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

Classify the data as either qualitative or quantitative.

1) For the year 2006 , a large record company reported the following sales figures for various music media. 1) _____

Media	Sales ($ millions)
CD	1477.3
CD single	1.8
MP3	65.9
Vinyl	2.6
Music video	531.4
Mini Disc	0.3
DVD	108.2
Cassette	3.4

What kind of data is provided by the information in the first column?

A) Qualitative B) Quantitative

2) A large record company reported the following sales figures for various music media last year. 2) _____

Media	Sales ($ millions)
CD	1477.3
CD single	1.8
MP3	65.9
Vinyl	2.6
Music video	531.4
Mini Disc	0.3
DVD	108.2
Cassette	3.4

What kind of data is provided by the information in the second column?

A) Qualitative B) Quantitative

3) The following table gives the top five movies at the box office this week. 3) _____

Rank	Last week	Movie title	Studio	Box office sales ($ millions)
1	N/A	Pirate Adventure	Movie Giant	35.2
2	2	Secret Agent Files	G.M.G.	19.5
3	1	Epic Super Hero Team	21st Century	14.3
4	5	Reptile Ride	Movie Giant	10.1
5	4	Must Love Cats	Dreamboat	9.9

What kind of data is provided by the information in the first column?

A) Qualitative B) Quantitative

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4) The following table gives the top five movies at the box office this week. 4) _____

Rank	Last week	Movie title	Studio	Box office sales ($ millions)
1	N/A	Pirate Adventure	Movie Giant	35.2
2	2	Secret Agent Files	G.M.G.	19.5
3	1	Epic Super Hero Team	21st Century	14.3
4	5	Reptile Ride	Movie Giant	10.1
5	4	Must Love Cats	Dreamboat	9.9

What kind of data is provided by the information in the second column?
A) Qualitative B) Quantitative

5) The following table gives the top five movies at the box office this week. 5) _____

Rank	Last week	Movie title	Studio	Box office sales ($ millions)
1	N/A	Pirate Adventure	Movie Giant	35.2
2	2	Secret Agent Files	G.M.G.	19.5
3	1	Epic Super Hero Team	21st Century	14.3
4	5	Reptile Ride	Movie Giant	10.1
5	4	Must Love Cats	Dreamboat	9.9

What kind of data is provided by the information in the third column?
A) Qualitative B) Quantitative

6) The following table gives the top five movies at the box office this week. 6) _____

Rank	Last week	Movie title	Studio	Box office sales ($ millions)
1	N/A	Pirate Adventure	Movie Giant	35.2
2	2	Secret Agent Files	G.M.G.	19.5
3	1	Epic Super Hero Team	21st Century	14.3
4	5	Reptile Ride	Movie Giant	10.1
5	4	Must Love Cats	Dreamboat	9.9

What kind of data is provided by the information in the fourth column?
A) Qualitative B) Quantitative

7) The following table gives the top five movies at the box office this week. 7) _____

Rank	Last week	Movie title	Studio	Box office sales ($ millions)
1	N/A	Pirate Adventure	Movie Giant	35.2
2	2	Secret Agent Files	G.M.G.	19.5
3	1	Epic Super Hero Team	22nd Century	14.3
4	5	Reptile Ride	Movie Giant	10.1
5	4	Must Love Cats	Dreamboat	9.9

What kind of data is provided by the information in the fifth column?
A) Qualitative B) Quantitative

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8) The following table shows the average weight of offensive linemen for each given football team. 8) _____

Team	Average weight (pounds)
Gators	303.52
Lakers	326.78
Eagles	290.61
Pioneers	321.96
Lions	297.35
Mustangs	302.49
Rams	345.88
Buffalos	329.24

What kind of data is provided by the information in the first column?
A) Qualitative B) Quantitative

9) The following table shows the average weight of offensive linemen for each given football team. 9) _____

Team	Average weight (pounds)
Gators	303.52
Lakers	326.78
Eagles	290.61
Pioneers	321.96
Lions	297.35
Mustangs	302.49
Rams	345.88
Buffalos	329.24

What kind of data is provided by the information in the second column?
A) Qualitative B) Quantitative

Classify the data as either discrete or continuous.

10) The number of freshmen entering college in a certain year is 621. 10) _____
A) Discrete B) Continuous

11) The average height of all freshmen entering college in a certain year is 68.4 inches. 11) _____
A) Discrete B) Continuous

12) An athlete runs 100 meters in 10.7 seconds. 12) _____
A) Discrete B) Continuous

13) The number of cars passing a busy intersection between 4:30 P.M. and 6:30 P.M. on a Monday is 2,200. 13) _____
A) Discrete B) Continuous

14) The average speed of cars passing a busy intersection between 4:30 P.M. and 6:30 P.M. on a Friday is 32.3 mi/h. 14) _____
A) Discrete B) Continuous

15) The total number of phone calls a sales representative makes in a month is 425. 15) _____
A) Discrete B) Continuous

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16) The temperature in Manhattan at 1 p.m. on New Year's Day was 34.1°F. 16) _____

A) Discrete B) Continuous

17) What type of data is provided by the statement "Helen finished in 7th place in the ice dancing competition"? 17) _____

A) Discrete B) Continuous

18) The following table shows the heights of the five tallest mountains in North America. 18) _____

Mountain	Height (ft)	Rank
McKinley	20,320	1
Logan	19,850	2
Citlaltepec	18,700	3
St. Elias	18,008	4
Popocatepetl	17,930	5

What kind of data is given in the third column of the table?

A) Discrete B) Continuous

19) The following table shows the heights of the five tallest mountains in North America. 19) _____

Mountain	Height (ft)	Rank
McKinley	20,320	1
Logan	19,850	2
Citlaltepec	18,700	3
St. Elias	18,008	4
Popocatepetl	17,930	5

What kind of data is given in the second column of the table?

A) Discrete B) Continuous

Identify the variable.

20) For the year 2006 , a large record company reported the following sales figures for various music media. 20) _____

Media	Sales ($ millions)
CD	1477.3
CD single	1.8
MP3	65.9
Vinyl	2.6
Music video	531.4
Mini Disc	0.3
DVD	108.2
Cassette	3.4

Identify the variable under consideration in the first column?

