Util. Bill (dollars)	Frequency	Relative Frequency
33–35	3	0.10
36–38	6	0.20
39–41	6	0.20
42–44	6	0.20
45–47	3	0.10
48–50	6	0.20

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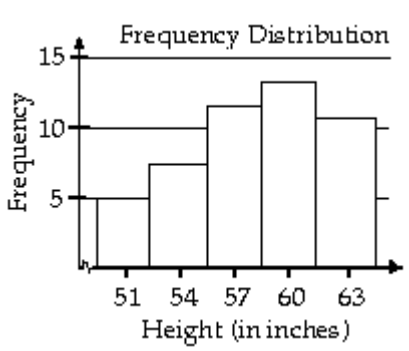
17) a. 95–104, 105–114, 115–124, 125–134, 135–144

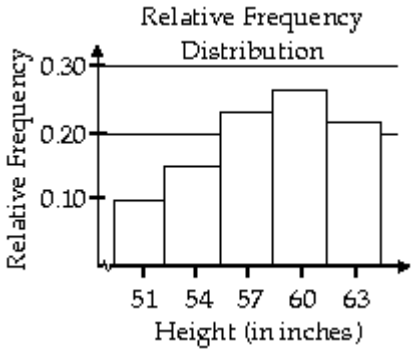
b.

Weight (lb)	Tally	Frequency
95–104	ll	2
105–114	lll	3
115–124	lllll	5
125–134	lll	3
135–144	ll	2

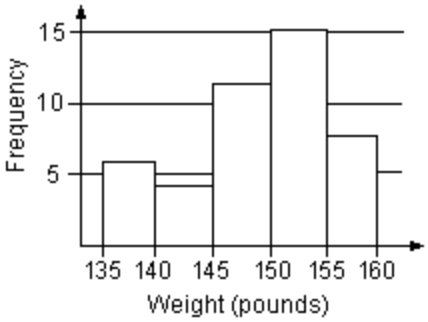
4 Construct histograms of continuous data.

18)

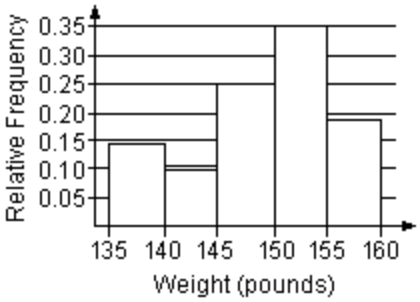




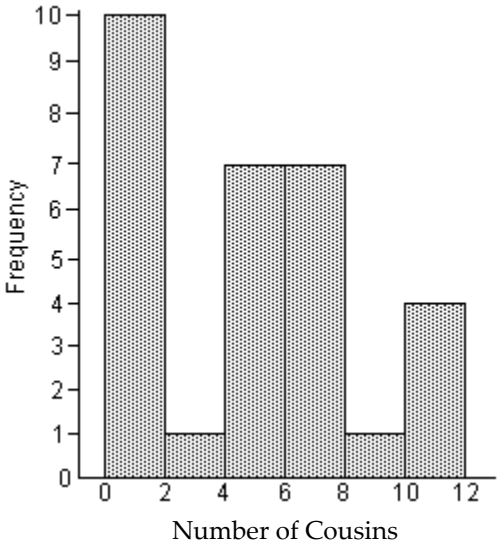
19) Frequency Histogram:



Relative Frequency Histogram:

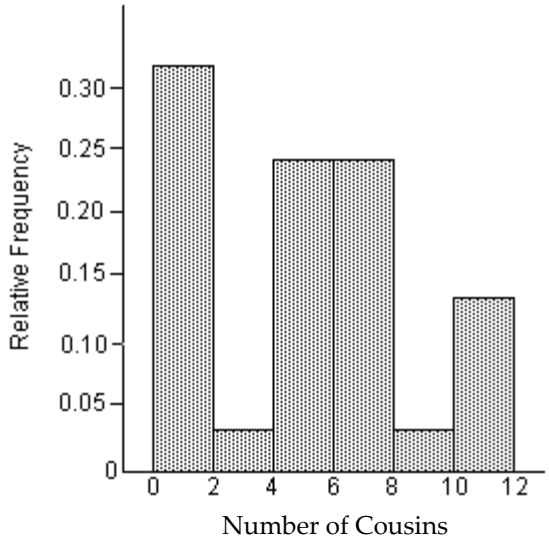


20)

