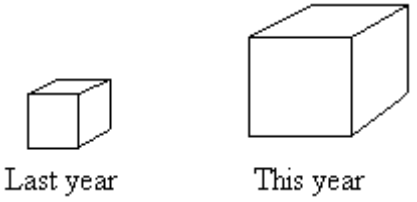
Exam

Name_____

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

Provide an appropriate response.

1) A parcel delivery service lowered its prices and finds that it has delivered twice as many parcels this year as it did last year. To illustrate this fact, the manager draws a graph as shown below. Each cube depicts a parcel. The side length of the "parcel" on the right is twice the side length of the "parcel" on the left. Why is this graph misleading? What visual impression is created by the graph? 1) _____



Answer: The volume of the cube on the right is eight times (not twice) the volume of the cube on the left. The graph gives the visual impression that eight times as many parcels were delivered this year as last year.

Explanation:

2) A medical research team studied the ages of 34 patients who had strokes caused by stress. The frequency distribution below summarizes the results. When trying to understand the stroke data, what would be the advantage of looking at a histogram instead of this frequency distribution? 2) _____

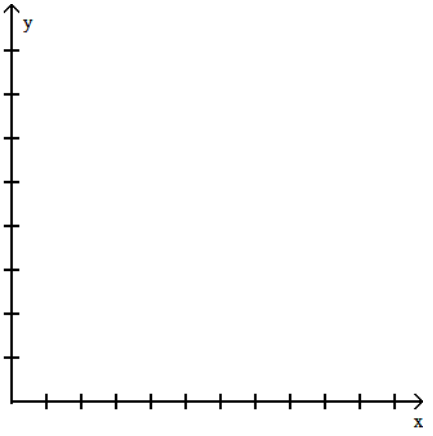
Age	Frequency
25-29	3
30-34	3
35-39	6
40-44	4
45-49	5
50-54	3
55-59	5
60-64	5

Answer: It would be easier to see the distribution of the data in the graph of the histogram than in the lists of numbers in the frequency distribution.

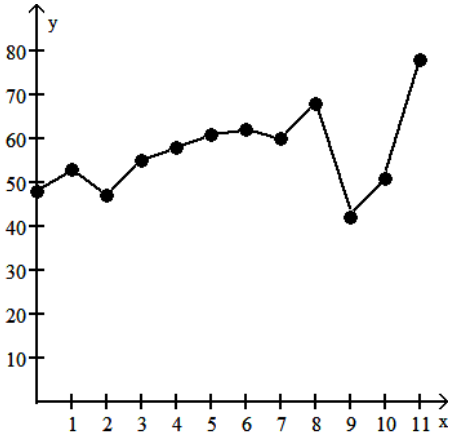
Explanation:

3) Use the high closing values of Naristar Inc. stock from the years 1992 - 2003 to construct a time-series graph. (Let x = 0 represent 1992 and so on.) Identify a trend. 3) _____

Year	High	Year	High
1992	48	1998	62
1993	53	1999	60
1994	47	2000	68
1995	55	2001	42
1996	58	2002	51
1997	61	2003	78



Answer: Trend: Answers will vary. Possible answer: Except for a drop in high closing value in 1994, there was a steady rise through 2000, after which there was a sharp drop in 2001 followed by increases through 2003.



Explanation:

Solve the problem.

4) Construct one table that includes relative frequencies based on the two frequency distributions below. Do those weights appear to be about the same or are they substantially different.? Round to the nearest tenth of a percent if necessary. 4) _____

Weight (lb) of Discarded Metal	Frequency
0.00-0.99	6
1.00-1.99	20
2.00-2.99	12
3.00-3.99	9
4.00-4.99	6

Weight (lb) of Discarded Plastic	Frequency
0.00-0.99	11
1.00-1.99	16
2.00-2.99	15
3.00-3.99	6
4.00-4.99	4
5.00-5.99	1

Answer:

Weight (lb)	Relative Frequency (Metal)	Relative Frequency (Plastic)
0.00-0.99	11.3%	20.8%
1.00-1.99	37.7%	30.2%
2.00-2.99	22.6%	28.3%
3.00-3.99	17.0%	11.3%
4.00-4.99	11.3%	7.5%
5.00-5.99	0%	1.9%

The weights are different, but they do not appear to be substantially different.

Explanation:

Provide an appropriate response.

5) Describe at least two advantages to using stemplots rather than frequency distributions. 5) _____

Answer: Answers will vary. Possible answer: The shape of a distribution can readily be seen. The plot can be drawn quicker, since class width need not be calculated.

Explanation:

6) One purpose of displaying data graphically is to provide clues about trends. The given values are weights (ounces) of steaks listed on a restaurant menu as "20 ounce porterhouse" steaks. The weights are supposed to be 21 ounces because they supposedly lose an ounce when cooked. Create a frequency distribution with 5 classes. Based on your distribution, comment on the advertised "20 ounce" steaks. 6) _____

17 20 21 18 20 20 20 18 19 19 20 19 21 20 18 20 20 19 18 19

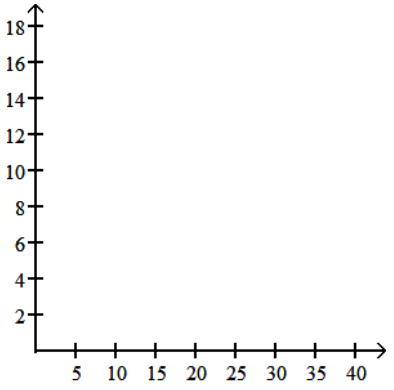
Answer: Answers will vary. Possible answer: The frequency distribution shows that half of the cooked steaks are less than their advertised weights.

Explanation:

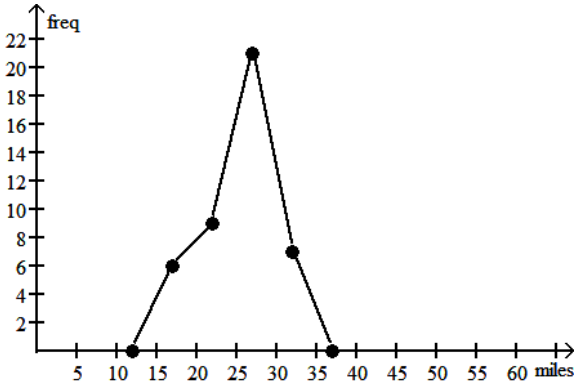
Solve the problem.

7) The data shows the roundtrip mileage that 43 randomly selected students drive to school each day. Construct a frequency polygon. Applying a loose interpretation of the requirements for a normal distribution, do the mileages appear to be normally distributed? Why or why not? 7) _____

Miles	Frequency
10-14	0
15-19	6
20-24	9
25-29	21
30-34	7



Answer: The frequency polygon appears to roughly approximate a normal distribution. The frequencies increase to a maximum and then decrease, and the graph is symmetric with the left half being roughly a mirror image of the right half.



Explanation:

Provide an appropriate response.

8) Suppose you are comparing frequency data for two different groups, 25 managers and 150 blue collar workers. Why would a relative frequency distribution be better than a frequency distribution? 8) _____

Answer: Answers will vary. Possible answer: A relative frequency distribution is better for comparison between groups whose numbers are different, since ratios are readily comparable.

Explanation:

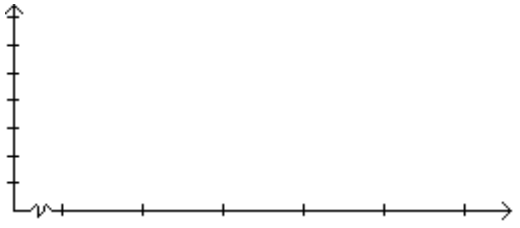
9) Create an example displaying data in a pie chart. Display the same data in a Pareto chart. Which graph is more effective? List at least two reasons in support of your choice. 9) _____

Answer: Answers will vary. The answer should include the fact that pie charts are better for showing categories that are parts of a whole, whereas Pareto charts are better for displaying relative importance among categories.

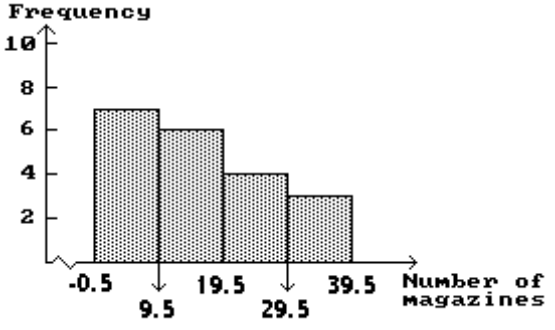
Explanation:

10) In a survey, 20 people were asked how many magazines they had purchased during the previous year. The results are shown below. Construct a histogram to represent the data. Use 4 classes with a class width of 10, and begin with a lower class limit of -0.5. What is the approximate amount at the center? 10) _____

6	15	3	36	25	18	12	18	5	30
24	7	0	22	33	24	19	4	12	9

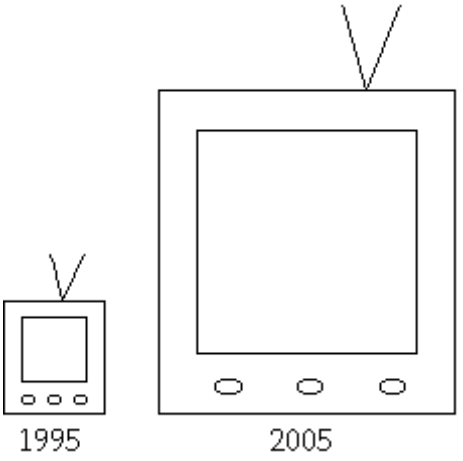


Answer: The approximate amount at the center is 16 magazines.



Explanation:

11) A television manufacturer sold three times as many televisions in 2005 as it did in 1995. To illustrate this fact, the manufacturer draws a graph as shown below. The television on the right is three times as tall and three times as wide as the television on the left. Why is this graph misleading? What visual impression is created by the graph? 11) _____



Answer: The area of the television on the right is nine times (not three times) the area of the television on the left. The graph gives the visual impression that sales in 2005 were nine times the sales in 1995.

Explanation:

Solve the problem.

12) Using a strict interpretation of the relevant criteria characterizing a normal distribution,does the frequency distribution below appear to have a normal distribution? Does the distribution appear to be normal if the criteria are interpreted very loosely? 12) _____

Closing Share Price	Frequency
0-5	2
6-10	5
11-15	15
16-20	27

Answer: No; no; The frequencies do not increase, reach a maximum, and then decrease.

Explanation:

Use the given data to construct a frequency distribution.

13) A medical research team studied the ages of patients who had strokes caused by stress. The ages of 34 patients who suffered stress strokes were as follows. 13) _____

29 30 36 41 45 50 57 61 28 50 36 58
60 38 36 47 40 32 58 46 61 40 55 32
61 56 45 46 62 36 38 40 50 27

Construct a frequency distribution for these ages. Use 8 classes beginning with a lower class limit of 25.

Age	Frequency

Answer:

Age	Frequency
25-29	3
30-34	3
35-39	6
40-44	4
45-49	5
50-54	3
55-59	5
60-64	5

Explanation:

14) On a math test, the scores of 24 students were 14) _____

96 74 79 67 79 79 96 89 79 69 89 74
74 89 79 74 89 79 74 89 74 89 89 67

Construct a frequency distribution. Use 4 classes beginning with a lower class limit of 60.

Score	Frequency

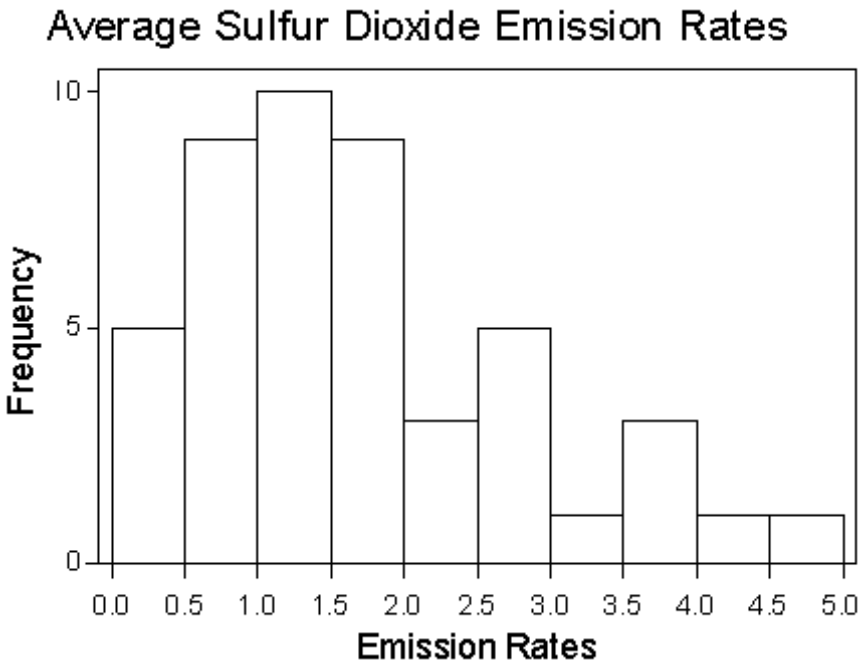
Answer:

Score	Frequency
60-69	3
70-79	12
80-89	7
90-99	2

Explanation:

Provide an appropriate response.