A) media type B) CD C) 1477.3 D) sales

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21) A large record company reported the following sales figures for various music media last year. 21) _____

Media	Sales ($ millions)
CD	1477.3
CD single	1.8
MP3	65.9
Vinyl	2.6
Music video	531.4
Mini Disc	0.3
DVD	108.2
Cassette	3.4

Identify the variable under consideration in the second column?

A) media B) $ millions C) CD single D) sales

22) The following table gives the top five movies at the box office this week. 22) _____

Rank	Last week	Movie title	Studio	Box office sales ($ millions)
1	N/A	Pirate Adventure	Movie Giant	35.2
2	2	Secret Agent Files	G.M.G.	19.5
3	1	Epic Super Hero Team	21st Century	14.3
4	5	Reptile Ride	Movie Giant	10.1
5	4	Must Love Cats	Dreamboat	9.9

Identify the variable under consideration in the first column?

A) last week's rank B) rank this week

C) movie title D) Pirate Adventure

23) The following table gives the top five movies at the box office this week. 23) _____

Rank	Last week	Movie title	Studio	Box office sales ($ millions)
1	N/A	Pirate Adventure	Movie Giant	35.2
2	2	Secret Agent Files	G.M.G.	19.5
3	1	Epic Super Hero Team	21st Century	14.3
4	5	Reptile Ride	Movie Giant	10.1
5	4	Must Love Cats	Dreamboat	9.9

Identify the variable under consideration in the second column?

A) Secret Agent Files B) last week's rank

C) box office sales D) movie title

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24) The following table gives the top five movies at the box office this week. 24) _____

Rank	Last week	Movie title	Studio	Box office sales ($ millions)
1	N/A	Pirate Adventure	Movie Giant	35.2
2	2	Secret Agent Files	G.M.G.	19.5
3	1	Epic Super Hero Team	21st Century	14.3
4	5	Reptile Ride	Movie Giant	10.1
5	4	Must Love Cats	Dreamboat	9.9

Identify the variable under consideration in the third column?

A) rank B) studio name
C) movie title D) Epic Super Hero Team

25) The following table gives the top five movies at the box office this week. 25) _____

Rank	Last week	Movie title	Studio	Box office sales ($ millions)
1	N/A	Pirate Adventure	Movie Giant	35.2
2	2	Secret Agent Files	G.M.G.	19.5
3	1	Epic Super Hero Team	21st Century	14.3
4	5	Reptile Ride	Movie Giant	10.1
5	4	Must Love Cats	Dreamboat	9.9

Identify the variable under consideration in the fourth column?

A) movie title B) rank C) studio name D) box office sales

26) The following table gives the top five movies at the box office this week. 26) _____

Rank	Last week	Movie title	Studio	Box office sales ($ millions)
1	N/A	Pirate Adventure	Movie Giant	35.2
2	2	Secret Agent Files	G.M.G.	19.5
3	1	Epic Super Hero Team	22nd Century	14.3
4	5	Reptile Ride	Movie Giant	10.1
5	4	Must Love Cats	Dreamboat	9.9

Identify the variable under consideration in the fifth column?

A) box office sales B) studio C) movie title D) rank

27) The following table shows the average weight of offensive linemen for each given football team. 27) _____

Team	Average weight (pounds)
Gators	303.52
Lakers	326.78
Eagles	290.61
Pioneers	321.96
Lions	297.35
Mustangs	302.49
Rams	345.88
Buffalos	329.24

Identify the variable under consideration in the first column?

A) Gators B) average weight of offensive linemen
C) team name D) pounds

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28) The following table shows the average weight of offensive linemen for each given football team. 28) _____

Team	Average weight (pounds)
Gators	303.52
Lakers	326.78
Eagles	290.61
Pioneers	321.96
Lions	297.35
Mustangs	302.49
Rams	345.88
Buffalos	329.24

Identify the variable under consideration in the second column?

A) team name B) Gators

C) pounds D) average weight of offensive linemen

Tell whether the statement is true or false.

29) A discrete variable always yields numerical values. 29) _____

A) True B) False

30) The possible values of a discrete variable always form a finite set. 30) _____

A) True B) False

31) A variable whose values are observed by counting something must be a discrete variable. 31) _____

A) True B) False

32) The set of possible values that a variable can take constitutes the data. 32) _____

A) True B) False

33) A discrete variable can only yield whole- number values. 33) _____

A) True B) False

34) A variable whose possible values are 1.15, 1.20, 1.25, 1.30, 1.35, 1.40, 1.45, 1.50, 1.55, 1.60, is a continuous variable. 34) _____

A) True B) False

35) A variable which can take any real- number value in the interval [0, 1] is a continuous variable. 35) _____

A) True B) False

36) A person's blood type can be classified as A, B, AB, or O. In this example, "blood type" is the variable while A, B, AB, O constitute the data. 36) _____

A) True B) False

37) Arranging the age of students in a class in from youngest to oldest yields ordinal data. 37) _____

A) True B) False

Construct a frequency distribution for the given qualitative data.

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38) The table shows the country represented by the winner of the 10,000 meter run in the Summer Olympic Games in various years. 38) _____

Year	Country
1912	Finland
1920	Finland
1924	Finland
1928	Finland
1932	Poland
1936	Finland
1948	Czechoslovakia
1952	Czechoslovakia
1956	USSR
1960	USSR
1964	United States
1968	Kenya
1972	Finland
1976	Finland
1980	Ethiopia
1984	Italy
1988	Morocco
1992	Morocco

A)

Country	Frequency
Finland	7
Poland	1
Czechoslovakia	2
USSR	2
United States	1
Kenya	1
Ethiopia	1
Italy	1
Morocco	2

B)

Country	Frequency
Finland	7
Poland	1
Czechoslovakia	2
USSR	2
United States	1
Kenya	1
France	1
Ethiopia	1
Italy	1
Morocco	2

C)

Country	Frequency
Finland	7
Poland	1
Czechoslovakia	2
USSR	2
United States	1
Ethiopia	1
Italy	1
Morocco	2

D)

Country	Frequency
Finland	6
Poland	1
Czechoslovakia	2
USSR	2
United States	1
Kenya	1
Ethiopia	1
Italy	1
Morocco	2

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39) The blood types for 40 people who agreed to participate in a medical study were as follows. 39) _____

O	A	A	O	O	AB	O	B	A	O
A	O	A	B	O	O	O	AB	A	A
A	B	O	A	A	O	O	B	O	O
O	A	O	O	A	B	O	O	A	AB

Construct a frequency distribution for the data.