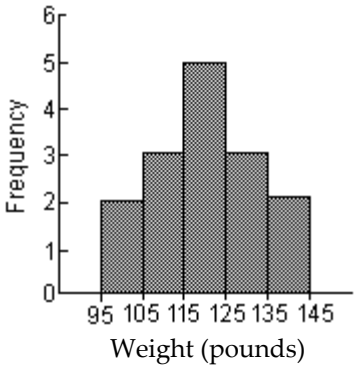


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21)



22)



23) A

5 Draw stem–and–leaf plots.

24) A

25) 75, 83, 90, 92, 106, 116, 117, 126, 129, 136, 137, 139, 142, 143, 148, 149, 15 8, 159

26) 5.3, 6.4, 7.0, 7.9, 8.3, 9.1, 9.7, 10.6, 10.9, 11.6, 11.7, 11.9, 12.2, 12.3, 12.8, 12.9, 13. 1, 13.9

27)

0 | 3 9 9
1 |
2 | 2
3 | 2 3 9 9
4 | 2 9
5 | 2 8
6 |
7 | 0

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28)

0	0 9 9
1	
2	5
3	
4	
5	6 6
7	
8	8
9	1
10	2
11	4
12	2
13	
14	
15	0
16	5

29)

6	7 7 8 8 8 8 9 9 9 9
7	0 0 0 0 0 1 1 1 1 1 1 1 2 2 3 3 4 4

30)

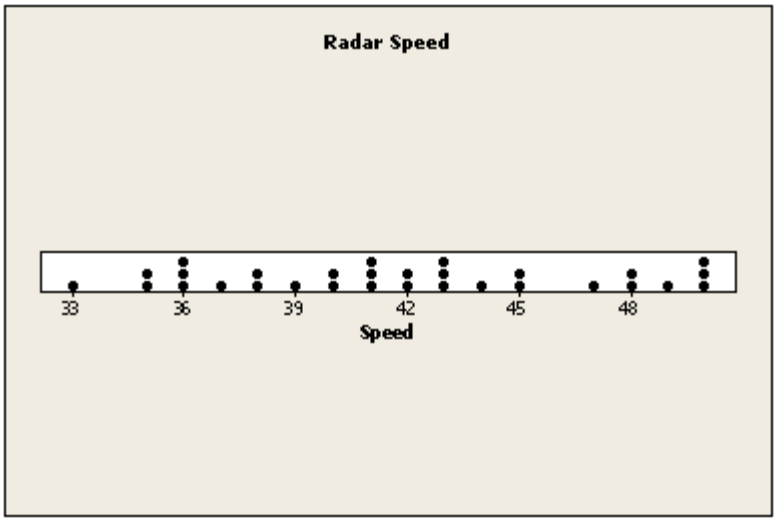
3	3 5 5 6 6 6 7 8 8 9
4	0 0 1 1 1 2 2 3 3 3 4 5 5 7 8 8 9
5	0 0 0

31) The stem will consist of the tens digit and range from 1 to 9. The leaves will be drawn in the appropriate stems based on the data values.