15) The following histogram shows average SO_2 (sulfur dioxide) boiler emission rates from selected utility companies. The data was collected from a voluntary response sample of utility companies. Does the distribution depicted in the histogram reflect the true distribution of the population? Why or why not? 15) _____

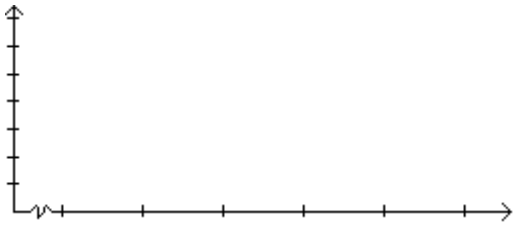


Answer: Not necessarily. The voluntary response sample may have characteristics fundamentally different from those of the population of all utility companies. Utilities with smaller emission rates might be more likely to respond, causing the voluntary response sample to show a smaller range of emission rates than found in the general population.

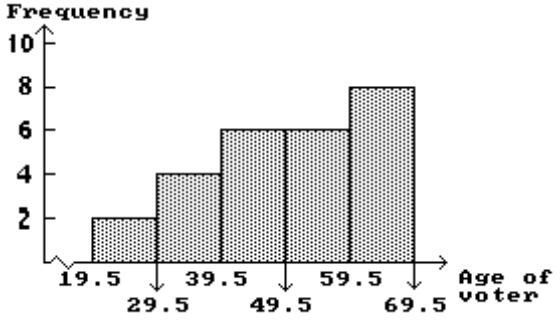
Explanation:

16) In a survey, 26 voters were asked their ages. The results are shown below. Construct a histogram to represent the data (with 5 classes beginning with a lower class limit of 19.5 and a class width of 10). What is the approximate age at the center? 16) _____

43 56 28 63 67 66 52 48 37 51 40 60 62
66 45 21 35 49 32 53 61 53 69 31 48 59



Answer: The approximate age at the center is 50.



Explanation:

17) Explain in your own words why a bar graph can be misleading if one or both of the scales begin at some value other than zero. 17) _____

Answer: A bar graph with these characteristics exaggerates the differences in the data.
Explanation:

18) Suppose that a histogram is constructed for the frequency distribution shown below: 18) _____

Age	Frequency
30-39	11
40-49	23
50-59	17
60-69	12
70-89	6

The class 60-69 has twice the frequency of the class 70-89. In the histogram, will the area of the bar for the class 60-69 be twice the area of the bar for the class 70-89? In other words, will areas be proportional to frequencies in this histogram? Explain your thinking. Are there any conditions under which areas are proportional to frequencies in histograms?

Answer: The areas of the bars for the two classes will actually be the same. This is because the bar for the class 60-69, while it is twice as tall as the bar for the class 70-89, is also only half the width because the class widths are not the same. Heights, not areas, are proportional to frequencies. For classes of equal width, areas will also be proportional to frequencies.

Explanation:

19) A college student wants to purchase one of two stocks. She has the average annual high values for each of these stocks over the most recent ten-year period. For comparison, she decides to sketch a time-series graph. How should she prepare her graph, and what should she look for? 19) _____

Answer: The student should plot her data on a baseline marked by year and with vertical axis marked by high values. The stock that shows less volatility and a steady rise would be the better choice.

Explanation:

20) An airline checked 7 of its flights into a regional airport and found that 1 was early, 4 were on time, and 2 were late. Why does it not make sense to construct a histogram for this data set? 20) _____

Answer: With a data set that is so small, the true nature of the distribution cannot be seen with a histogram.

Explanation:

21) Histograms and Pareto charts are both bar charts. What is the significant difference between the two? 21) _____

Answer: Answers will vary. Possible answer: Histograms convey quantitative information about shapes of distributions. Pareto charts convey comparative information about relative standing of categorical data.

Explanation:

22) Construct a frequency distribution that includes an outlier. Construct the corresponding histogram. Then, construct the corresponding histogram without including the outlier. How much does the outlier affect the shape of the histogram? 22) _____

Answer: Answers will vary.

Explanation:

Use the given data to construct a frequency distribution.

23) The following figures represent Jennifer's monthly charges for long distance telephone calls for the past twelve months. 23) _____

7.33	11.26	13.54	17.00
10.56	16.15	9.59	15.08
14.50	15.28	14.88	12.41

Construct a frequency distribution with 4 classes.

Charges	Frequency

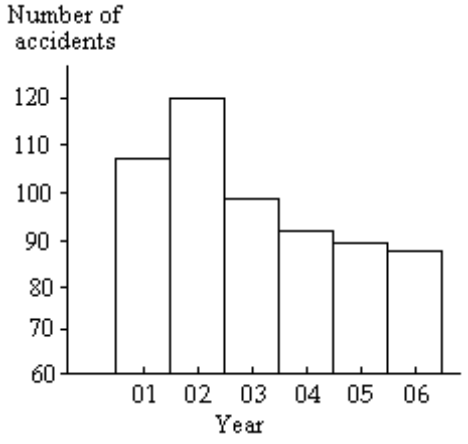
Answer:

Charges	Frequency
7.00-9.99	2
10.00-12.99	3
13.00-15.99	5
16.00-18.99	2

Explanation:

Provide an appropriate response.

24) The graph below shows the number of car accidents occurring in one city in each of the years 2001 through 2006. The number of accidents dropped in 2003 after a new speed limit was imposed. Does the graph distort the data? How would you redesign the graph to be less misleading? 24) _____

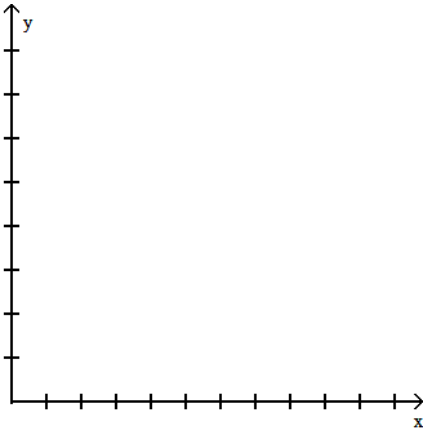


Answer: The graph distorts the data because the the vertical scale starts at 60 rather than 0, giving the impression of a large difference in the number of accidents, when actually the number of accidents only varies from 90 to 120. To make the graph less misleading, change the vertical scale so that it begins at 0 and increases in increments of 20.

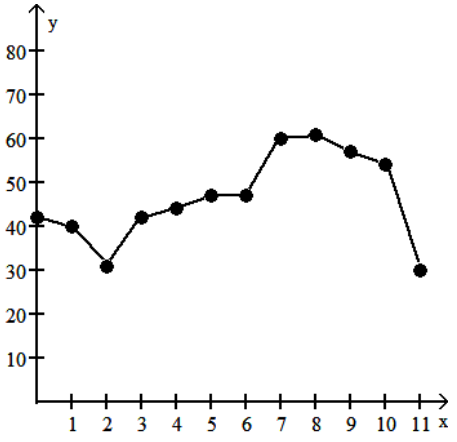
Explanation:

25) Use the high closing values of Naristar Inc. stock from the years 1990 - 2001 to construct a time-series graph. (Let x = 0 represent 1990 and so on.) Identify a trend. 25) _____

Year	High	Year	High
1990	42	1996	47
1991	40	1997	60
1992	31	1998	61
1993	42	1999	57
1994	44	2000	54
1995	47	2001	30



Answer: Trend: Answers will vary. Possible answer: High closing stock values show a decrease from 1990 through 1992, after which the value of the stock rose through 1998. Another decrease occurred in 1999 and continued through 2001.



Explanation:

26) Construct a frequency distribution and the corresponding histogram in which the following conditions are satisfied: 26) _____

- The frequency for the second class is twice the frequency of the first class.
- In the histogram, the area of the bar corresponding to the second class is four times the area of the bar corresponding to the first class.

Answer: Answers will vary. The class width of the second class should be twice the class width of the first class.

Explanation:

Use the given data to construct a frequency distribution.

27) Kevin asked some of his friends how many hours they had worked during the previous week at their after-school jobs. The results are shown below. 27) _____

6 6 6 4 6 6 9 8 6 3 8 6
6 8 6 6 8 6 6 8 6 8 8 4

Construct a frequency distribution. Use 4 classes, a class width of 2 hours, and a lower limit of 3 for class 1.

Hours	Frequency

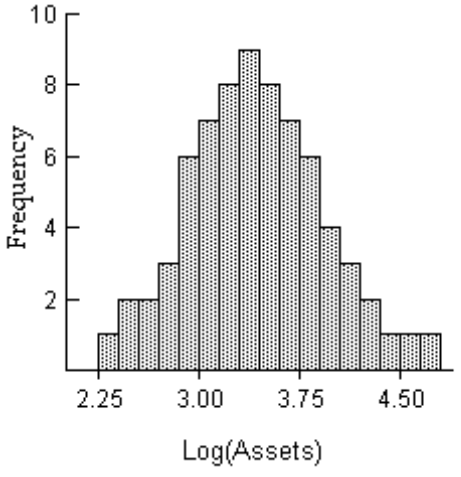
Answer:

Hours	Frequency
3-4	3
5-6	13
7-8	7
9-10	1

Explanation:

Provide an appropriate response.

28) The histogram below shows the distribution of the assets (in millions of dollars) of 71 companies. Does the distribution appear to be normal? 28) _____



Answer: Yes, it appears to be normal.

Explanation:

29) Consider the frequency distribution below, which has single values as classes: 29) _____

Value	Frequency
10	1
11	3
12	7
13	18
14	10
15	4
16	2
17	7
18	16
19	10
20	6
21	2

Construct a new frequency distribution for this data with 4 classes. Now, construct another frequency distribution for this data with 6 classes. Suppose that you construct a histogram corresponding to the original data and histograms corresponding to each of the new frequency distributions. Describe the shapes of the three histograms. Does the histogram with six classes capture the distribution of the data? Does the histogram with four classes capture the distribution of the data?

Answer: The data is bimodal because it has two peaks, one at near 13 and one at near 18. The two frequency distributions are as follows:

Class	Frequency
10-12	11
13-15	32
16-18	25
19-21	18

Class	Frequency
10-11	4
12-13	25
14-15	14
16-17	9
18-19	26
20-21	8

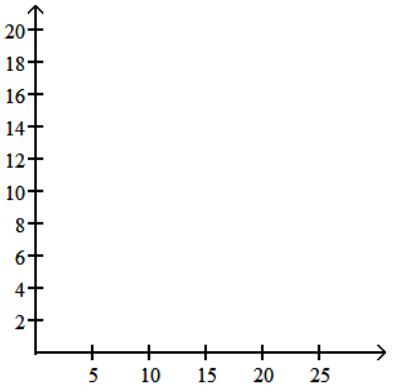
The bimodal distribution of the data will be clearly seen in the histogram of the original data and in the histogram with six classes. In the histogram with four classes, the shape of the data is lost.

Explanation:

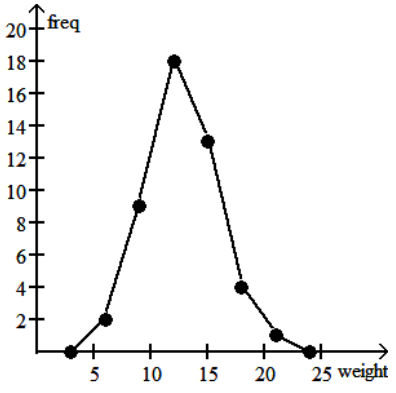
Solve the problem.