A)

Blood type	Frequency
O	19
A	11
B	5
AB	2

B)

Blood type	Frequency
O	19
A	13
B	5
AB	3

C)

Blood type	Frequency
O	18
A	14
B	5
AB	3

D)

Blood type	Frequency
O	20
A	13
B	4
AB	3

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

Provide an appropriate response.

40) Scott Tarnowski owns a pet grooming shop. His prices for grooming dogs are based on the size of the dog. His records from last year are summarized below. Construct a relative frequency distribution. 40) _____

Class	Frequency
Large	345
Medium	830
Small	645

41) The results of a survey about a recent judicial appointment are given in the table below. Construct a relative frequency distribution. 41) _____

Response	Frequency
Strongly Favor	20
Favor	24
Neutral	5
Oppose	9
Strongly Oppose	142

42) The preschool children at Elmwood Elementary School were asked to name their favorite color. The results are listed below. Construct a frequency distribution and a relative frequency distribution. 42) _____

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

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

43) The data in the following table show the results of a survey of college students asking which vacation destination they would choose given the eight choices shown. Determine the value that should be entered in the relative frequency column for Mexico. 43) _____

Destination	Frequency	Relative frequency
Florida	26	
Mexico	95	
Belize	18	
Puerto Rico	21	
Alaska	6	
California	20	
Colorado	8	
Arizona	6	

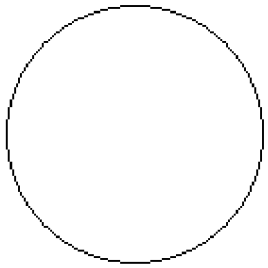
A) 0.475 B) 0.0475 C) 95 D) 0.95

Construct a pie chart representing the given data set.

44) The following data give the distribution of the types of houses in a town containing 35,000 houses. 44) _____

House Type	Frequency	Relative Frequency
Cape	8750	0.25
Garrison	14,000	0.35
Split	12,250	0.40

A)

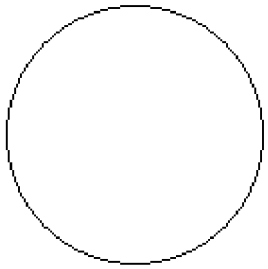


B)

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45) 1000 movie critics rated a movie. The following data give the rating distribution. 45) _____

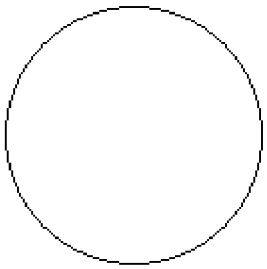
Rating	Frequency	Relative Frequency
Excellent	200	0.20
Good	500	0.50
Fair	300	0.30



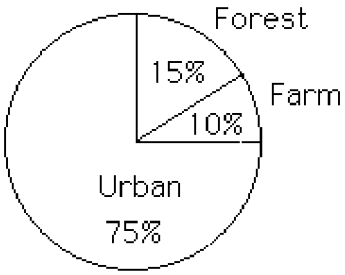
A) B)

46) The following figures give the distribution of land (in acres) for a county containing 70,000 acres. 46) _____

Land Use	Acres	Relative Frequency
Forest	10,500	0.15
Farm	7000	0.10
Urban	52,500	0.75



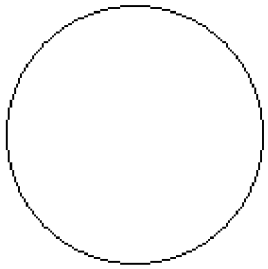
A) B)



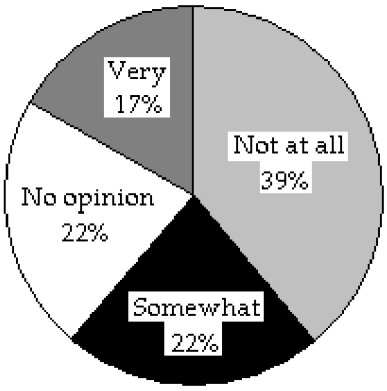
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47) The data below represent the results of a poll in which the the following question was asked: "To what degree are you satisfied with the outcome of the 2006 mayoral election?" 47) _____

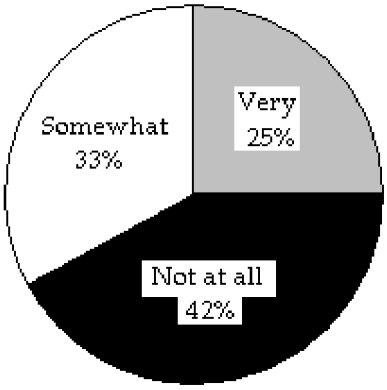
Very	17%
Somewhat	22%
Not at All	39%
No opinion	22%



A)



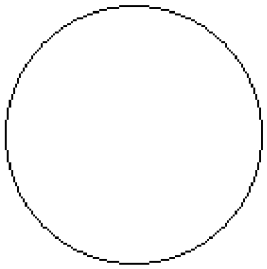
B)



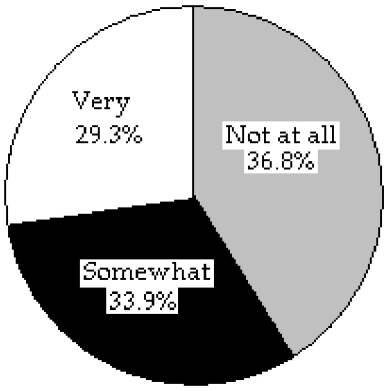
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48) The data below represent the results of a poll in which the following question was asked: "To what degree are you satisfied with your current health insurance?" 48) _____