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

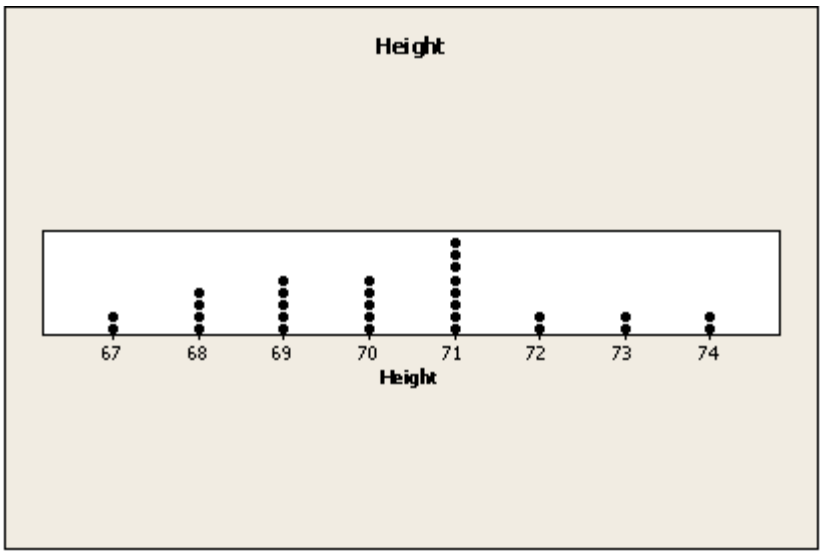
6 Draw dot plots.

32)



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33)



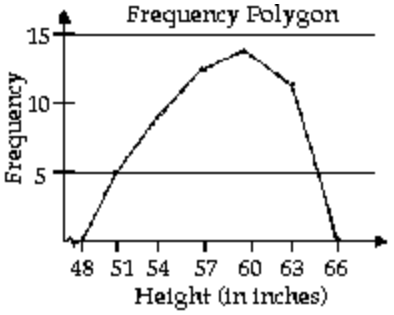
7 Identify the shape of a distribution.

34) A
35) A
36) A
37) A
38) A
39) A
40) symmetric

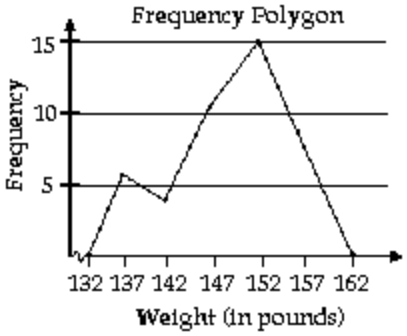
2.3 Additional Displays of Quantitative Data

1 Construct frequency polygons.

1)

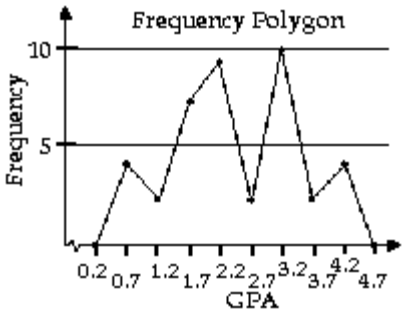


2)

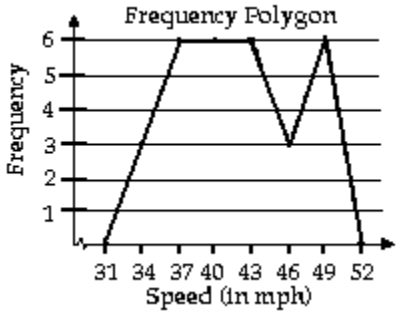


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3)



4)



5) A

6) A

2 Create cumulative frequency and relative frequency tables.

7)

Precip (in.)	Frequency	Relative Frequency	Cumulative Frequency	Cumulative Relative Frequency
0.5–0.9	4	0.10	4	0.10
1.0–1.4	2	0.05	6	0.15
1.5–1.9	7	0.175	13	0.325
2.0–2.4	9	0.225	22	0.55
2.5–2.9	2	0.05	24	0.60
3.0–3.4	10	0.25	34	0.85
3.5–3.9	2	0.05	36	0.90
4.0–4.4	4	0.10	40	1

8)

Commute Time (in min)	Frequency	Relative Frequency	Cumulative Frequency	Cumulative Relative Frequency
67.0–68.4	6	0.20	6	0.20
68.5–69.9	5	0.167	11	0.367
70.0–71.4	13	0.433	24	0.80
71.5–72.9	2	0.067	26	0.867
73.0–74.4	4	0.133	30	1

