Fundamentals of Statistics 5th edition Sullivan Solutions Manual

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Exam

Name_____

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 s 1) _____
the dog. His records from last year are summarized below. Construct a frequency distributi
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. Co 2) _____
a relative frequency distribution.

Response	Frequency
Strongly Favor	38
Favor	37
Neutral	20
Oppose	21
Strongly Oppose	84

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

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

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. 4) _____
A) False B) True

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

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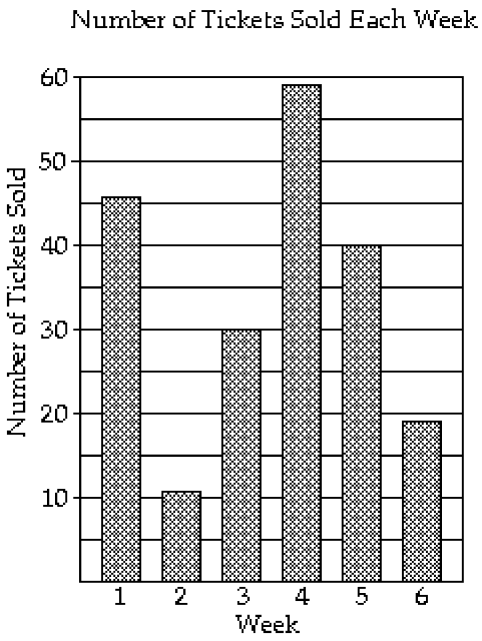
The bar graph shows the number of tickets sold each week by the garden club for their annual flower show.



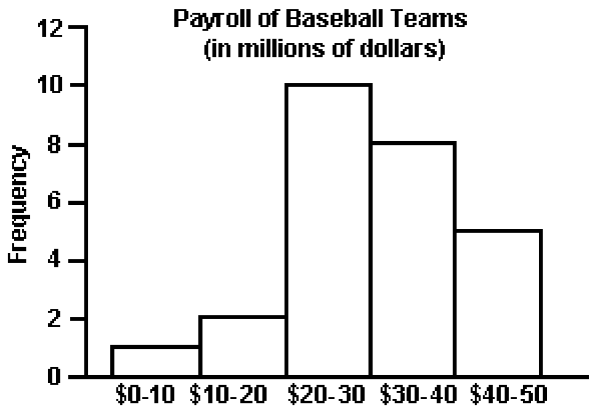
6) During which week was the most number of tickets sold? 6) _____
A) week 5 B) week 1 C) week 2 D) week 4

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

8) Approximately how many tickets were sold during week 6? 8) _____
A) 46 tickets B) 11 tickets C) 30 tickets D) 19 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 $30–$40 million range? Round to the nearest whole percent. 9) _____



A) 31% B) 42% C) 19% D) 8%

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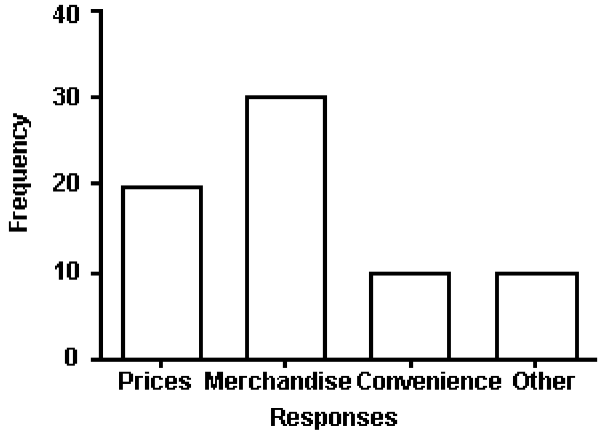
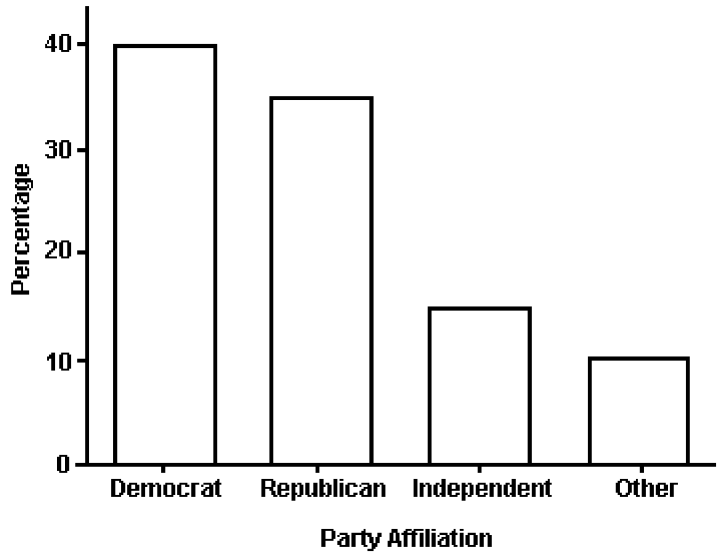
10) Retailers are always interested in determining why a customer selected their store to make a purcha 10) _____
sporting goods retailer conducted a customer survey to determine why its customers shopped at the
The results are shown below. What percentage of the customers responded that the merchandise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