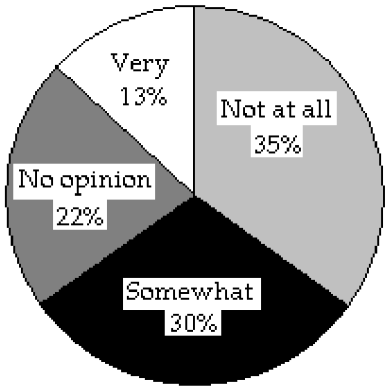
Very	13%
Somewhat	30%
Not at All	35%
No opinion	22%



A)



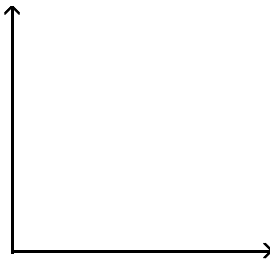
B)



Construct the requested graph.

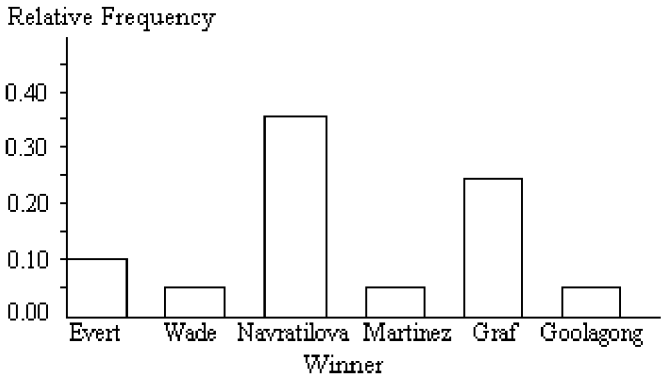
49) The table lists the winners of the State Tennis Tournament women's singles title for the years 1986- 2005. Construct a bar graph for the given relative frequencies. 49) _____

Winner	Frequency	Relative frequency
C. Evert	2	0.10
V. Wade	1	0.05
M. Navratilova	9	0.45
C. Martinez	1	0.05
S. Graf	6	0.30
E. Goolagong	1	0.05

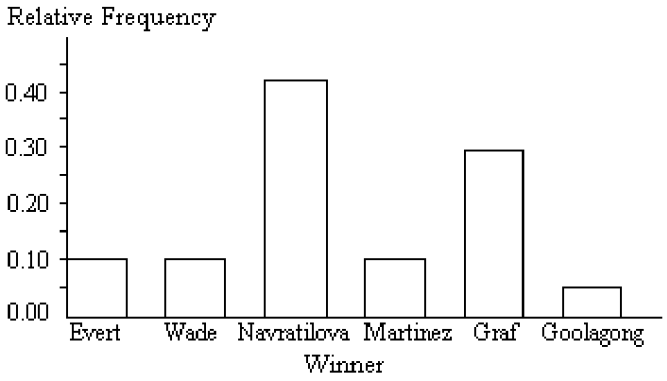


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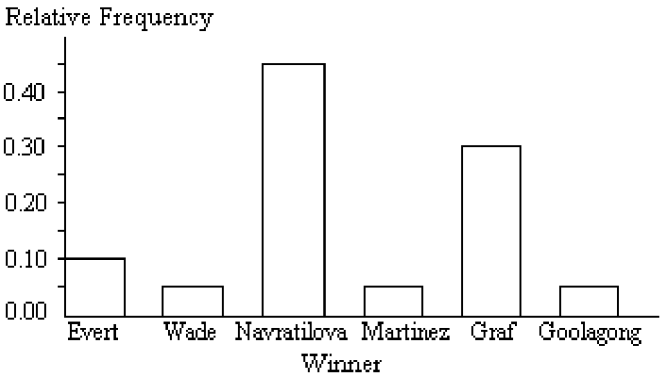
A)



B)

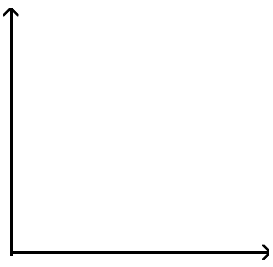


C)



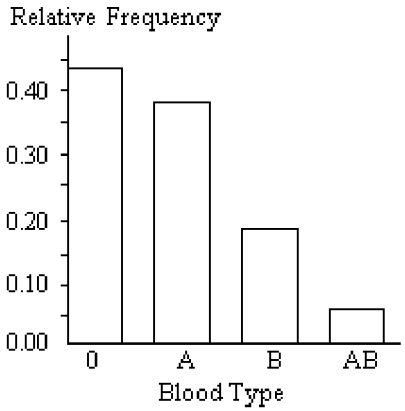
50) Construct a bar graph for the relative frequencies given. 50) _____

Blood type	Frequency	Relative frequency
O	22	0.44
A	19	0.38
B	6	0.12
AB	3	0.06

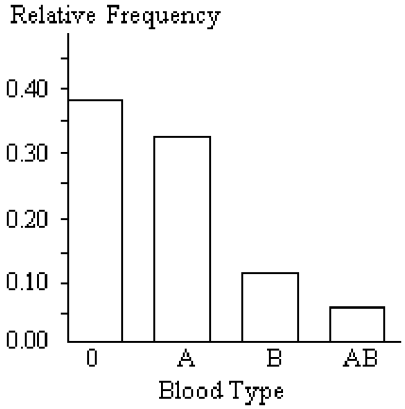


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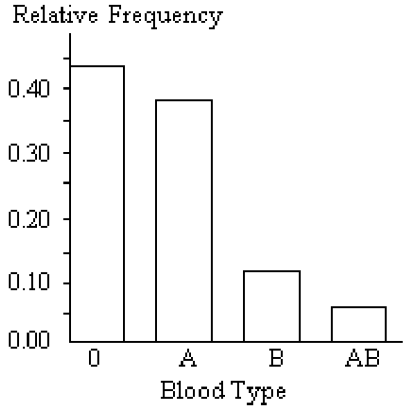
A)



B)



C)



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

Provide an appropriate response.