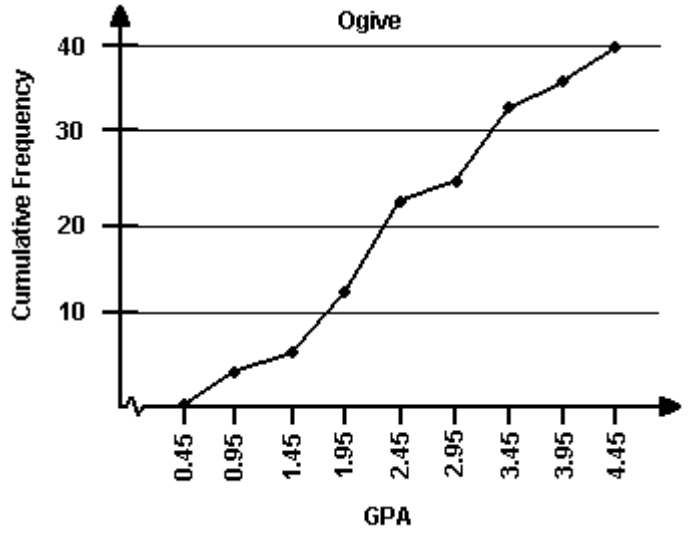
9)

Speed (in mph)	Frequency	Relative Frequency	Cumulative Frequency	Cumulative Relative Frequency
33–35	3	0.10	3	0.10
36–38	6	0.20	9	0.30
39–41	6	0.20	15	0.50
42–44	6	0.20	21	0.70
45–47	3	0.10	24	0.80
48–50	6	0.20	30	1

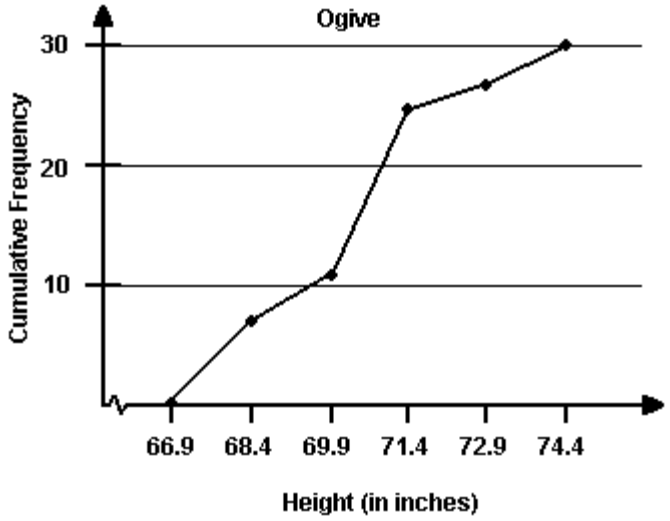
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3 Construct frequency and relative frequency ogives.

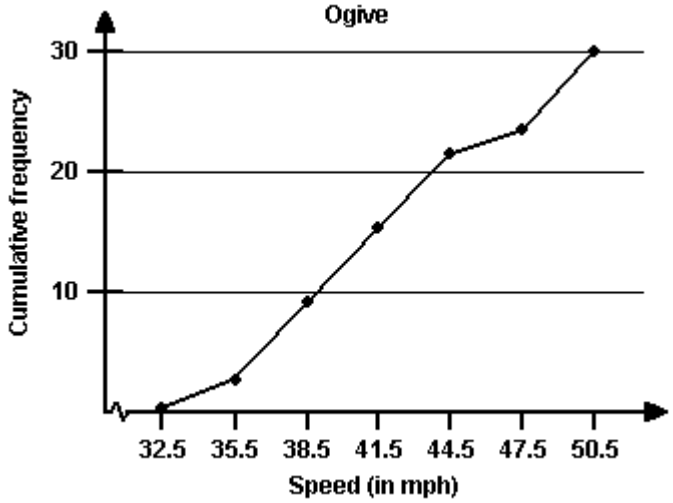
10)