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

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



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

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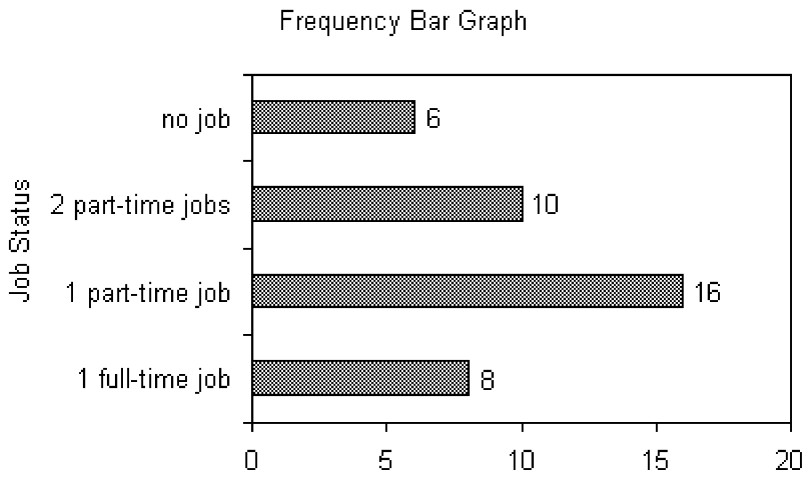
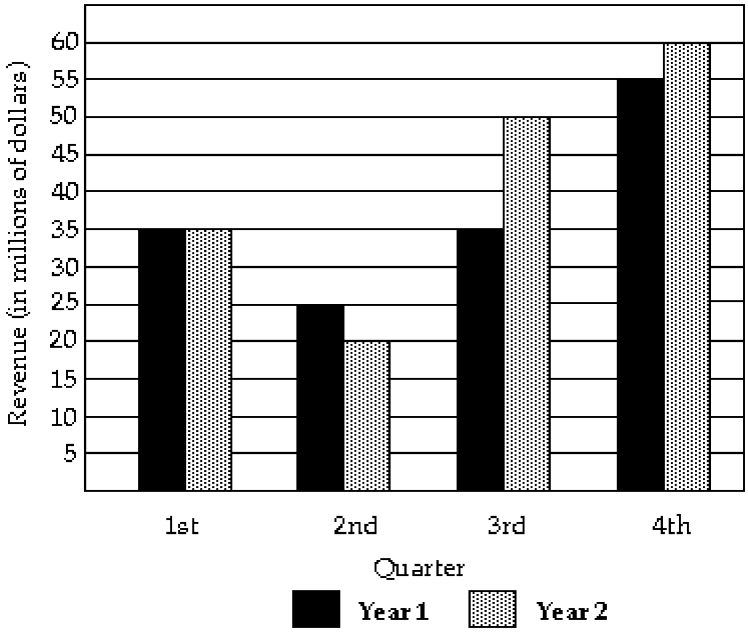
12) The Excel frequency bar graph below describes the employment status of a random sample of U.S. a 12) _____
What is the percentage of those having no job?



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

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



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

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

15) What was the revenue for the second quarter of Year 2? 15) _____
A) $4 million B) $25 million C) $20 million D) $5 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 ba 16) _____
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 a 17) _____
The results are listed below. Construct a frequency bar graph and a relative frequency bar g

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) _____

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
be?
c) If the university sets the minimum score at 17, what percent of the applicants will be acce

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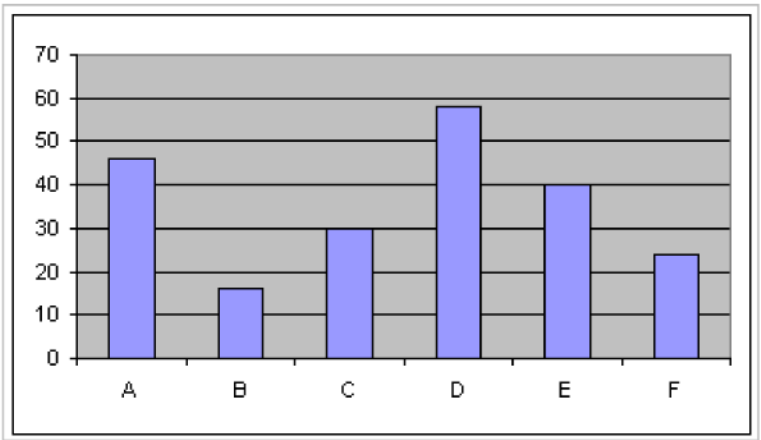
MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