51) Explain the difference between a frequency distribution and a relative frequency distribution. Comment on the differences on the vertical axis scale. Given the same data set and the same classes, will the shapes of the frequency distribution and the relative frequency distribution be the same? You may draw a diagram to support your answer. 51) _____

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52) Suppose that you want to construct a pie chart to represent the following data. 52) _____

Blood Type	Frequency
O	90
A	84
B	18
AB	8

Explain how you would calculate the angle for the pie- shaped piece corresponding to the blood type O.

53) Explain in your own words the difference between a bar graph and a histogram. Give an example of data for which you might use a histogram and an example of data for which you might use a bar graph. 53) _____

54) Suppose that you want to construct a graph to represent the following data. 54) _____

Blood Type	Frequency
O	90
A	84
B	18
AB	8

If you are mostly interested in the number of people in each category as a percentage of the total number of people, would a bar chart or a pie chart be more useful? Explain your thinking.

55) Shortly before a mayoral election, a market research firm took a poll to find out which candidate people were planning to vote for. The results are shown below. 55) _____

Candidate	Frequency
Li Fong	2120
Bob Green	2329
Sue Moore	1042
Jose Alvarez	399

You wish to construct a graph to represent the data. It should be easy to see from your graph which candidate is in the lead. Which graph would be more useful, a bar graph or a pie chart? Explain your thinking.

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56) Shortly before an election, a market research firm took a poll to find out whether people were planning to vote for or against a particular ballot measure. The results are shown below. 56) _____

Position	Frequency
Against	3087
In favor	3691
Undecided	910

The ballot measure will pass if a simple majority (more than 50%) vote in favor of the measure. You wish to construct a graph to represent the data. It should be easy to see from your graph whether more than 50% of the people are planning to vote in favor of the measure. Which graph would be more useful, a bar graph or a pie chart? Explain your thinking.

57) 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? 57) _____

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

Given the following "data scenario," decide which type of grouping (single- value, limit, or cutpoint) is probably the best.

58) Number of Pets: The number of pets per family. 58) _____

A) Cutpoint grouping
B) Limit grouping
C) Single- value grouping
D) None of these

59) Exam Scores: The exam scores, rounded to the nearest whole number, of all students in a given math course. 59) _____

A) None of these
B) Limit grouping
C) Cutpoint grouping
D) Single- value grouping

60) Wingspan of Cardinal: The wingspan lengths, to the nearest hundredth of a millimeter, of a sample of 35 cardinals. 60) _____

A) Single- value grouping
B) Limit grouping
C) None of these
D) Cutpoint grouping

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Use single-value grouping to organize these data into a frequency distribution.

61) A car insurance company conducted a survey to find out how many car accidents people had been involved in. They selected a sample of 32 adults between the ages of 30 and 70 and asked each person how many accidents they had been involved in the past ten years. The following data were obtained. 61) _____

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

Construct a frequency distribution for the number of car accidents.

A)

Number of accidents	Frequency
0	11
1	10
2	5
3	3
4	1
5	1

B)

Number of accidents	Frequency
0	12
1	9
2	5
3	3
4	2
5	1

C)

Number of accidents	Frequency
1	10
2	5
3	3
4	2
5	1

D)

Number of accidents	Frequency
0	11
1	10
2	5
3	3
4	2
5	1

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62) The following data represent the total number of years of formal education for 40 employees of a bank. 62) _____

13	17	13	14	12	17	19	13	15	13
16	18	13	11	19	19	12	14	13	13
14	15	13	15	17	18	17	14	13	17
12	17	17	16	16	17	15	13	13	14

Construct a frequency distribution for the number of years of education.

A)

Number of years of education	Frequency
11	1
12	3
13	12
14	5
15	4
16	3
17	8
18	2
19	2

B)

Number of years of education	Frequency
11	1
12	3
13	11
14	6
15	4
16	3
17	7
18	2
19	3

C)

Number of years of education	Frequency
11	1
12	3
13	11
14	5
15	4
16	3
17	8
18	2
19	3

D)

Number of years of education	Frequency
12	3
13	11
14	5
15	4
16	3
17	8
18	2
19	3

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63) A teacher asked each of her students how many novels they had read in the previous six months. The results are shown below. 63) _____

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

Construct a frequency distribution for the number of novels read.

A)

Number of novels	Frequency
0	7
1	11
2	9
3- 5	7
6- 8	6

B)

Number of novels	Frequency
0	7
1	10
2	9
3	3
4	2
5	2
6	2
7	3

C)

Number of novels	Frequency
0	7
1	11
2	9
3	3
4	2
5	2
6	2
7	4

D)

Number of novels	Frequency
1	11
2	9
3	3
4	2
5	2
6	2
7	4

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

Use limit grouping to organize these data into a frequency distribution.

64) 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. 64) _____

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 and class width of 5.

Age	Frequency

65) 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. 65) _____

5 6 5 4 5 5 9 8 5 3 8 6
6 8 5 6 8 5 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 the first class.

Hours	Frequency

66) Lori asked 24 students how many hours they had spent doing homework during the previous week. The results are shown below. 66) _____

10 11 10 8 10 10 14 12 10 9 12 11
11 12 10 11 12 10 11 12 11 12 12 8

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

Hours	Frequency

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67) On a math test, the scores of 24 students were 67) _____

99 75 78 65 78 78 99 88 78 65 83 75
75 83 78 75 83 78 75 88 75 83 88 65

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

Score	Frequency

Use cutpoint grouping to organize these data into a frequency distribution.

68) 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. 68) _____

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

69) 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. 69) _____

6 5 6 3 6 6 9 8 6 3 8 5
5 8 6 5 8 6 5 8 5 8 8 3

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

Hours	Frequency

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70) Lori asked 24 students how many hours they had spent doing homework during the previous week. The results are shown below. 70) _____

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 the first class.