30) The frequency table below shows the amount of weight loss during the first month of a diet program for a group of men. Constructing a frequency polygon. Applying a loose interpretation of the requirements for
a normal distribution, do the pounds of weight loss appear to be normally distributed? Why or why not? 30) _____

Weight (lb)	Frequency
5-7	2
8-10	9
11-13	18
14-16	13
17-19	4
20-22	1



Answer: The frequency polygon appears to roughly approximate a normal distribution. The frequencies increase to a maximum and then decrease, and the graph is symmetric with the left half being roughly a mirror image of the right half.



Explanation:

Use the given data to construct a frequency distribution.

31) A school district performed a study to find the main causes leading to its students dropping out of school. Thirty cases were analyzed, and a primary cause was assigned to each case. The causes included unexcused absences (U), illness (I), family problems (F), and other causes (O). The results for the thirty cases are listed below: 31) _____

U U U I F O O U I F
F O U I I F I I O U
I F F U U I I O F U

Construct a table summarizing the frequency distribution of the primary causes leading to student dropout.

Cause	Frequency

Answer:

Cause	Frequency
U	9
I	9
F	7
O	5

Explanation:

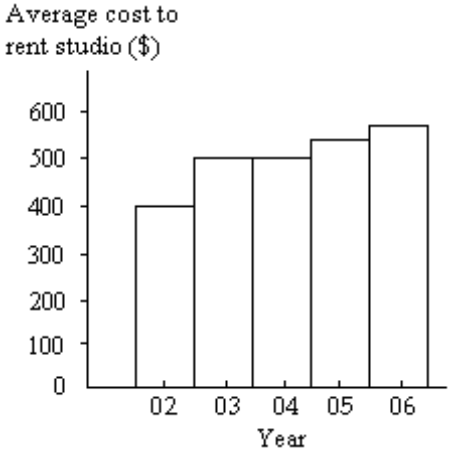
Provide an appropriate response.

32) Suppose that a data set has a minimum value of 18 and a maximum of 83 and that you want 5 classes. Explain how to find the class width for this frequency table. What happens if you mistakenly use a class width of 13 instead of 14? 32) _____

Answer: Since the range is 83 - 18 = 65, and 65 divided by 5 equals 13, a whole number, the class width has to be widened from 13 to 14. If the class width was 13 data values equal to 83 would not be included in the frequency distribution.

Explanation:

33) The graph below shows the average cost of renting a studio in one city in each of the years 2002 through 2006. By what percentage does the average price increase from 2002 to 2003? Obtain a second version of the graph by sliding a piece of paper over the bottom of the graph so that the bars start at 300. In this new graph, by what percentage does the price appear to increase from 2002 to 2003? Is the second graph misleading? 33) _____



Answer: The average price increases by 25% from 2002 to 2003. Using the second graph, the price appears to double from 2002 to 2003 (i.e. it appears to increase by 100%).The second graph is misleading because the differences between the bars seem bigger (relatively) than they really are.

Explanation:

34) Suppose that you construct a histogram and a relative frequency histogram corresponding to a particular frequency table. In what ways will the two histograms be similar? In what ways will they differ? 34) _____

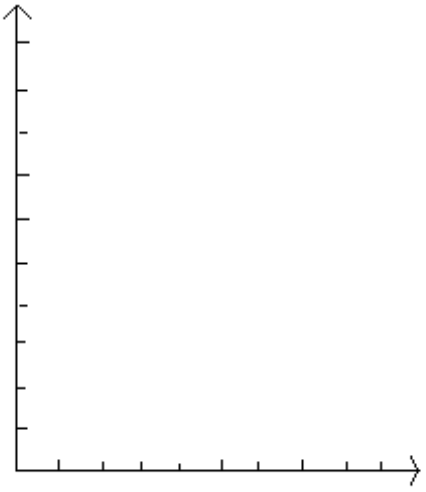
Answer: The two histograms will have the same shape. They will also have the same scale on the horizontal axis. They will differ only in the scales on the vertical axis: the histogram will show frequencies on the vertical axis while the relative frequency histogram will show relative frequencies.

Explanation:

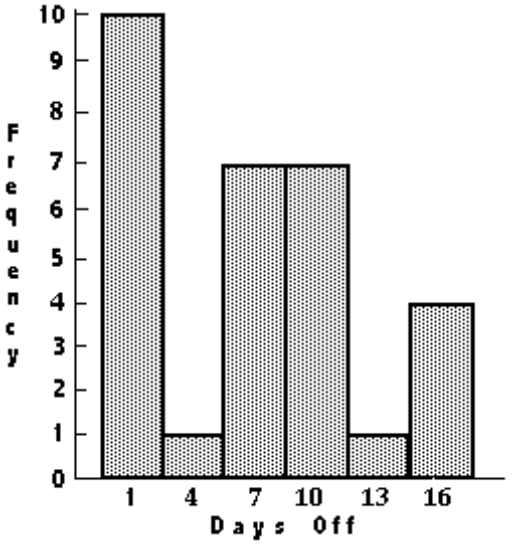
35) The frequency table below shows the number of days off in a given year for 30 police detectives. 35) _____

Days off	Frequency
0-2	10
3-5	1
6-8	7
9-11	7
12-14	1
15-17	4

Construct a histogram. Use the class midpoints for the horizontal scale. Does the result appear to be a normal distribution? Why or why not?



Answer: The distribution does not appear to be normal. It is not bell-shaped and it is not symmetric.



Explanation:

Use the given data to construct a frequency distribution.

36) Lori asked 24 students how many hours they had spent doing homework during the previous week. The results are shown below. 36) _____

11 10 11 8 11 11 15 13 11 8 13 10
10 13 11 10 13 11 10 13 10 13 13 8

Construct a frequency distribution. Use 4 classes, a class width of 2 hours, and a lower limit of 8 for

Hours	Frequency

Answer:

Hours	Frequency
8-9	3
10-11	13
12-13	7
14-15	1

Explanation:

Provide an appropriate response.

37) Consider the frequency distribution below, which has single values as classes: 37) _____

Value	Frequency
10	1
11	3
12	7
13	18
14	10
15	4
16	2
17	7
18	16
19	10
20	6
21	2

Describe the distribution of the data. Use this frequency distribution to create two new frequency distributions for the data, one with four classes of equal width and one with six classes of equal width. Does the frequency distribution with four classes capture the distribution of the data? Does the frequency distribution with six classes capture the distribution of the data? Explain your thinking.

Answer: The data is bimodal because it has two peaks, one at around 13 and one at around 18. The two frequency distributions are as follows:

class	freq
10-12	11
13-15	32
16-18	25
19-21	18

class	freq
10-11	4
12-13	25
14-15	14
16-17	9
18-19	26
20-21	8

The distribution with four classes does not capture the bimodal nature of the data, while the distribution with six classes does.

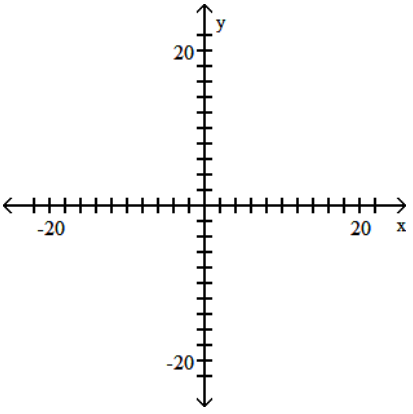
Explanation:

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

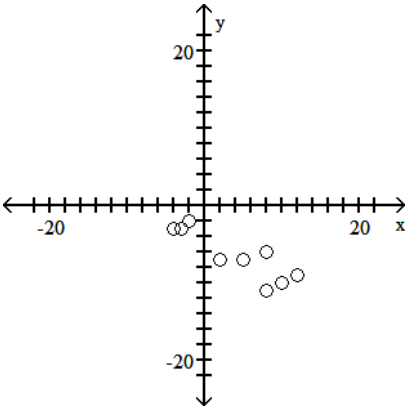
Use the given paired data to construct a scatterplot.

38) x -4 2 8 10 12 8 5 -3 -2
y 3 7 11 10 9 6 7 3 2

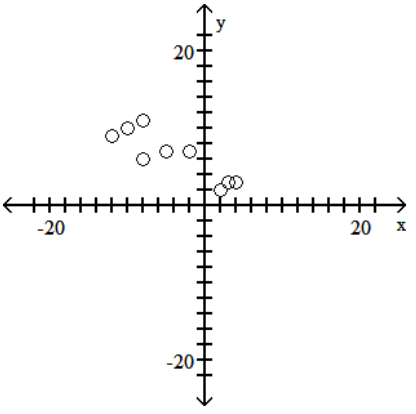
38) _____



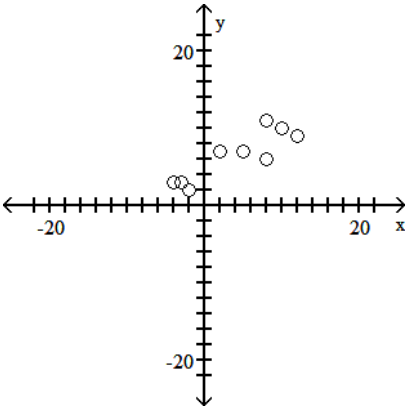
A)



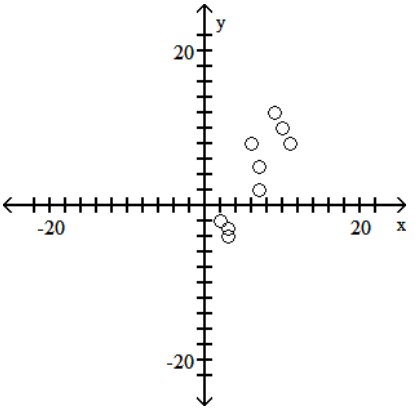
B)



C)



D)



Answer: C

Explanation: A)

B)

C)

D)

Provide an appropriate response.

39) The following frequency distribution analyzes the scores on a math test. Find the class boundaries of scores interval 40-59. 39) _____

Scores	Number of students
40-59	2
60-75	4
76-82	6
83-94	15
95-99	5

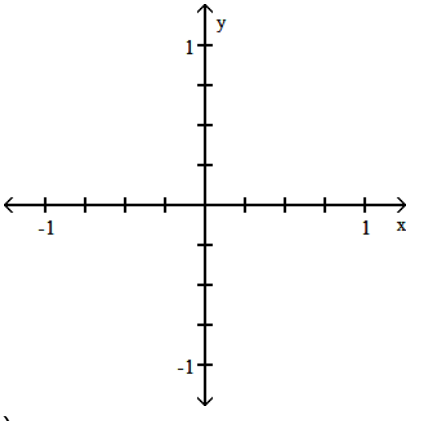
A) 39.5, 58.5 B) 40.5, 58.5 C) 40.5, 59.5 D) 39.5, 59.5

Answer: D

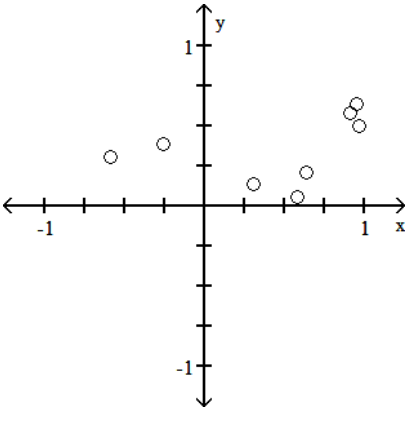
Explanation: A)
B)
C)
D)

Use the given paired data to construct a scatterplot.