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

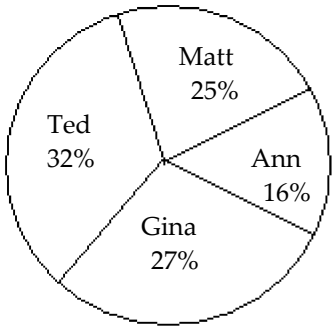


A) B F E D A C B) C A D E F B C) D A E C F B D) B F C E A D

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) 20) _____

Student Council President



700 total votes

Who got the most votes?

A) Matt B) Ann C) Ted D) Gina

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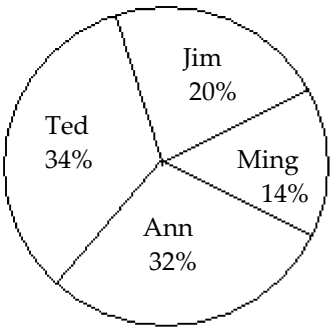
21) 21) _____

Student Council President



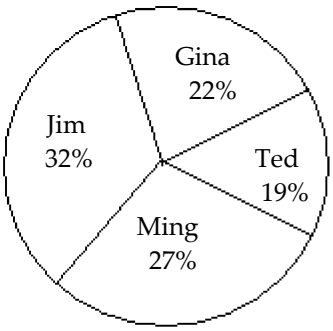
500 total votes

Who got the fewest votes?

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

22) 22) _____

Student Council President



500 total votes

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

A) 59% B) 41% C) 19% D) 22%

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 rand 23) _____
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 s 24) _____
the dog. His records from last year are summarized below. Round percents to whole numb

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, 25) _____
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) 5° C) 52° D) 19°

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

Construct a frequency distribution for the data.

26) A random sample of 30 high school students is selected. Each student is asked how much ti 26) _____
or she spent on the Internet during the previous week. The following times (in hours) are obtained:

14 22 16 19 16 14 16 15 13 19
17 15 15 14 17 16 13 13 18 15
13 15 22 17 14 18 14 17 16 15

Construct a frequency distribution for the data.

27) A sample of 25 service project scores is taken and is recorded below. Construct a frequency 27) _____
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

Construct the specified histogram.

28) A random sample of 30 high school students is selected. Each student is asked how much ti 28) _____
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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29) A sample of 25 community service projects is obtained and the scores are recorded. The resu 29) _____
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

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

Provide an appropriate response.

30) The class width is the difference between 30) _____

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

31) Determine the number of classes in the frequency table below. 31) _____

Class	Frequency
23–24	7
25–26	2
27–28	6
29–30	4
31–32	1

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

32) Find the class width for the frequency table below. 32) _____

Class	Frequency
22–23	3
24–25	1
26–27	3
28–29	6
30–31	2

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

33) Use the following frequency distribution to determine the class limits of the third class. 33) _____

Class	Frequency
9–15	5
16–22	9
23–29	6
30–36	3
37–43	7
44–50	4

A) lower limit: 23; upper limit: 30
B) lower limit: 23; upper limit: 29
C) lower limit: 22.5; upper limit: 29.5
D) lower limit: 22; upper limit: 30

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34) A researcher records the number of employees of each of the IT companies in the town of Westmoo 34) _____
The results are summarized in the table.

Number of Employees	Number of IT Companies
0 – 749	34
750 – 1499	24
1500 – 2249	9
2250 – 2999	7
3000 – 3749	5

Find the class width.
A) 3749 B) 749.5 C) 750 D) 5

35) A researcher records the number of employees of each of the IT companies in the town of Westmoo 35) _____
The results are summarized in the table.

Number of Employees	Number of IT Companies
0 – 399	32
400 – 799	21
800 – 1199	5
1200 – 1599	10
1600 – 1999	10

Find the class limits of the third class.
A) lower limit: 799.5; upper limit: 1199.5 B) lower limit: 800; upper limit: 1200
C) lower limit: 799; upper limit: 1200 D) lower limit: 800; upper limit: 1199

36) The weights (in pounds) of babies born at St Mary's hospital last month are summarized in the table 36) _____

Weight (lb)	Number of Babies
5.0 – 5.8	8
5.9 – 6.7	18
6.8 – 7.6	20
7.7 – 8.5	9
8.6 – 9.4	4

Find the class width.
A) 0.9 lb B) 0.95 lb C) 0.8 lb D) 0.85 lb

37) The weights (in pounds) of babies born at St Mary's hospital last month are summarized in the table 37) _____