Hours	Frequency

71) On a math test, the scores of 24 students were 71) _____

92 75 75 67 75 75 92 83 75 65 83 75
75 83 75 75 83 75 75 83 75 83 83 67

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

Score	Frequency

72) The following figures represent Jennifer's monthly charges for long distance telephone calls for the past twelve months. 72) _____

9.80 12.23 13.47 18.16
11.19 18.36 9.57 14.55
13.17 14.41 15.02 10.40

Construct a frequency distribution with 4 classes.

Charges	Frequency

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73) A government researcher was interested in the starting salaries of humanities graduates. A random sample of 30 humanities graduates yielded the following annual salaries. Data are in thousands of dollars, rounded to the nearest hundred dollars. 73) _____

23.1	24.0	33.7	28.4	36.0	41.0	22.2	21.8	30.5	49.2
30.1	25.2	38.3	46.1	40.0	27.5	24.9	28.0	31.8	29.9
25.7	32.5	48.6	27.4	41.4	35.9	31.9	42.4	26.3	33.0

Construct a frequency distribution for these annual starting salaries. Use 20 as the first cutpoint and classes of equal width 4.

Salary	Frequency

74) The table shows the closing share price, in dollars, for each of the 32 stock holdings of a mutual fund. 74) _____

$18\frac{1}{16}$	$24\frac{5}{8}$	$56\frac{3}{4}$	48	$14\frac{9}{16}$	$53\frac{3}{8}$	$25\frac{1}{4}$	$20\frac{1}{4}$
20	$27\frac{11}{16}$	$67\frac{3}{16}$	$30\frac{1}{2}$	$18\frac{1}{8}$	62	$31\frac{9}{16}$	$47\frac{3}{8}$
$52\frac{15}{16}$	$29\frac{5}{8}$	26	$13\frac{15}{16}$	$11\frac{11}{16}$	$24\frac{7}{8}$	$49\frac{3}{4}$	70
$45\frac{1}{16}$	$54\frac{1}{2}$	$56\frac{3}{16}$	60	$58\frac{15}{16}$	$37\frac{5}{8}$	$59\frac{3}{4}$	51

Construct a frequency distribution for these share prices. Use 10 as the first cutpoint and classes of equal width 10.

Share price	

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

Provide the requested table entry.

75) The data in the following table reflect the amount of time 40 students in a section of Statistics 101 spend on homework each day. Determine the value that should be entered in the relative frequency column for the class 45- 59. 75) _____

Homework time (minutes)	Number of students	Relative frequency
0- 14	2	
15- 29	4	
30- 44	10	
45- 59	16	
60- 74	6	
75- 89	2	

A) 0.4 B) 40% C) 16 D) 16%

76) The data in the following table reflect the amount of time 40 students in a section of Statistics 101 spend on homework each day. Find the value of the missing entry. 76) _____

Homework time (minutes)	Relative frequency
0- 14	0.05
15- 29	0.10
30- 44	0.25
45- 59	
60- 74	0.15
75- 89	0.05

A) 0.40
B) 16
C) 40%
D) The value cannot be determined from the given data.

77) The data in the following table represent heights of students at a highschool. Find the value of the missing entry. 77) _____

Height (centimeters)	Relative frequency
142- under 152	0.03
152- under 162	0.22
162- under 172	0.25
172- under 182	0.26
182- under 192	
192- under 202	0.04

A) 0.16
B) 0.20
C) 20%
D) The value cannot be determined from the given data.

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78) The data in the following table represent heights of students at a highschool. Find the value of the missing entry. 78) _____

Height (centimeters)	Relative frequency
142- under 152	0.03
152- under 162	0.21
162- under 172	0.27
172- under 182	0.28
182- under 192	
192- under 202	0.02

A) 19%
B) 0.21
C) 0.19
D) The value cannot be determined from the given data.

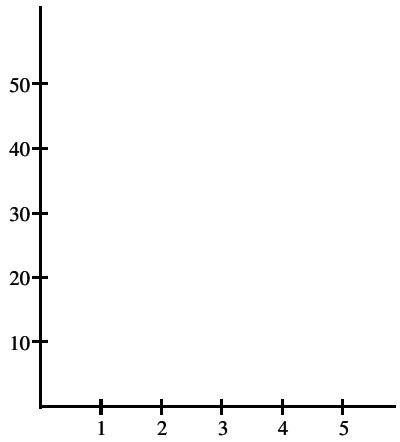
SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Construct the requested histogram.

79) The table gives the frequency distribution for the data involving the number of television sets per household for a sample of 100 U.S. households. 79) _____

# of TVs	Frequency
1	25
2	45
3	15
4	10
5	5

Construct a frequency histogram.

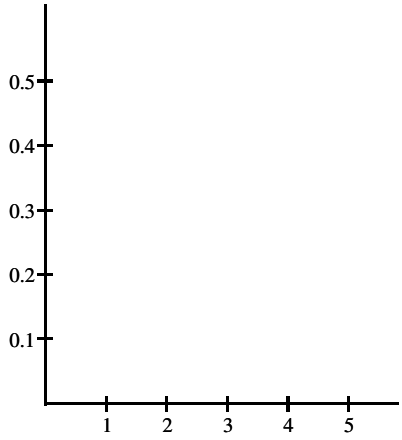


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80) The table gives the frequency distribution for the data involving the number of television sets per household for a sample of 100 U.S. households. 80) _____

# of TVs	Frequency
1	20
2	50
3	15
4	10
5	5

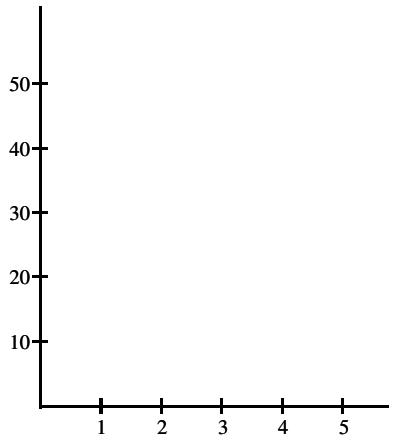
Construct a relative frequency histogram.



81) The table gives the frequency distribution for the data involving the number of radios per household for a sample of 80 U.S. households. 81) _____

# of Radios	Frequency
1	5
2	10
3	30
4	25
5	10

Construct a frequency histogram.