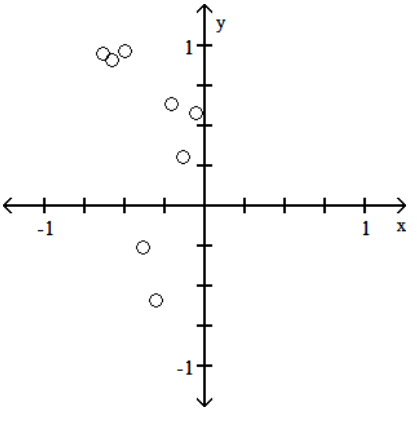
40) x 0.21 0.06 0.58 0.14 0.31 0.64 0.5 0.39 40) _____
y 0.64 0.58 0.91 0.31 -0.59 0.95 0.97 -0.26



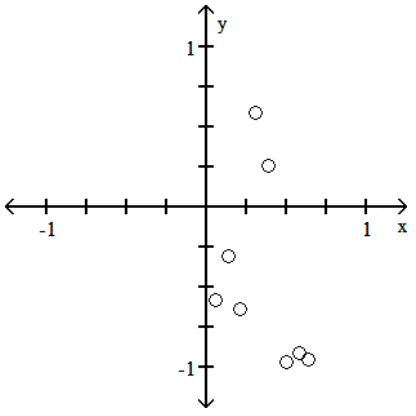
A)



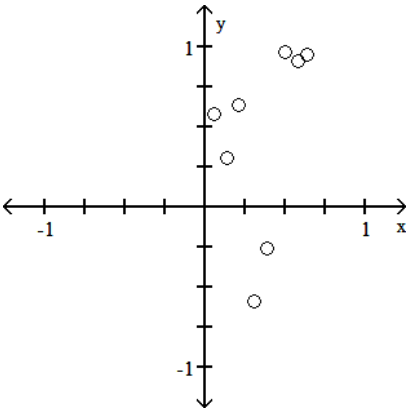
B)



C)



D)



Answer: D

Explanation: A)

B)

C)

D)

Use the data to create a stemplot.

41) The attendance counts for this season's basketball games are listed below. 41) _____

227 239 215 219
221 233 229 233
235 228 245 231

A)

21	5 7 9
22	1 8 9
23	1 3 3 5 9
24	5

B)

21	5 9
22	1 7 8 9
23	1 3 3 5 9
24	5

Answer: B

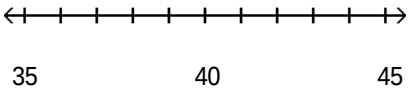
Explanation: A)

B)

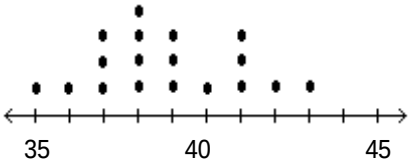
Construct the dotplot for the given data.

42) The following data represent the number of cars passing through a toll booth during a certain time period over a number of days. 42) _____

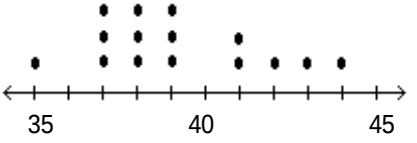
38 39 37 37 44 38 41 38 39 35 42 39 43 37 41



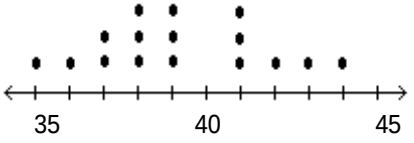
A)



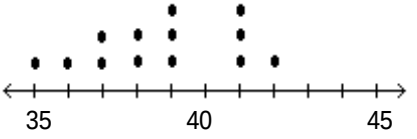
B)



C)



D)



Answer: B

Explanation: A)
B)
C)
D)

Provide an appropriate response.

43) The frequency distribution below summarizes employee years of service for Alpha Corporation. Find the class midpoint for class 1-5. 43) _____

Years of service	Frequency
1-5	5
6-10	20
11-15	25
16-20	10
21-25	5
26-30	3

A) 5.0 B) 2.5 C) 3.0 D) 3.5

Answer: C

Explanation: A)
B)
C)
D)

Use the data to create a stemplot.

44) The weights of 22 members of the varsity football team are listed below. 44) _____

144 152 142 151 160 152 131 164 141 153 140
144 175 156 147 133 172 159 135 159 148 171

A)

13	1 3 5
14	0 1 2 4 4 7 8
15	1 2 2 3 6 9 9
16	0 4
17	1 2 5

B)

13	1 3 5
14	1 2 2 3 6 9 9
15	0 1 2 4 4 7 8
16	0 4
17	1 2 5

Answer: A

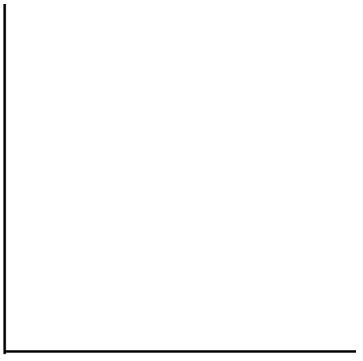
Explanation: A)

B)

Solve the problem.

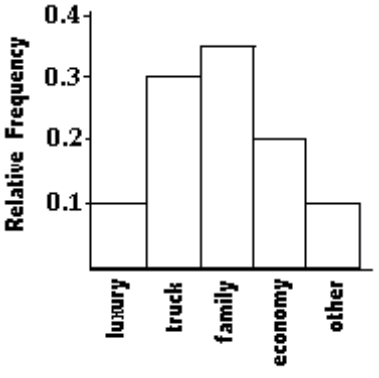
45) A car dealer is deciding what kinds of vehicles he should order from the factory. He looks at his sales report for the preceding period. Choose the vertical scale so that the relative frequencies are represented. 45) _____

Vehicle	Sales
Economy	30
Sports	7.5
Family	52.5
Luxury	15
Truck	45

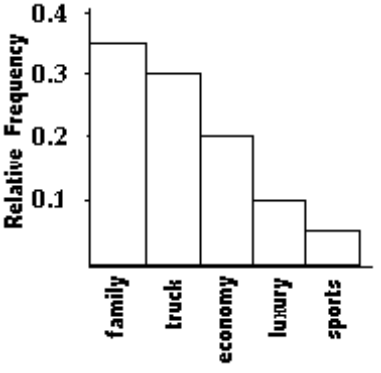


Construct a Pareto chart to help him decide.

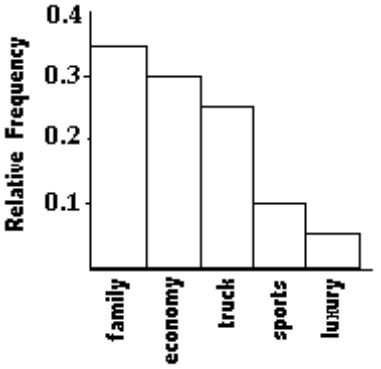
A)



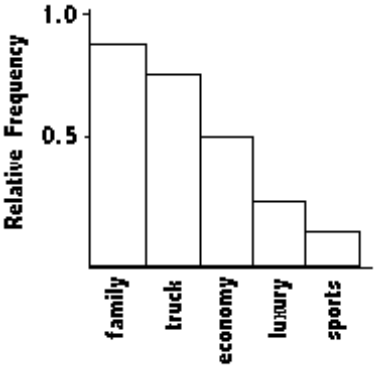
B)



C)



D)



Answer: B

Explanation: A)

B)

C)

D)

Provide an appropriate response.

46) The following frequency distribution analyzes the scores on a math test. Find the class midpoint of scores interval 40-59. 46) _____

Scores	Number of students
40-59	2
60-75	4
76-82	6
83-94	15
95-99	5

A) 50.5 B) 49.0 C) 49.5 D) 48.5

Answer: C

Explanation: A)

B)

C)

D)

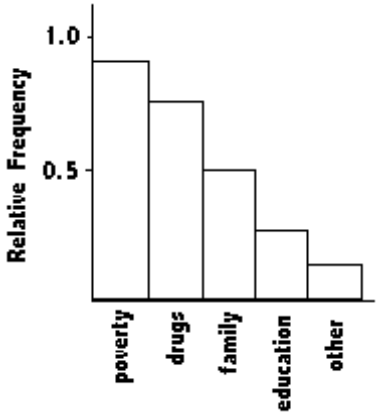
Solve the problem.

47) At the National Criminologists Association's annual convention, participants filled out a questionnaire asking what they thought was the most important cause for criminal behavior. The tally was as follows. 47) _____

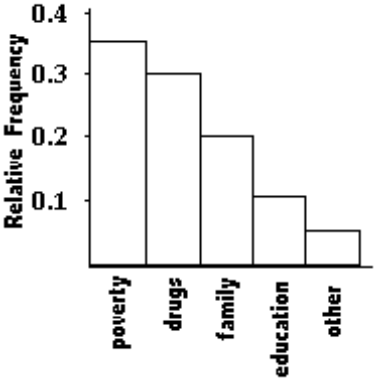
Cause	Frequency
education	47.1
drugs	141.3
family	94.2
poverty	164.85
other	23.55

Construct a Pareto chart to display these findings.

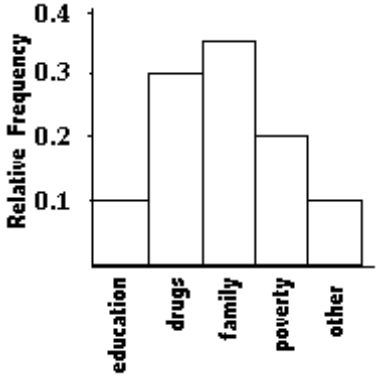
A)



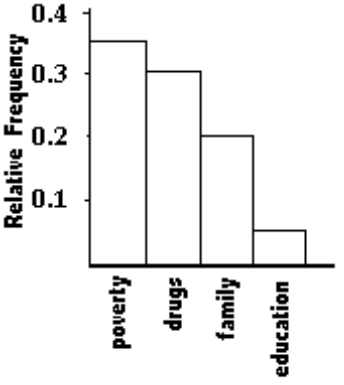
B)



C)



D)



Answer: B

Explanation: A)

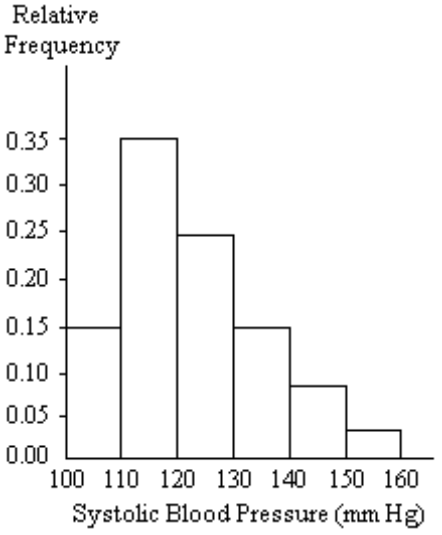
B)

C)

D)

Provide an appropriate response.

48) A nurse measured the blood pressure of each person who visited her clinic. Following is a relative-frequency histogram for the systolic blood pressure readings for those people aged between 25 and 40. The blood pressure readings were given to the nearest whole number. Approximately what percentage of the people aged 25-40 had a systolic blood pressure reading between 110 and 119 inclusive? 48) _____



A) 3.5% B) 35% C) 30% D) 0.35%

Answer: B

Explanation: A)
B)
C)
D)

Use the data to create a stemplot.

49) The normal monthly precipitation (in inches) for August is listed for 39 different U.S. cities. Construct an expanded stemplot with about 9 rows. 49) _____

3.5 1.6 2.4 3.7 4.1 3.9 1.0 3.6 1.7 0.4 3.2 4.2 4.1
4.2 3.4 3.7 2.2 1.5 4.2 3.4 2.7 4.0 2.0 0.8 3.6 3.7
0.4 3.7 2.0 3.6 3.8 1.2 4.0 3.1 0.5 3.9 0.1 3.5 3.4

A)

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

B)

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

Answer: A

Explanation: A)
B)

Construct the cumulative frequency distribution that corresponds to the given frequency distribution.

50) 50) _____

Speed	Number of cars
0-29	4
30-59	16
60-89	60
90-119	20

A)

Speed	Cumulative Frequency
Less than 30	4
Less than 60	20
Less than 90	80
Less than120	100

B)

Speed	Cumulative Frequency
Less than 30	0.04
Less than 60	0.20
Less than 90	0.80
Less than120	1.00

C)

Speed	Cumulative Frequency
Less than 30	100
Less than 60	80
Less than 90	82
Less than120	4

D)

Speed	Cumulative Frequency
0-29	4
30-59	20
60-89	80
90-119	100

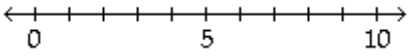
Answer: A

Explanation: A)
B)
C)
D)

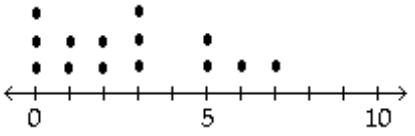
Construct the dotplot for the given data.

51) Attendance records at a school show the number of days each student was absent during the year. 51) _____
The days absent for each student were as follows.