Weight (lb)	Number of Babies
5.0 – 5.8	8
5.9 – 6.7	20
6.8 – 7.6	18
7.7 – 8.5	10
8.6 – 9.4	4

Find the class limits for the second class.
A) lower limit: 5.9; upper limit: 6.8 B) lower limit: 5.85; upper limit:6.75
C) lower limit: 5.9; upper limit: 6.7 D) lower limit: 5.8; upper limit: 6.8

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38) The table below summarizes the weights of the almonds (in grams) in a one–pound bag. What is the class width? 38) _____

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) 0.4 C) 0.408 D) 0.059

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

Construct the requested frequency distribution.

39) The June precipitation amounts (in inches) for 40 cites are listed below. Construct a frequen distribution and a relative frequency distribution using eight classes. 39) _____

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

40) 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 frequen values to three decimal places. 40) _____

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

41) The March utility bills (in dollars) of 30 homeowners are listed below. Construct a frequency distribution and a relative frequency distribution using six classes. 41) _____

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.

42) A sample of 15 Boy Scouts was selected and their weights (in pounds) were recorded as foll 42) _____

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 limit of 95 for the first class.

b. Construct a frequency distribution for the data

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Construct the specified histogram.

43) For the data below, construct a frequency distribution and a relative frequency distribution. 43) _____

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

44) For the data below, construct a frequency histogram and a relative frequency histogram. 44) _____

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

45) The 30 students in Mrs Harrison's literature class were asked how many cousins they had. T 45) _____
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

46) The 30 students in Mrs Harrison's literature class were asked how many cousins they had. 46) _____
The results are shown below. Construct a relative–frequency histogram using a class width 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

47) A sample of 15 Girl Scouts was selected and their weights (in pounds) were recorded. The r 47) _____
are listed below. Construct a frequency histogram for the data using a class width of 10 and 95 as the lower limit of the first class.

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

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

Provide an appropriate response.

48) What is the difference between a bar chart and a histogram? 48) _____

A) The bars in a bar chart are all the same width while the bars of a histogram may be of various widths.

B) The bars on a bar chart do not touch while the bars of a histogram do touch.

C) The bars in a bar chart may be of various widths while the bars of a histogram are all the same width.

D) There is no difference between these two graphical displays.

49) For the stem–and–leaf plot below, what are the maximum and minimum entries? 49) _____

1 | 3 4
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 | 1 3

A) max: 43; min: 13

B) max: 47; min: 14

C) max: 41; min: 13

D) max: 38; min: 7

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

Determine the original set of data.

50) 50) _____

Stem	Leaves
7	1
8	7
9	0 9
10	2
11	0 1
12	6 9
13	6 7 9
14	2 3 8 9
15	0 9

Legend: 5|1 represents 51

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51) 51) _____

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

Legend: 5|5 represents 5.5

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

52) 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. 52) _____

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

53) 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. 53) _____

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

54) The heights (in inches) of 30 mechanics are listed below. Construct a stem–and–leaf plot for the data. 54) _____

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

55) The March utility bills (in dollars) of 30 homeowners are listed below. Construct a stem–and–leaf plot for the data. 55) _____

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

56) The scores for an economics test are listed below. Create a stem–and–leaf plot for the data. 56) _____

87 76 91 77 90 96 88 85 66 89
79 95 51 94 83 88 82 59 13 69

Construct a dot plot for the data.

57) The local police, using radar, checked the speeds (in mph) of 30 motorists at a busy intersect 57) _____
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

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58) The heights (in inches) of 30 mechanics are listed below. Construct a dot plot for the data. 58) _____

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

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.

59) The data set: Pick Three Lottery Outcomes for 10 Consecutive Weeks 59) _____

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

60) The data set: ages of dishwashers (in years) in 20 randomly selected households 60) _____

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

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

61) The data set: weekly grocery bills (in dollars) for 20 randomly selected households 61) _____

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

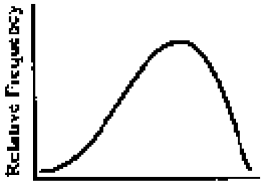
A) bell shaped
B) skewed to the right
C) uniform
D) skewed to the left

Describe the shape of the distribution.

62) 62) _____

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

63) 63) _____



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

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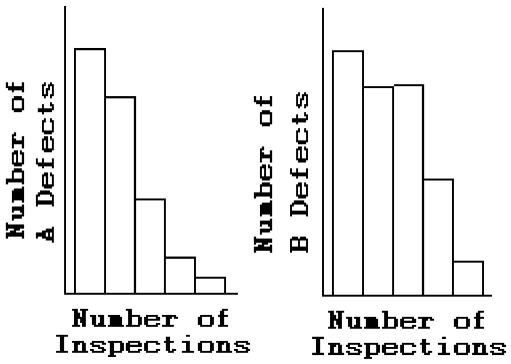
Use the histograms shown to answer the question.