11)

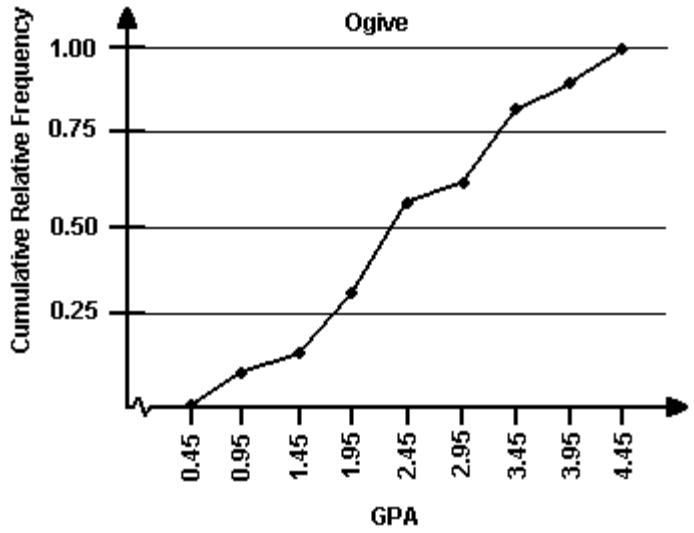


12)

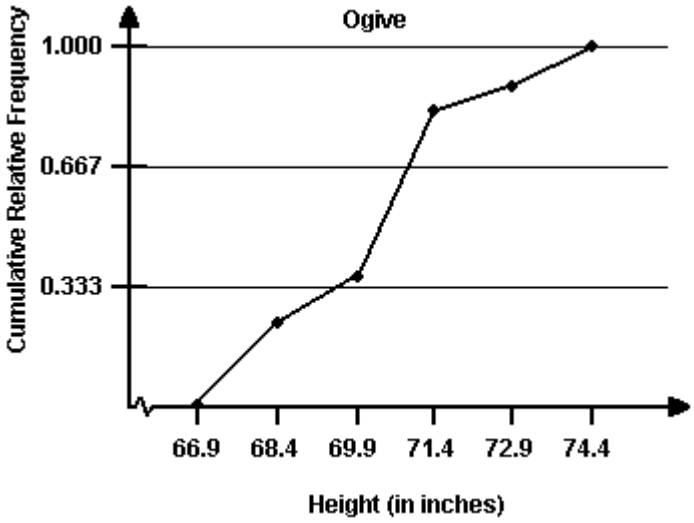


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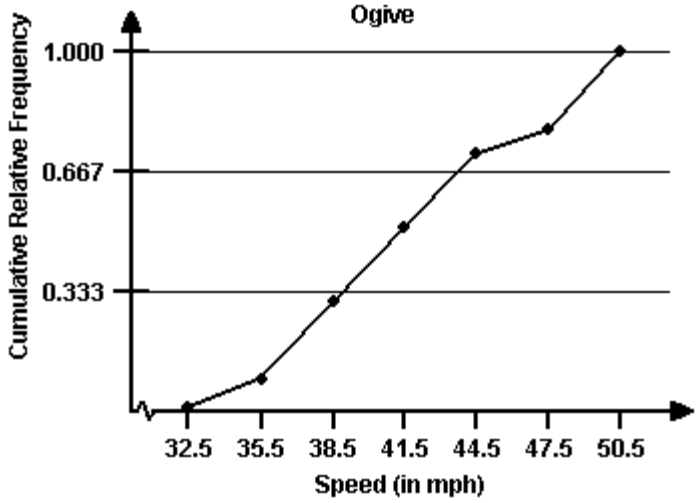
13)



14)



15)