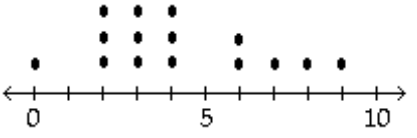
0 2 3 4 2 3 4 6 7 2 3 4 6 9 8



A)



B)



C)

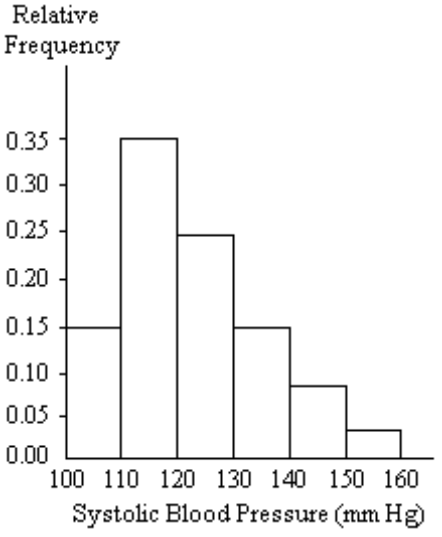
D)

Answer: B

Explanation: A)
B)
C)
D)

Provide an appropriate response.

52) A nurse measured the blood pressure of each person who visited her clinic. Following is a relative-frequency histogram for the systolic blood pressure readings for those people aged between 25 and 40. The blood pressure readings were given to the nearest whole number. What class width was used to construct the relative frequency distribution? 52) _____



A) 9 B) 11 C) 100 D) 10

Answer: D

Explanation: A)
B)
C)
D)

Construct the cumulative frequency distribution that corresponds to the given frequency distribution.

53) 53) _____

Height (inches)	Frequency
69.0 - 71.9	18
72.0 - 74.9	22
75.0 - 77.9	20
78.0 - 80.9	16
81.0 - 83.9	4

A)

Height (inches)	Cumulative Frequency
69.0 - 71.9	18
72.0 - 74.9	40
75.0 - 77.9	60
78.0 - 80.9	76
81.0 - 83.9	80

B)

Height (inches)	Cumulative Frequency
Less than 72.0	18
Less than 75.0	40
Less than 78.0	60
Less than 81.0	76
Less than 84.0	80

C)

Height (inches)	Cumulative Frequency
Less than 72.0	40
Less than 75.0	60
Less than 78.0	76
Less than 81.0	80
Less than 84.0	84

D)

Height (inches)	Cumulative Frequency
Less than 72.0	0.225
Less than 75.0	0.275
Less than 78.0	0.250
Less than 81.0	0.200
Less than 84.0	0.050

Answer: B

Explanation: A)
B)
C)
D)

Provide an appropriate response.

54) Sturges' guideline suggests that when constructing a frequency distribution, the ideal number of classes can be approximated by 1 + (log n)/(log 2), where n is the number of data values. Use this guideline to find the ideal number of classes when the number of data values is 180. 54) _____

A) 7 B) 10 C) 8 D) 9

Answer: C

Explanation: A)
B)
C)
D)

55) The frequency distribution below summarizes the home sale prices in the city of Summerhill for the month of June. Determine the width of each class. 55) _____

(Sale price in thousand $)	Frequency
80.0 - 110.9	2
111.0 - 141.9	5
142.0 - 172.9	7
173.0 - 203.9	10
204.0 - 234.9	3
235.0 - 265.9	1

A) 30 B) 31 C) 61 D) 28

Answer: B

Explanation: A)
B)
C)
D)

Use the data to create a stemplot.

56) The following data consists of the weights (in pounds) of 15 randomly selected women and the weights of 15 randomly selected men. Construct a back-to-back stemplot for the data. 56) _____

Women: 128 150 118 166 142
122 137 110 175 152
145 126 139 111 170

Men: 140 153 199 186 169
136 176 162 196 155
173 190 141 166 153

A)

Men		Women
	11	0 1 8
	12	2 6 8
6	13	7 9
1 0	14	2 5
5 3 3	15	0 2
9 6 2	16	6
6 3	17	0 5
6	18	
9 6 0	19	

B)

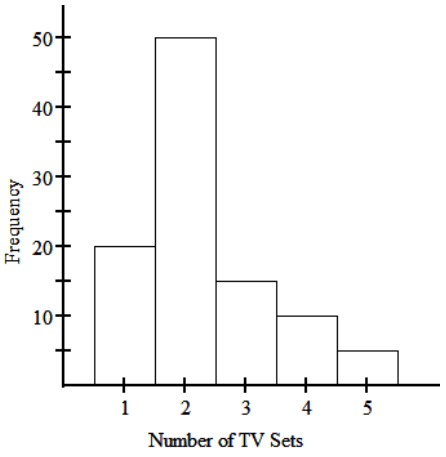
Men		Women
	11	0 1
	12	2 6 8
6	13	7 9
1 0	14	2 5
5 3 3	15	0 2 4
9 6 2	16	6
6 3	17	0 5
9 6	18	
9 6	19	

Answer: A

Explanation: A)
B)

Provide an appropriate response.

57) The histogram below represents the number of television sets per household for a sample of U.S. households. How many households are included in the histogram? 57) _____



A) 100 B) 110 C) 95 D) 90

Answer: A

Explanation: A)
B)
C)
D)

58) The frequency distribution below summarizes employee years of service for Alpha Corporation. Determine the width of each class. 58) _____

Years of service	Frequency
1-5	5
6-10	20
11-15	25
16-20	10
21-25	5
26-30	3

A) 4 B) 10 C) 6 D) 5

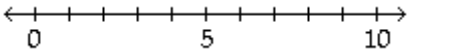
Answer: D

Explanation: A)
B)
C)
D)

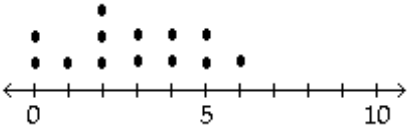
Construct the dotplot for the given data.

59) A manufacturer records the number of errors each work station makes during the week. The data are as follows. 59) _____

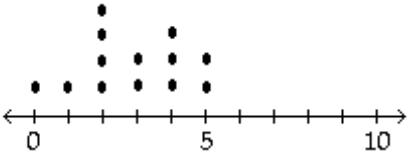
6 3 2 3 5 2 0 2 5 4 2 0 1



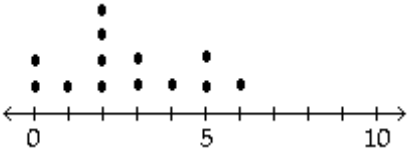
A)



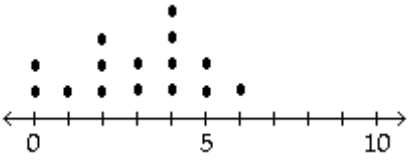
B)



C)



D)



Answer: C

Explanation: A)
B)
C)
D)

Use the data to create a stemplot.

60) The midterm test scores for the seventh-period typing class are listed below. 60) _____

85 77 93 91 74 65 68 97 88 59 74 83 85 72 63 79

A)

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

B)

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

Answer: A

Explanation: A)
B)

Provide an appropriate response.

61) The following frequency distribution analyzes the scores on a math test. Find the class midpoint of scores interval 95-99. 61) _____

Scores	Number of students
40-59	2
60-75	4
76-82	6
83-94	15
95-99	5

A) 97.0 B) 97.5 C) 98.0 D) 96.5

Answer: A

Explanation: A)
B)
C)
D)

Use the data to create a stemplot.

62) The following data show the number of laps run by each participant in a marathon. 62) _____

46 65 55 43 51 48 57 30 43 49 32 56

A)

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

B)

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

Answer: A

Explanation: A)
B)

Provide an appropriate response.

63) The following frequency distribution analyzes the scores on a math test. Find the class boundaries of scores interval 95-99. 63) _____

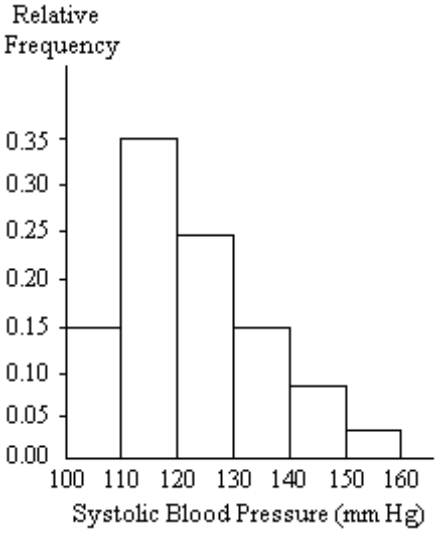
Scores	Number of students
40-59	2
60-75	4
76-82	6
83-94	15
95-99	5

A) 94.5, 100.5 B) 95.5, 100.5 C) 94.5, 99.5 D) 95.5, 99.5

Answer: C

Explanation: A)
B)
C)
D)

64) A nurse measured the blood pressure of each person who visited her clinic. Following is a relative-frequency histogram for the systolic blood pressure readings for those people aged between 25 and 40. The blood pressure readings were given to the nearest whole number. Approximately what percentage of the people aged 25-40 had a systolic blood pressure reading between 110 and 139 inclusive? 64) _____



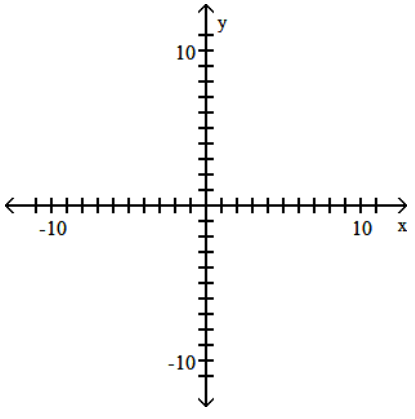
A) 39% B) 75% C) 89% D) 59%

Answer: B

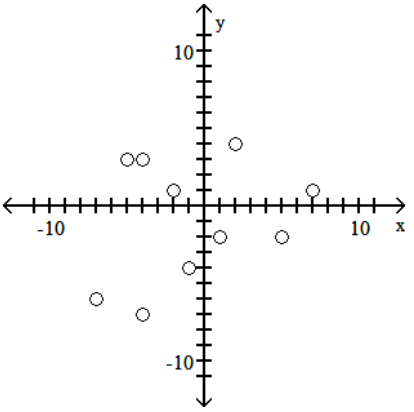
Explanation: A)
B)
C)
D)

Use the given paired data to construct a scatterplot.

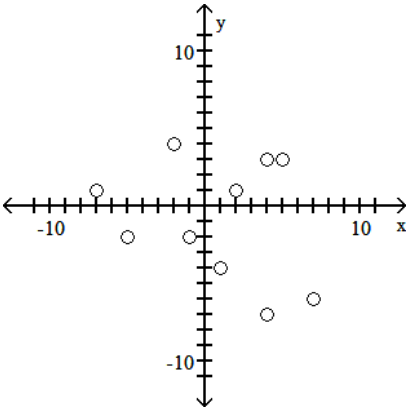
65) x -5 -7 -2 -4 2 5 1 7 -4 -1 65) _____
y 3 -6 1 3 4 -2 -2 1 -7 -4



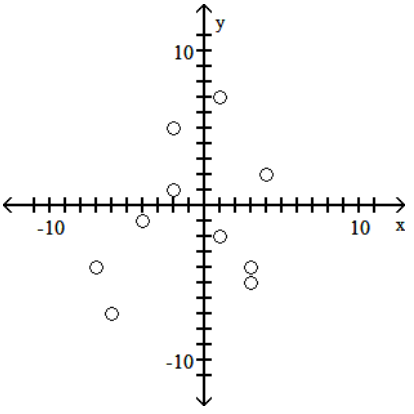
A)



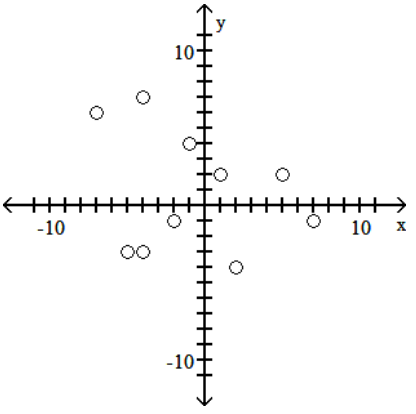
B)



C)



D)



Answer: A

Explanation: A)

B)

C)

D)

Provide an appropriate response.