64) 64) _____



Is either histogram symmetric?

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

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

Describe the shape of the distribution.

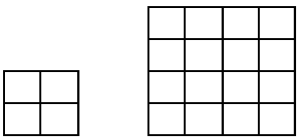
65) A sample of 15 Little League players was selected and their weights (in pounds) were recor 65) _____
follows:

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.

Explain what is misleading about the graphic.

66) 66) _____



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 graphic is not misleading.
D) The length of a side has doubled, but the area has been unchanged.

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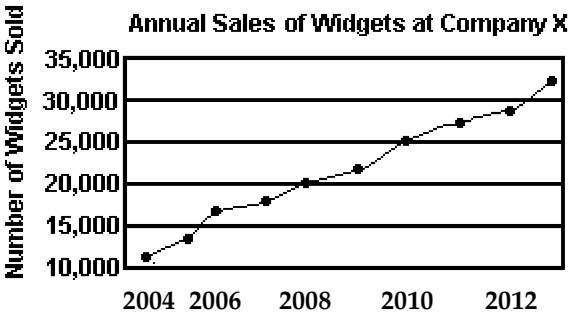
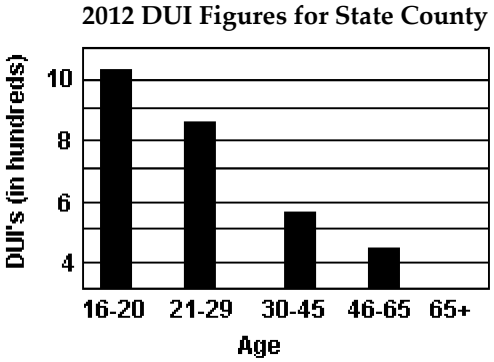
67) 67) _____



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

68) 68) _____



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

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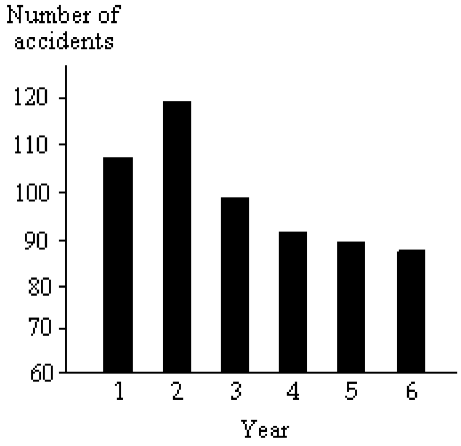
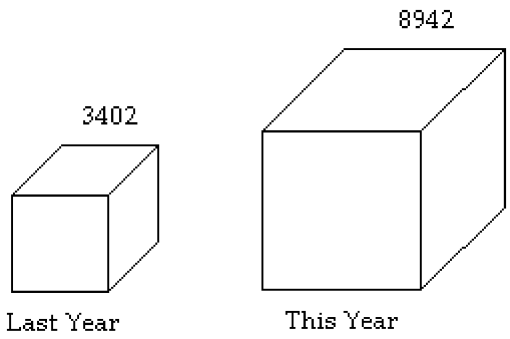
SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Provide an appropriate response.

69) 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? 69) _____



70) A parcel delivery store finds that their delivery rates increased over the past year. Last year they delivered 3402 parcels. This year it delivered 8942 parcels. 70) _____



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

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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

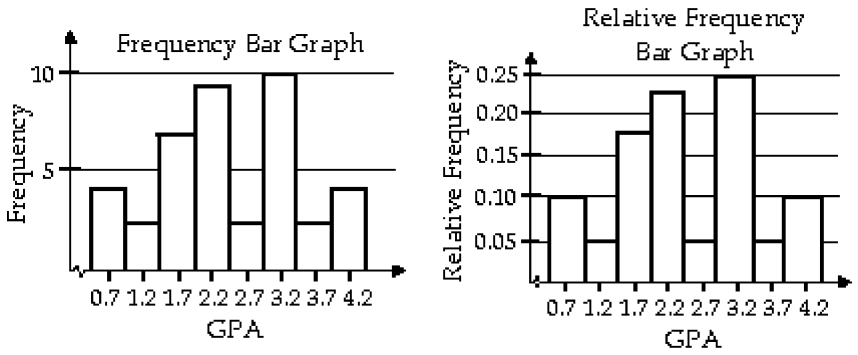
2)