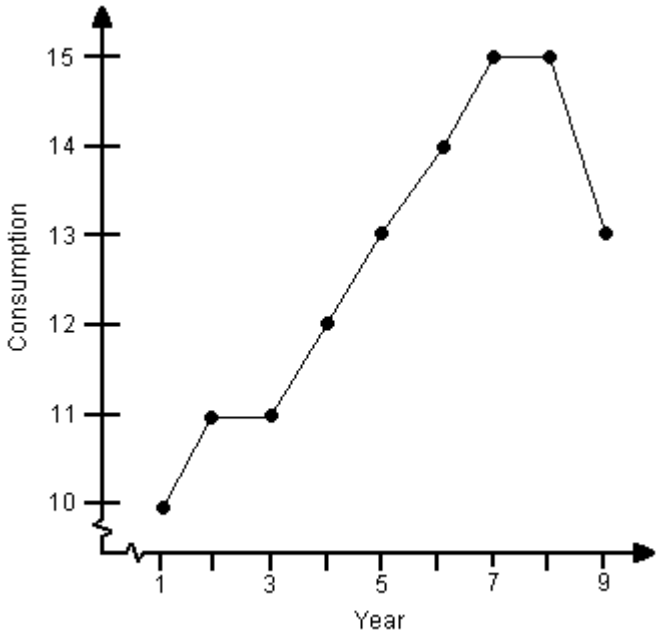


16) A

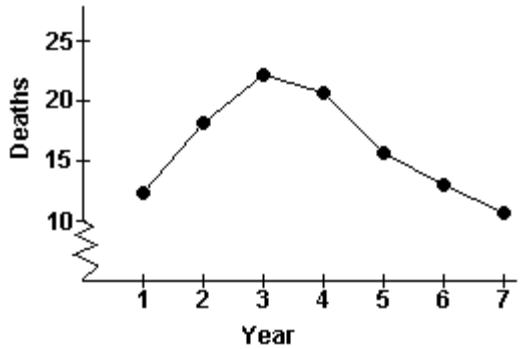
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4 Draw time-series graphs.

17) In general, there is an increasing trend in high-energy drinks consumption of adult Americans. However, beginning in Year 9, there is sign of a decreasing trend.



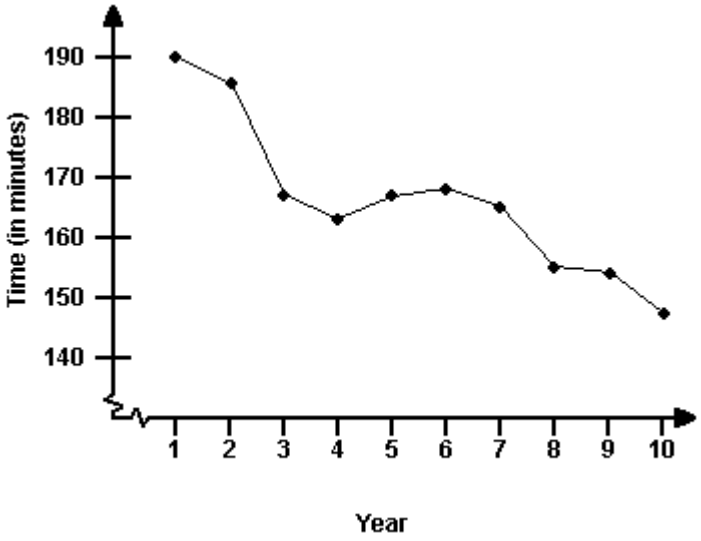
18)



From Year 1 to Year 3, there was an increasing trend in the number of collision deaths. Subsequently, there was a decreasing trend.

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19)



In general, there was a decreasing trend in women's Boston marathon times.

2.4 Graphical Misrepresentations of Data

1 Describe what can make a graph misleading or deceptive.

1) A
2) A
3) A
4) The bar graph is misleading because the vertical axis starts at 60 instead of 0. This tends to indicate that the number of accidents decreased at a faster rate than they actually did. The graph would be less misleading if the vertical scale began at 0 or if a symbol were used to clearly indicate that the vertical scale is truncated and has a gap.
5) roughly 3 times larger

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