66) The frequency distribution for the weekly incomes of students with part-time jobs is given below. Construct the corresponding relative frequency distribution. Round relative frequencies to the nearest hundredth of a percent if necessary. 66) _____

Income ($)	Frequency
200-300	61
301-400	51
401-500	87
501-600	88
More than 600	20

A)

Income ($)	Relative Frequency
201-300	15.5%
301-400	22.1%
401-500	31.3%
501-600	16.2%
More than600	14.9%

B)

Income ($)	Relative Frequency
200-300	27.88%
301-400	28.95%
401-500	6.56%
501-600	19.61%
More than 600	27.97%

C)

Income ($)	Relative Frequency
200-300	12.5%
301-400	20.1%
401-500	37.3%
501-600	15.2%
More than 600	14.9%

D)

Income ($)	Relative Frequency
200-300	19.87%
301-400	16.61%
401-500	28.34%
501-600	28.66%
More than 600	6.51%

Answer: D

Explanation: A)
B)
C)
D)

67) The scores on a recent statistics test are given in the frequency distribution below. Construct the corresponding relative frequency distribution. Round relative frequencies to the nearest hundredth of a percent if necessary. 67) _____

Scores	Frequency
0-60	5
61-70	10
71-80	8
81-90	6
91-100	2

A)

Scores	Relative Frequency
0-60	0.26%
61-70	0.23%
71-80	0.42%
81-90	0.10%
91-100	0.00%

B)

Scores	Relative Frequency
0-60	15.5%
61-70	22.1%
71-80	31.3%
81-90	16.2%
91-100	14.9%

C)

Scores	Relative Frequency
0-60	16.13%
61-70	32.26%
71-80	25.81%
81-90	19.35%
91-100	6.45%

D)

Scores	Relative Frequency
0-60	12.5%
61-70	20.1%
71-80	37.3%
81-90	15.2%
91-100	14.9%

Answer: C

Explanation: A)
B)
C)
D)

Use the data to create a stemplot.

68) The ages of the 45 members of a track and field team are listed below. Construct an expanded stemplot with about 8 rows. 68) _____

21 18 42 35 32 21 44 25 38 48 14 19 23 22 28
32 34 27 31 17 16 41 37 22 24 33 32 21 26 30
22 27 32 30 20 18 17 21 15 26 36 31 40 16 25

A)

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

B)

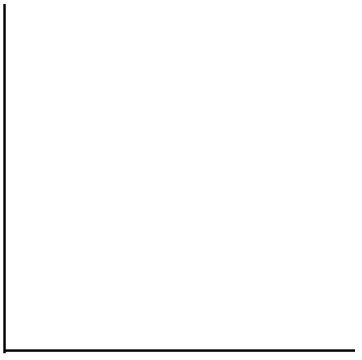
1	4 5
1	5 6 6 7 7 8 8 9
2	0 1 1 1 1 2 2 2 3 4 5 5
2	5 5 6 6 7 7 8
3	0 0 1 1 2 2 2 2 3 4 5
3	5 6 7 8
4	0 1 2 4
4	8

Answer: A

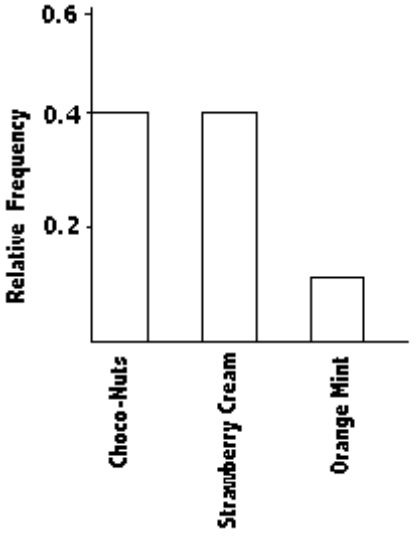
Explanation: A)
B)

Solve the problem.

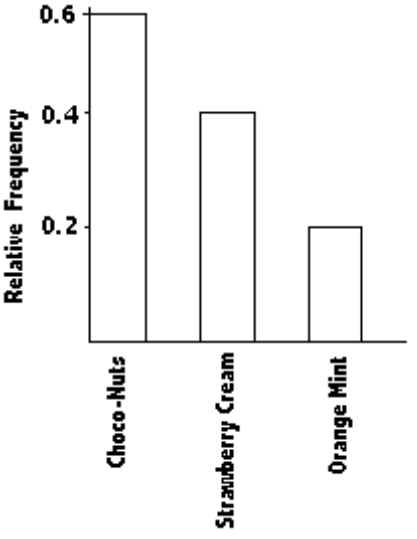
69) Wagenlucht Ice Cream Company is always trying to create new flavors of ice cream. They are market testing three kinds to find out which one has the best chance of becoming popular. They give small samples of each to 40 people at a grocery store. 8 ice cream tasters preferred the Strawberry Cream, 24 preferred Choco-Nuts, and 8 loved the Orange Mint. Construct a Pareto chart to represent these preferences. Choose the vertical scale so that the relative frequencies are represented. 69) _____



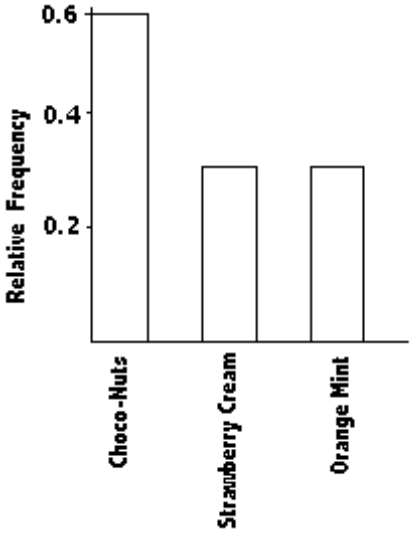
A)



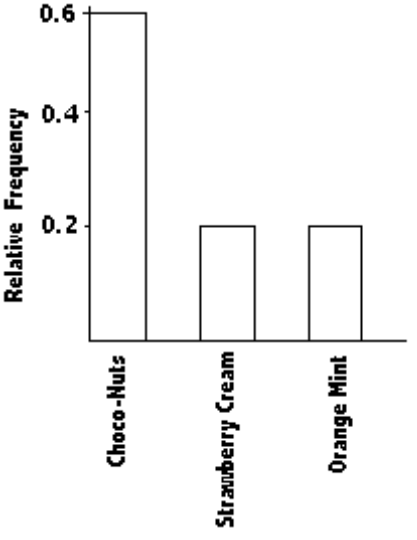
B)



C)



D)



Answer: D
Explanation: A)
B)
C)
D)

Provide an appropriate response.

70) The frequency distribution below summarizes the home sale prices in the city of Summerhill for the month of June. Find the class boundaries for class 80.0-110.9. 70) _____

(Sale price in thousand $)	Frequency
80.0 - 110.9	2
111.0 - 141.9	5
142.0 - 172.9	7
173.0 - 203.9	10
204.0 - 234.9	3
235.0 - 265.9	1

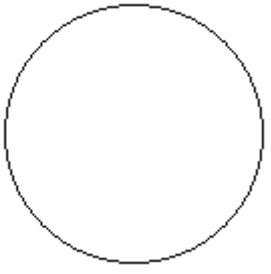
A) 79.90, 111.0 B) 79.95, 110.95 C) 80.00, 110.95 D) 79.90, 110.95

Answer: B
Explanation: A)
B)
C)
D)

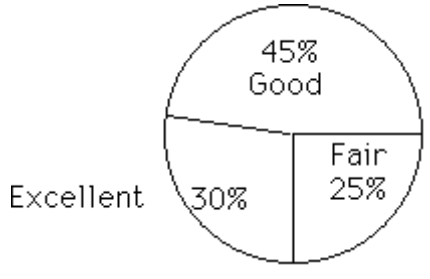
Construct a pie chart representing the given data set.

71) After reviewing a movie, 700 people rated the movie as excellent, good, or fair. The following data give the rating distribution. 71) _____

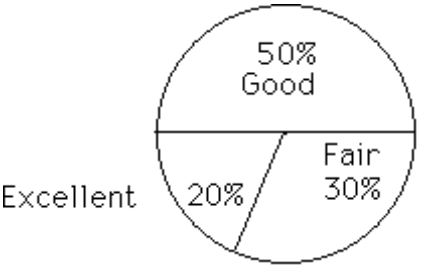
Excellent	Good	Fair
140	350	210



A)



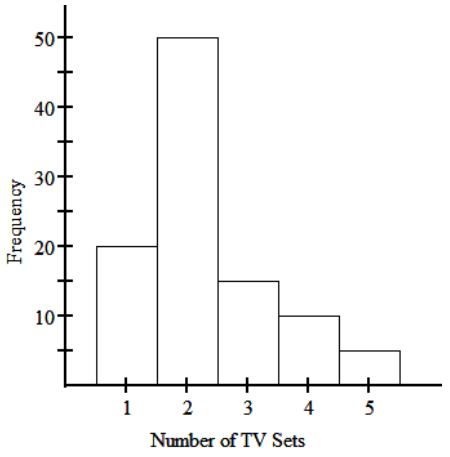
B)



Answer: B
Explanation: A)
B)

Provide an appropriate response.

72) The histogram below represents the number of television sets per household for a sample of U.S. households. What is the class width? 72) _____

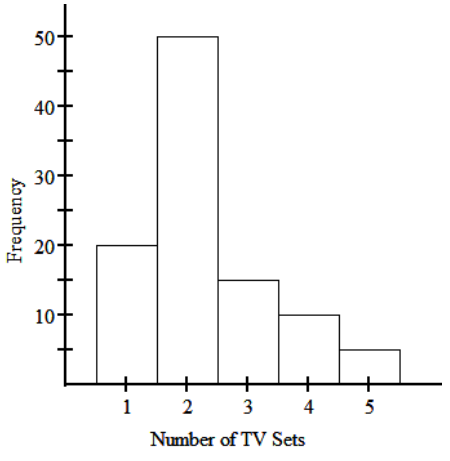


A) 0.5 B) 5 C) 1 D) 2

Answer: C

Explanation: A)
B)
C)
D)

73) The histogram below represents the number of television sets per household for a sample of U.S. households. What is the maximum number of households having the same number of television sets? 73) _____



A) 100 B) 25 C) 20 D) 50

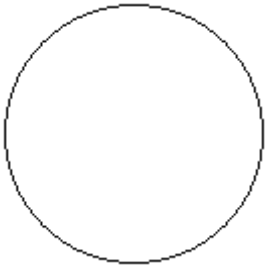
Answer: D

Explanation: A)
B)
C)
D)

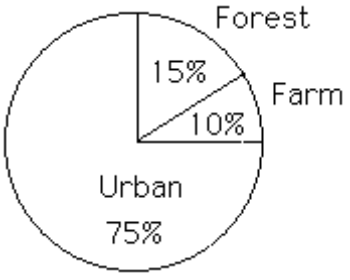
Construct a pie chart representing the given data set.

74) The following figures give the distribution of land (in acres) for a county containing 98,000 acres. 74) _____

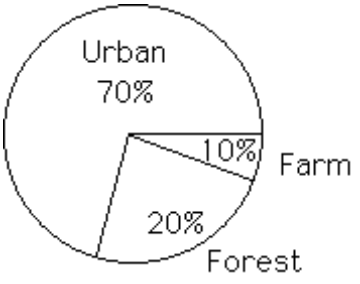
Forest	Farm	Urban
14,700	9800	73,500



A)



B)



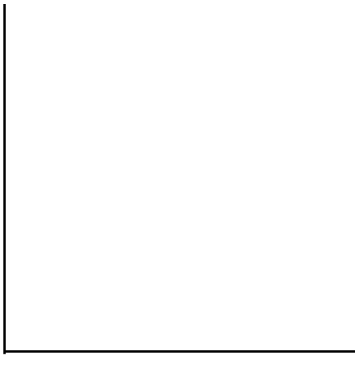
Answer: A

Explanation: A)

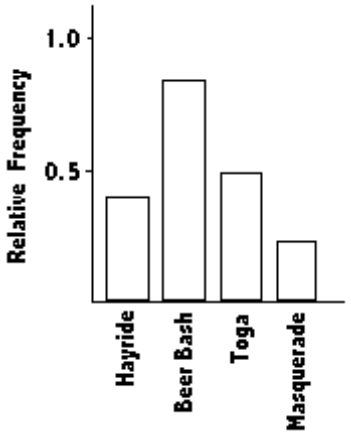
B)

Solve the problem.