Response	Frequency	Relative Frequency
Strongly Favor	38	0.19
Favor	37	0.185
Neutral	20	0.1
Oppose	21	0.105
Strongly Oppose	84	0.42

3)

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

4) A
5) A
6) D
7) C
8) D
9) A
10) D
11) A
12) C
13) D
14) C
15) C
16)



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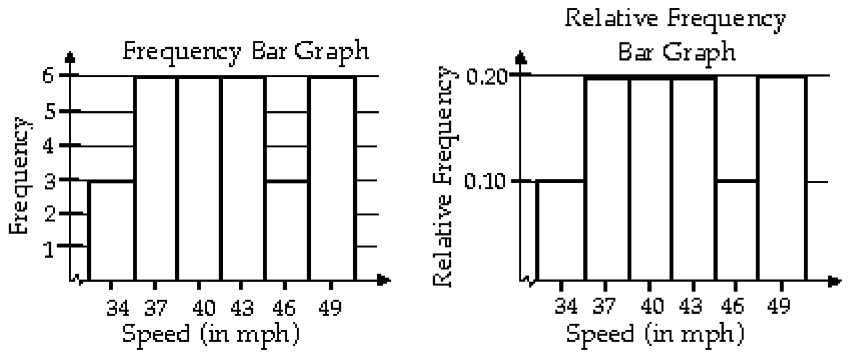
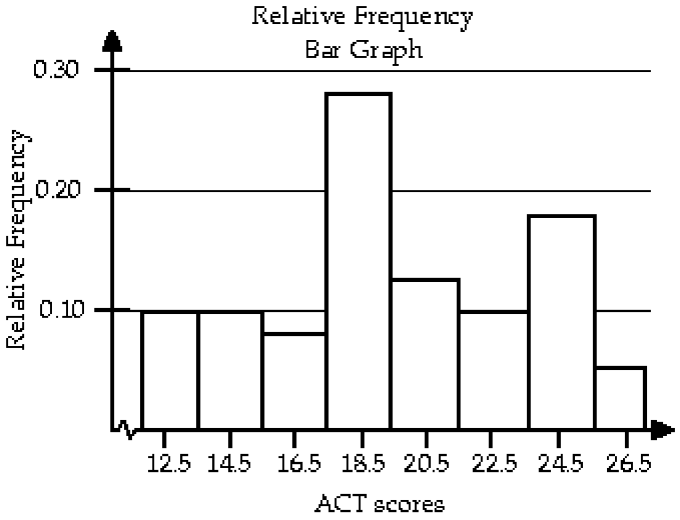
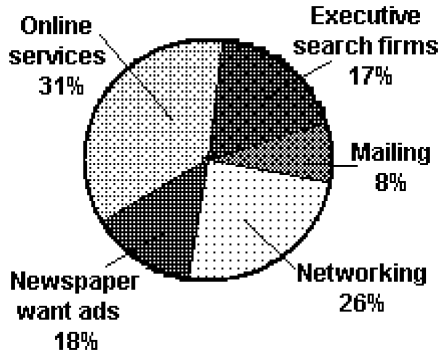
17)



18) a) See graph below
b) The minimum score = 14
c) The university will accept 76.57% of the applicants.



19) C
20) C
21) D
22) B
23)



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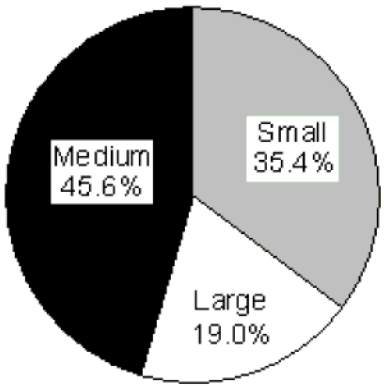
24)



25) A

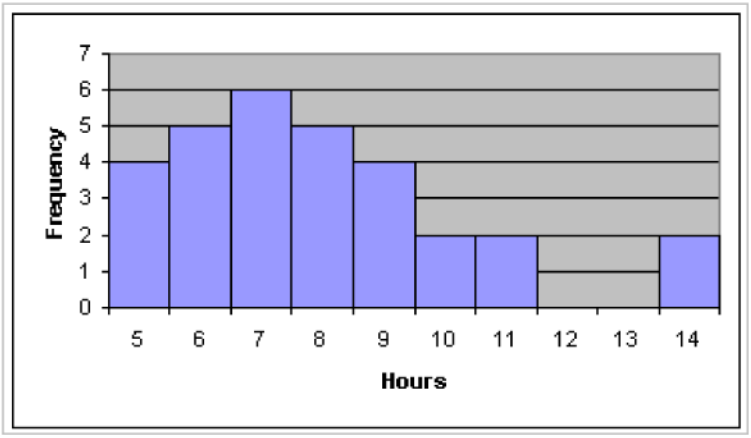
26)