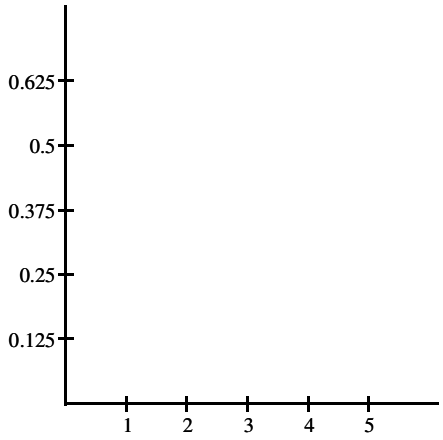


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82) The table gives the frequency distribution for the data involving the number of radios per household for a sample of 80 U.S. households. 82) _____

# of Radios	Frequency
1	5
2	10
3	30
4	25
5	10

Construct a relative frequency histogram.

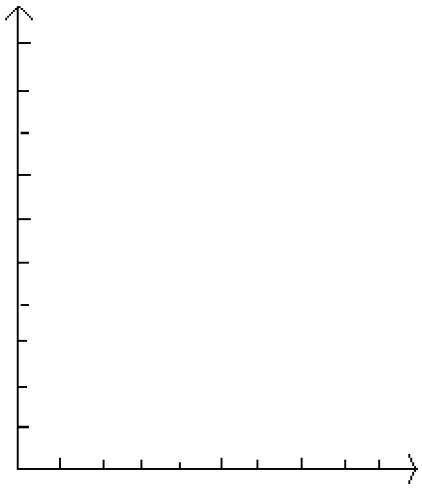


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83) The table below shows the number of days off in a given year for 30 police detectives. 83) _____

Days off	Frequency
0- under 2	10
2- under 4	1
4- under 6	7
6- under 8	7
8- under 10	1
10- under 12	4

Construct a frequency histogram.

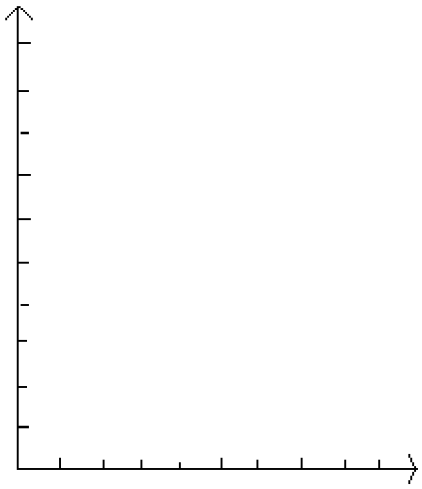


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84) The table below shows the number of days off in a given year for 30 police detectives. 84) _____

Days off	Frequency	Relative frequency
0- under 2	10	0.333
2- under 4	1	0.033
4- under 6	1	0.233
6- under 8	7	0.233
8- under 10	1	0.033
10- under 12	4	0.133

Construct a relative- frequency histogram.



85) In a survey, 20 voters were asked their age. The results are summarized in the table below. 85) _____
Construct a frequency histogram corresponding to data below.

Age of voters	Number of voters
20- under 30	5
30- under 40	5
40- under 50	6
50- under 60	0
60- under 70	4

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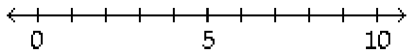
86) During the quality control process at a manufacturing plant, 142 finished items are randomly selected and weighed. The results are summarized in the table below. Construct a relative- frequency histogram corresponding to data below. 86) _____

Weight (g)	Frequency	Relative frequency
0.35- under 0.45	32	0.225
0.45- under 0.55	82	0.577
0.55- under 0.65	17	0.120
0.65- under 0.75	11	0.077

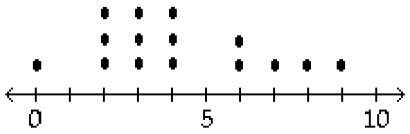
MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Construct a dotplot for the given data.

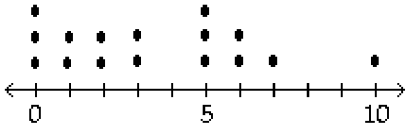
87) Attendance records at a school show the number of days each student was absent during the year. The days absent for each student were as follows. 87) _____
9 3 4 2 8 6 3 4 0 6 7 3 4 2 2



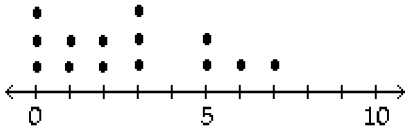
A)



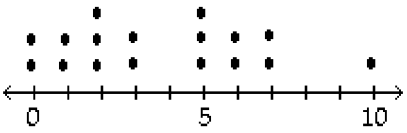
B)



C)



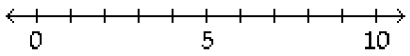
D)



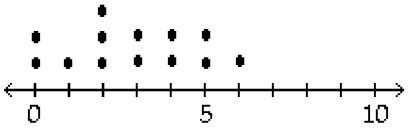
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88) A manufacturer records the number of errors each work station makes during the week. The data are as follows. 88) _____

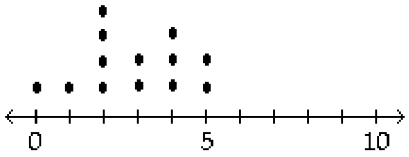
6 3 2 3 5 2 0 2 5 4 2 0 1



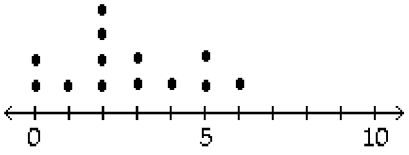
A)



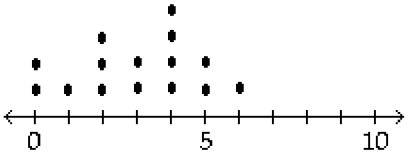
B)



C)

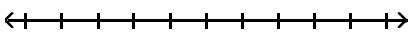


D)