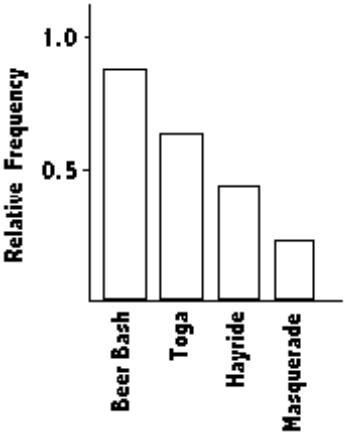
75) The Kappa Iota Sigma Fraternity polled its members on the weekend party theme. The vote was as follows: six for toga, four for hayride, eight for beer bash, and two for masquerade. Display the vote count in a Pareto chart. 75) _____



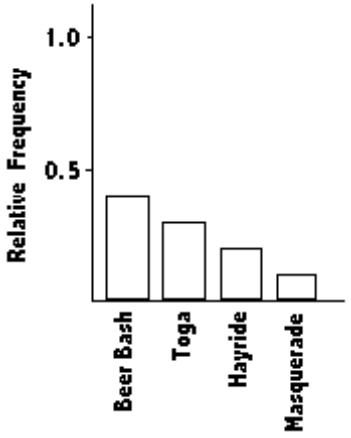
A)



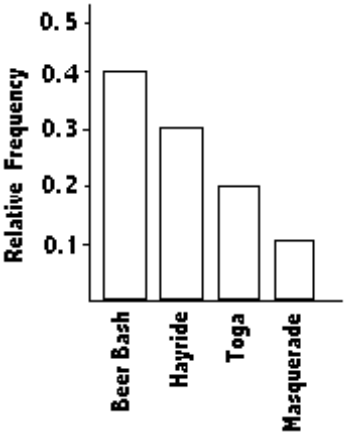
B)



C)



D)



Answer: C

Explanation: A)

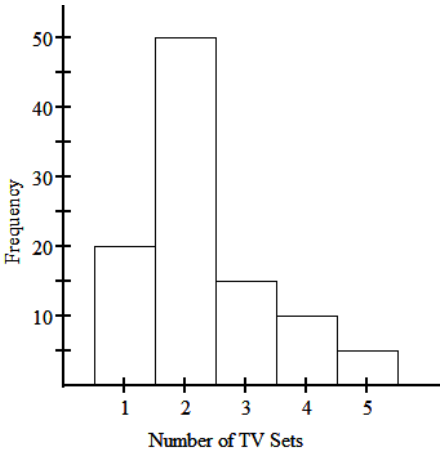
B)

C)

D)

Provide an appropriate response.

76) The histogram below represents the number of television sets per household for a sample of U.S. households. What is the minimum number of households having the same number of television sets? 76) _____



A) 20 B) 1 C) 100 D) 5

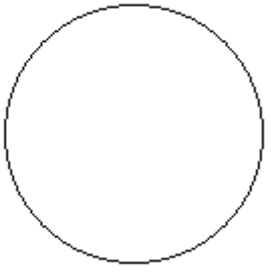
Answer: D

Explanation: A)
B)
C)
D)

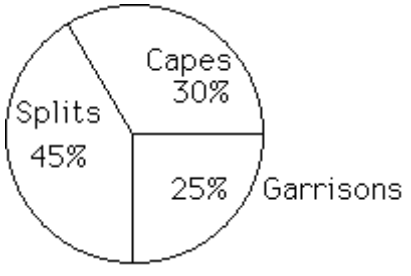
Construct a pie chart representing the given data set.

77) The following data give the distribution of the types of houses in a town containing 43,000 houses. 77) _____

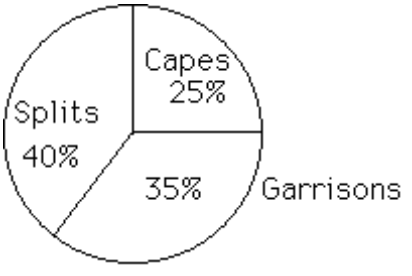
Capes	Garrisons	Splits
10,750	15,050	17,200



A)



B)

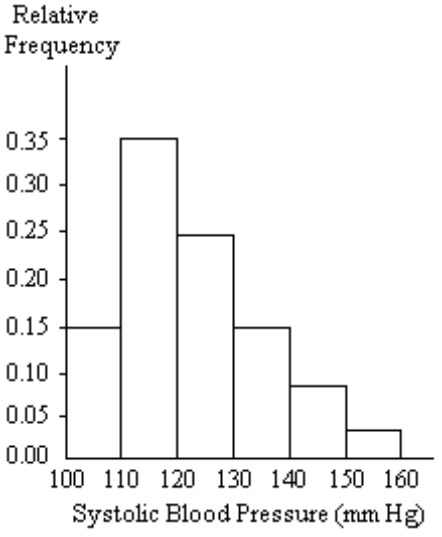


Answer: B

Explanation: A)
B)

Provide an appropriate response.

78) A nurse measured the blood pressure of each person who visited her clinic. Following is a relative-frequency histogram for the systolic blood pressure readings for those people aged between 25 and 40. The blood pressure readings were given to the nearest whole number. Identify the center of the third class. 78) _____



A) 125 B) 130 C) 120 D) 124

Answer: A

Explanation: A)
B)
C)
D)

79) The frequency distribution below summarizes employee years of service for Alpha Corporation. Find the class boundaries for class 26-30. 79) _____

Years of service	Frequency
1-5	5
6-10	20
11-15	25
16-20	10
21-25	5
26-30	3

A) 26.5, 30.5 B) 26.5, 29.5 C) 25.5, 30.5 D) 25.5, 20.5

Answer: C

Explanation: A)
B)
C)
D)

Construct the cumulative frequency distribution that corresponds to the given frequency distribution.

80) 80) _____

Weight (oz)	Number of Stones
1.2-1.6	5
1.7-2.1	2
2.2-2.6	5
2.7-3.1	5
3.2-3.6	13

A)

Weight (oz)	Cumulative Frequency
1.2-1.6	5
1.7-2.1	7
2.2-2.6	12
2.7-3.1	17
3.2-3.6	30

B)

Weight (oz)	Cumulative Frequency
Less than 1.7	5
Less than 2.2	7
Less than 2.7	12
Less than 3.2	17
Less than 3.7	30

C)

Weight (oz)	Cumulative Frequency
Less than 1.7	5
Less than 2.2	7
Less than 2.7	12
Less than 3.2	17
Less than 3.7	28

D)

Weight (oz)	Cumulative Frequency
Less than 2.2	7
Less than 3.2	17
Less than 3.7	30

Answer: B

Explanation: A)
B)
C)
D)

Provide an appropriate response.

81) The frequency distribution below summarizes the home sale prices in the city of Summerhill for the month of June. Determine the class midpoint for class 235.0-265.9. 81) _____

(Sale price in thousand $)	Frequency
80.0 - 110.9	2
111.0 - 141.9	5
142.0 - 172.9	7
173.0 - 203.9	10
204.0 - 234.9	3
235.0 - 265.9	1

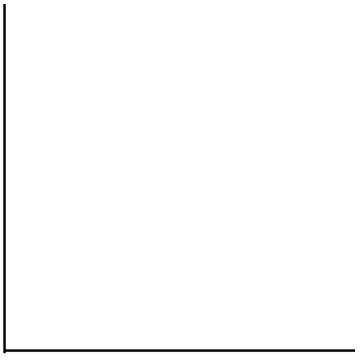
A) 250.50 B) 250.40 C) 250.55 D) 250.45

Answer: D

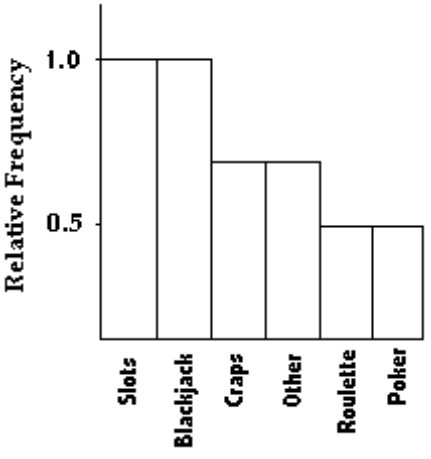
Explanation: A)
B)
C)
D)

Solve the problem.

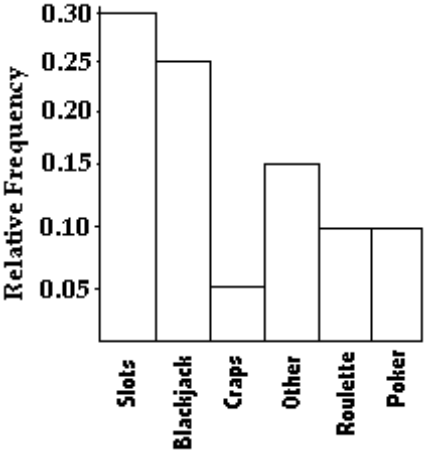
82) 300 casino patrons, were interviewed as they left the casino. 90 of them said they spent most of the time playing the slots. 90 of them said they played blackjack. 45 said they played craps. 15 said roulette. 15 said poker. The rest were not sure what they played the most. Construct a Pareto chart to depict the gaming practices of the group of casino goers. Choose the vertical scale so that the relative frequencies are represented. 82) _____



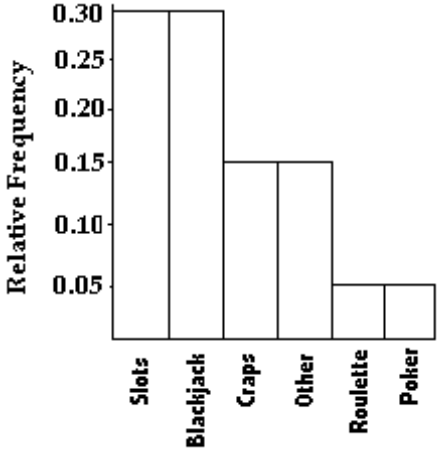
A)



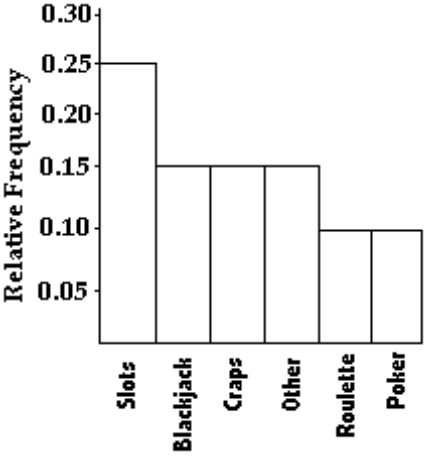
B)



C)



D)



Answer: C

Explanation: A)

B)

C)

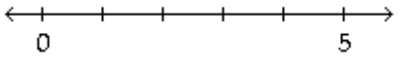
D)

D)

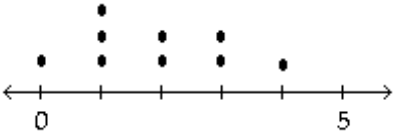
Construct the dotplot for the given data.

83) The frequency chart shows the distribution of defects for the machines used to produce a product. 83) _____

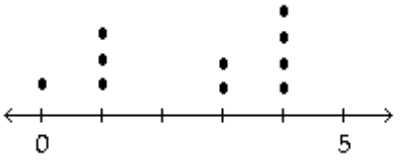
Defects	Frequency
0	1
1	3
2	0
3	2
4	4
5	0



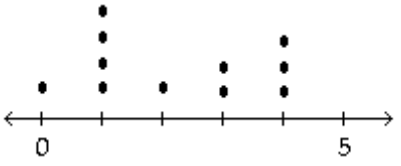
A)



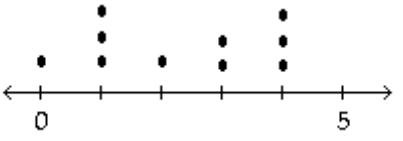
B)



C)



D)



Answer: B

Explanation: A)

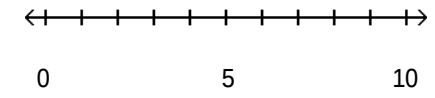
B)

C)

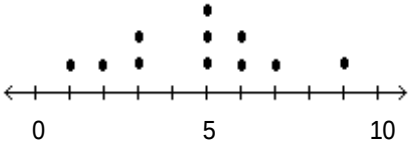
D)

84) A store manager counts the number of customers who make a purchase in his store each day. The data are as follows. 84) _____

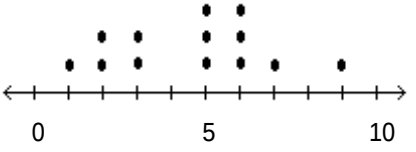
5 6 3 9 2 5 5 6 3 2



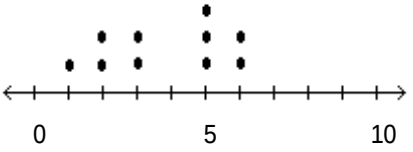
A)



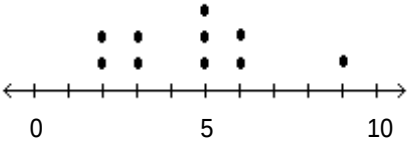
B)



C)



D)



Answer: D

Explanation: A)

B)

C)

D)

Use the data to create a stemplot.