Hours On Net	Number of HS Students
13	4
14	5
15	6
16	5
17	4
18	2
19	2
22	2

27)

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

28)



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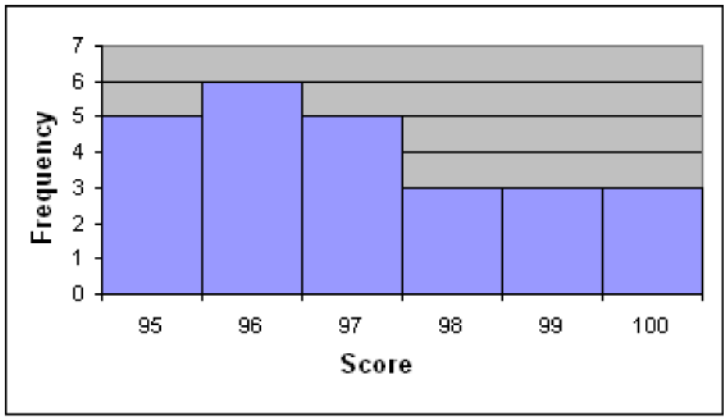
29)



30) C
31) D
32) D
33) B
34) C
35) D
36) A
37) C
38) A
39)

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

40)

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

41)

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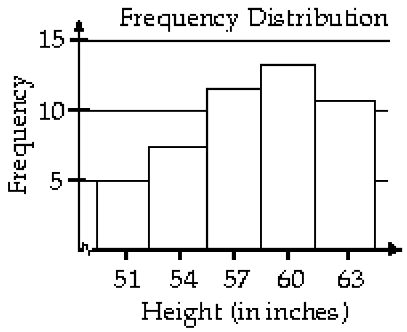
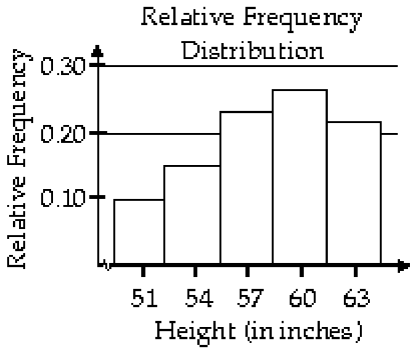
42) a. 95–104, 105–114, 115–124, 125–134, 135–144

b.

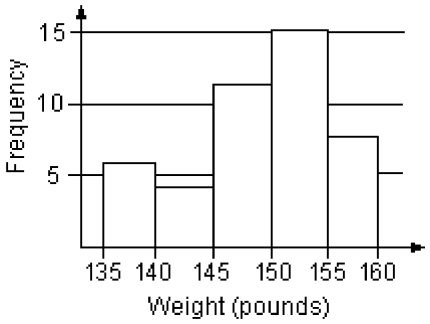
Weight (lb)	Tally	Frequency
95–104	ll	2
105–114	lll	3
115–124	lllll	5
125–134	lll	3
135–144	ll	2

43)

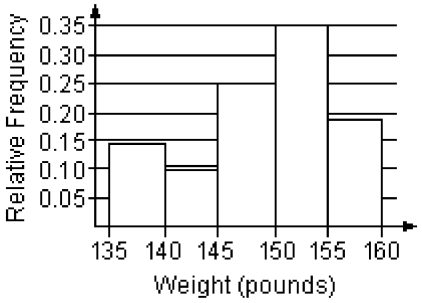




44) Frequency Histogram:



Relative Frequency Histogram:



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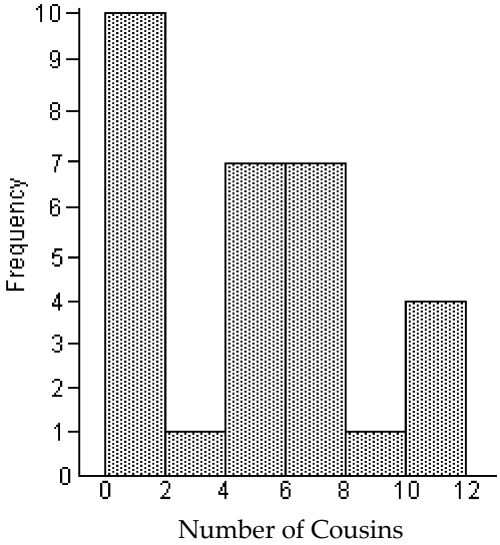
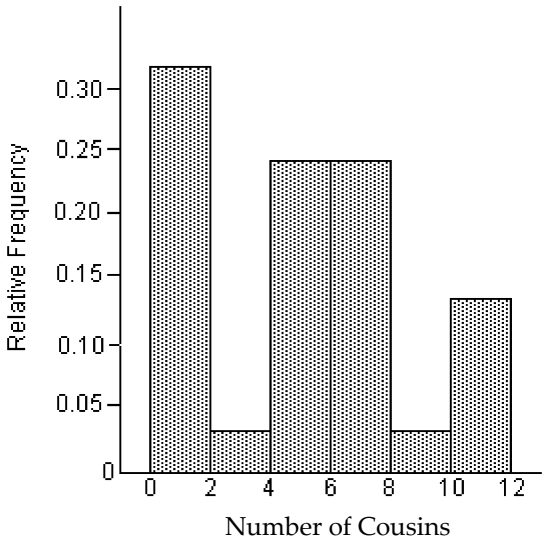
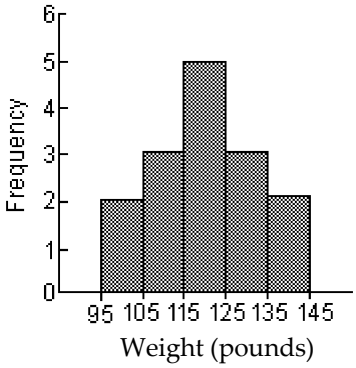
45)



46)



47)



48) B

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49) A
50) 71, 87, 90, 99, 102, 110, 111, 126, 129, 136, 137, 139, 142, 143, 148, 149, 150, 159
51) 5.5, 6.4, 7.0, 7.1, 8.5, 9.2, 9.4, 10.6, 10.9, 11.6, 11.7, 11.9, 12.2, 12.3, 12.8, 12.9, 13.7, 13.9
52)

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

53)

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

54)

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

55)

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

56) 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 values.

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

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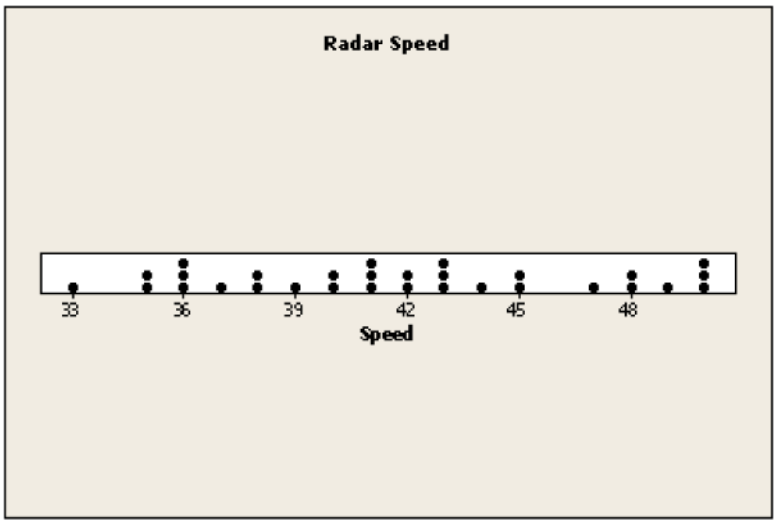
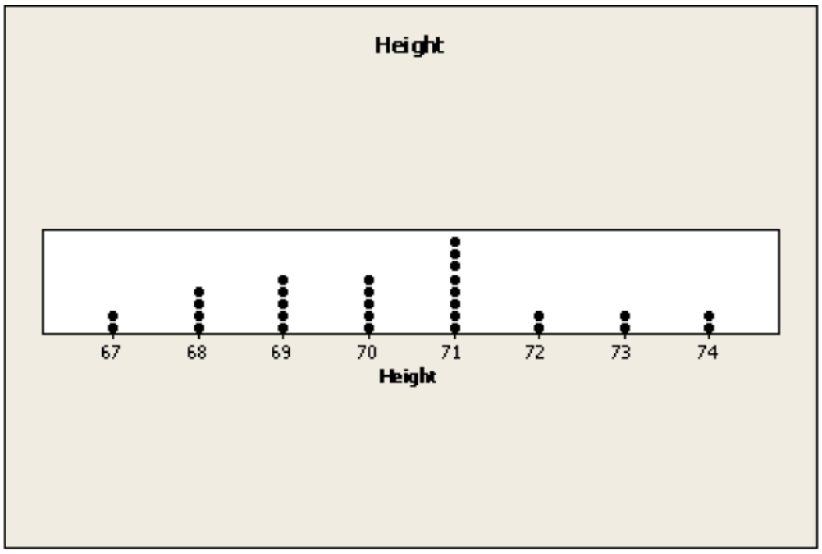
57)



58)



59) B
60) D
61) A
62) C
63) B
64) A
65) symmetric
66) A
67) B
68) B
69) 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.
70) roughly 3 times larger

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