85) Twenty-four workers were surveyed about how long it takes them to travel to work each day. The data below are given in minutes. 85) _____

20 35 42 52 65 20 60 49 24 37 23 24

22 20 41 25 28 27 50 47 58 30 32 48

A)

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

B)

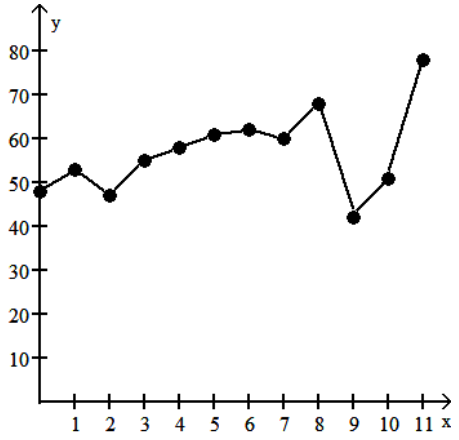
2	0 0 0 2 3 4 4 5 7 8
3	0 2 5 7
4	1 2 7 8 9
5	0 2 8
6	0 5

Answer: B

Explanation: A)

B)

1) The volume of the cube on the right is eight times (not twice) the volume of the cube on the left. The graph gives the visual impression that eight times as many parcels were delivered this year as last year.
2) It would be easier to see the distribution of the data in the graph of the histogram than in the lists of numbers in the frequency distribution.
3) Trend: Answers will vary. Possible answer: Except for a drop in high closing value in 1994, there was a steady rise through 2000, after which there was a sharp drop in 2001 followed by increases through 2003.

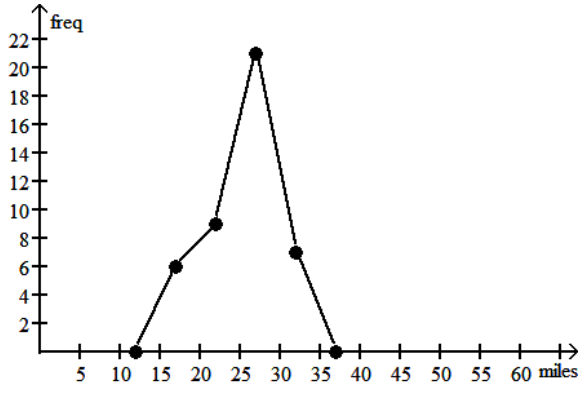


4)

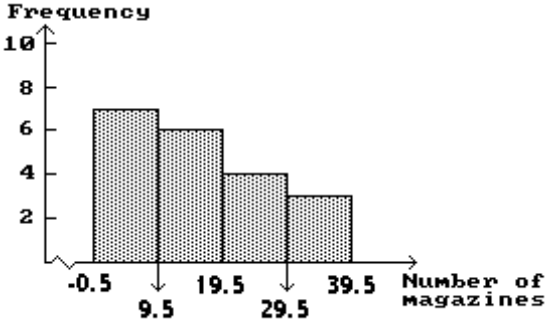
Weight (lb)	Relative Frequency (Metal)	Relative Frequency (Plastic)
0.00-0.99	11.3%	20.8%
1.00-1.99	37.7%	30.2%
2.00-2.99	22.6%	28.3%
3.00-3.99	17.0%	11.3%
4.00-4.99	11.3%	7.5%
5.00-5.99	0%	1.9%

The weights are different, but they do not appear to be substantially different.

5) Answers will vary. Possible answer: The shape of a distribution can readily be seen. The plot can be drawn quicker, since class width need not be calculated.
6) Answers will vary. Possible answer: The frequency distribution shows that half of the cooked steaks are less than their advertised weights.
7) The frequency polygon appears to roughly approximate a normal distribution. The frequencies increase to a maximum and then decrease, and the graph is symmetric with the left half being roughly a mirror image of the right half.



8) Answers will vary. Possible answer: A relative frequency distribution is better for comparison between groups whose numbers are different, since ratios are readily comparable.
9) Answers will vary. The answer should include the fact that pie charts are better for showing categories that are parts of a whole, whereas Pareto charts are better for displaying relative importance among categories.
10) The approximate amount at the center is 16 magazines.



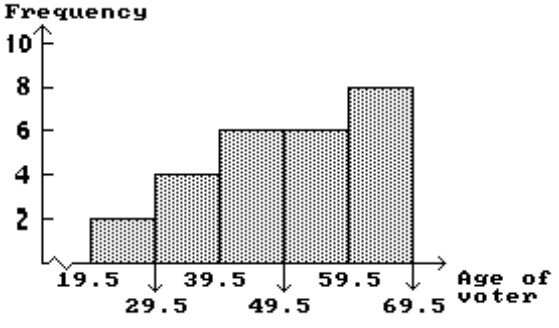
11) The area of the television on the right is nine times (not three times) the area of the television on the left. The graph gives the visual impression that sales in 2005 were nine times the sales in 1995.
12) No; no; The frequencies do not increase, reach a maximum, and then decrease.
13)

Age	Frequency
25-29	3
30-34	3
35-39	6
40-44	4
45-49	5
50-54	3
55-59	5
60-64	5

14)

Score	Frequency
60-69	3
70-79	12
80-89	7
90-99	2

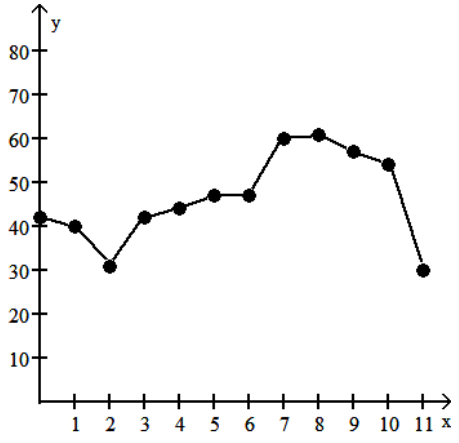
15) Not necessarily. The voluntary response sample may have characteristics fundamentally different from those of the population of all utility companies. Utilities with smaller emission rates might be more likely to respond, causing the voluntary response sample to show a smaller range of emission rates than found in the general population.
16) The approximate age at the center is 50.



17) A bar graph with these characteristics exaggerates the differences in the data.
18) The areas of the bars for the two classes will actually be the same. This is because the bar for the class 60-69, while it is twice as tall as the bar for the class 70-89, is also only half the width because the class widths are not the same. Heights, not areas, are proportional to frequencies. For classes of equal width, areas will also be proportional to frequencies.
19) The student should plot her data on a baseline marked by year and with vertical axis marked by high values. The stock that shows less volatility and a steady rise would be the better choice.
20) With a data set that is so small, the true nature of the distribution cannot be seen with a histogram.
21) Answers will vary. Possible answer: Histograms convey quantitative information about shapes of distributions. Pareto charts convey comparative information about relative standing of categorical data.
22) Answers will vary.
23)

Charges	Frequency
7.00-9.99	2
10.00-12.99	3
13.00-15.99	5
16.00-18.99	2

24) The graph distorts the data because the the vertical scale starts at 60 rather than 0, giving the impression of a large difference in the number of accidents, when actually the number of accidents only varies from 90 to 120. To make the graph less misleading, change the vertical scale so that it begins at 0 and increases in increments of 20.
25) Trend: Answers will vary. Possible answer: High closing stock values show a decrease from 1990 through 1992, after which the value of the stock rose through 1998. Another decrease occurred in 1999 and continued through 2001.



26) Answers will vary. The class width of the second class should be twice the class width of the first class.
27)

Hours	Frequency
3-4	3
5-6	13
7-8	7
9-10	1

28) Yes, it appears to be normal.

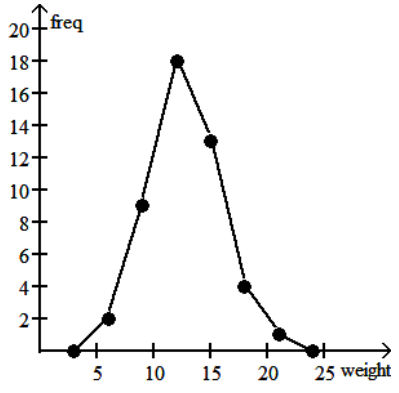
29) The data is bimodal because it has two peaks, one at near 13 and one at near 18. The two frequency distributions are as follows:

Class	Frequency
10-12	11
13-15	32
16-18	25
19-21	18

Class	Frequency
10-11	4
12-13	25
14-15	14
16-17	9
18-19	26
20-21	8

The bimodal distribution of the data will be clearly seen in the histogram of the original data and in the histogram with six classes. In the histogram with four classes, the shape of the data is lost.

30) The frequency polygon appears to roughly approximate a normal distribution. The frequencies increase to a maximum and then decrease, and the graph is symmetric with the left half being roughly a mirror image of the right half.



31)

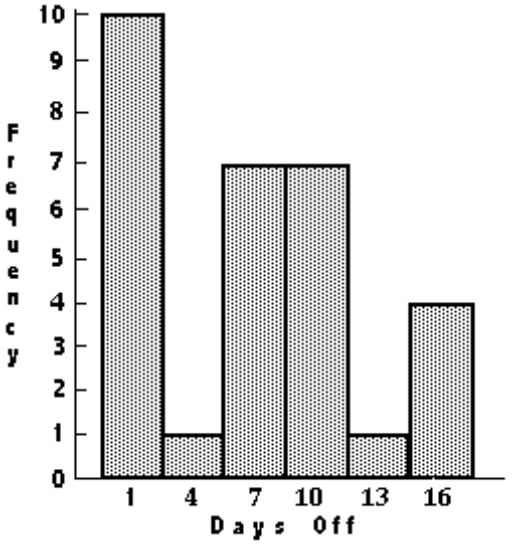
Cause	Frequency
U	9
I	9
F	7
O	5

32) Since the range is 83 - 18 = 65, and 65 divided by 5 equals 13, a whole number, the class width has to be widened from 13 to 14. If the class width was 13 data values equal to 83 would not be included in the frequency distribution.

33) The average price increases by 25% from 2002 to 2003. Using the second graph, the price appears to double from 2002 to 2003 (i.e. it appears to increase by 100%).The second graph is misleading because the differences between the bars seem bigger (relatively) than they really are.

34) The two histograms will have the same shape. They will also have the same scale on the horizontal axis. They will differ only in the scales on the vertical axis: the histogram will show frequencies on the vertical axis while the relative frequency histogram will show relative frequencies.

35) The distribution does not appear to be normal. It is not bell-shaped and it is not symmetric.



36)

Hours	Frequency
8-9	3
10-11	13
12-13	7
14-15	1

37) The data is bimodal because it has two peaks, one at around 13 and one at around 18. The two frequency distributions are as follows:

class	freq
10-12	11
13-15	32
16-18	25
19-21	18

class	freq
10-11	4
12-13	25
14-15	14
16-17	9
18-19	26
20-21	8

The distribution with four classes does not capture the bimodal nature of the data, while the distribution with six classes does.

38) C
39) D
40) D
41) B
42) B
43) C
44) A
45) B
46) C
47) B
48) B
49) A

50) A
51) B
52) D
53) B
54) C
55) B
56) A
57) A
58) D
59) C
60) A
61) A
62) A
63) C
64) B
65) A
66) D
67) C
68) A
69) D
70) B
71) B
72) C
73) D
74) A
75) C
76) D
77) B
78) A
79) C
80) B
81) D
82) C
83) B
84) D
85) B