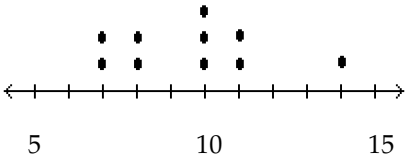


89) A store manager counts the number of customers who make a purchase in his store each day. The data are as follows. 89) _____

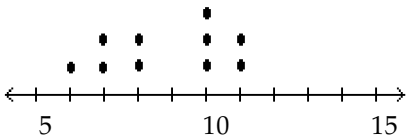
10 11 8 14 7 10 10 11 8 7



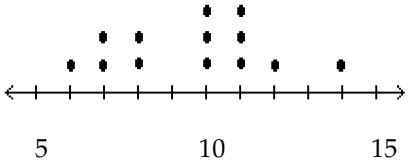
A)



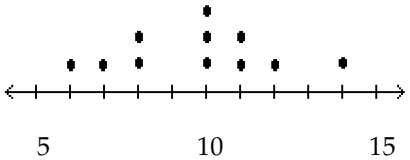
B)



C)



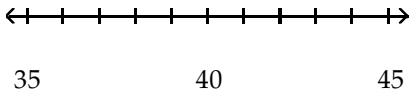
D)



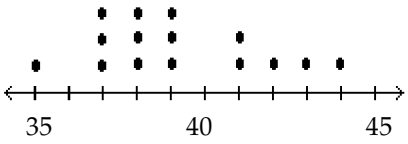
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90) The following data represent the number of cars passing through a toll booth during a certain time period over a number of days. 90) _____

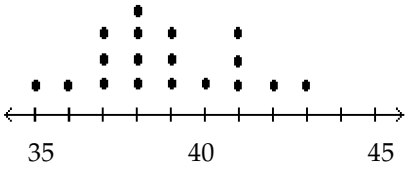
38 39 37 37 44 38 41 38 39 35 42 39 43 37 41



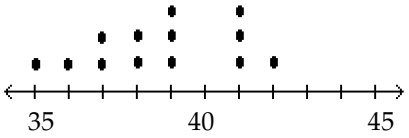
A)



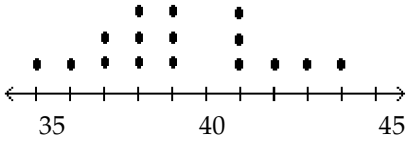
B)



C)

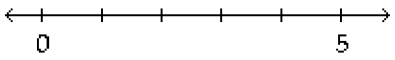


D)

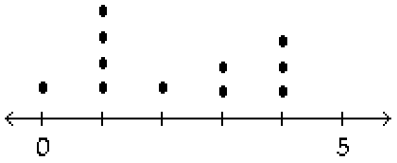


91) The frequency chart shows the distribution of defects for the machines used to produce a product. 91) _____

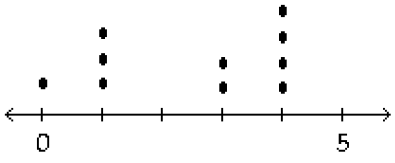
Defects	Frequency
0	1
1	3
2	0
3	2
4	4
5	0



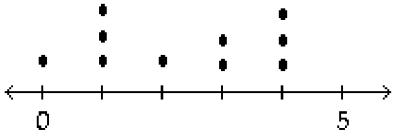
A)



B)



C)



D)



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Construct a stem-and-leaf diagram for the given data.

92) The following data show the number of laps run by each participant in a marathon. 92) _____

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

A)

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

B)

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

93) The midterm test scores for the seventh-period typing class are listed below. 93) _____

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

A)

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

B)

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

94) The attendance counts for this season's basketball games are listed below. 94) _____

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

95) The weights of 22 members of the varsity football team are listed below. 95) _____

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

B)

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

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96) The diastolic blood pressures for a sample of patients at a clinic were as follows. The measurements are in mmHg. 96) _____

78	87	91	85	97	102	73	90	110	105
94	85	81	95	77	106	84	111	83	92
79	81	96	88	100	85	89	101	83	120
88	95	78	74	105	85	87	92	114	83

A)

7	8 3 7 9 8 4
8	7 5 5 1 4 3 1 8 5 9 3 8 5 7 3
9	1 7 0 4 5 2 6 5 2
10	2 0 5 6 1 0 1 5 4

B)

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

97) The diastolic blood pressures for a sample of patients at a clinic were as follows. The measurements are in mmHg. 97) _____

78	87	91	85	97	102	73	90	102	105
94	85	81	95	77	106	84	101	83	92
79	81	96	88	100	85	89	87	83	90
88	95	78	74	108	85	87	92	97	83

Construct a stem- and- leaf diagram using two lines per stem.

A)

7	8 3 7
7	9 8 4
8	7 5 5 1 4 3 1 8
8	5 9 7 3 8 5 7 3
9	1 7 0 4 5 2
9	6 0 5 2 7
10	2 2 5 6
10	1 0 8

B)

7	3 4
7	8 7 9 8
8	1 4 3 1 3 3
8	7 5 5 8 5 9 7 8 5 7
9	1 0 4 2 0 2
9	7 5 6 5 7
10	2 2 1 0
10	5 6 8

98) The maximum recorded temperatures (in degrees Fahrenheit) for 35 different U.S. cities are given below. 98) _____

108	125	119	109	112	104	118
110	115	113	108	116	105	113
120	111	114	106	112	119	107
110	112	104	121	106	108	123
105	117	124	115	110	114	113

Construct a stem- and- leaf diagram using two lines per stem.

A)

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

B)

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

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99) The ages of the 45 members of a track and field team are listed below. Construct an ordered stem- and- leaf diagram using two lines per stem. 99) _____

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 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

B)

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

100) The normal monthly precipitation (in inches) for August is listed for 39 different U.S. cities. Construct an ordered stem- and- leaf diagram using two lines per stem. 100) _____

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

101) The average weekly temperatures (in degrees Fahrenheit) in Orlando, Florida over a 6- month span are given below. Round each observation to the nearest degree and then construct a stem- and- leaf diagram of the rounded data using two lines per stem. 101) _____

73.2	81.3	75.5	90.7	94.7	88.3
71.8	84.8	84.7	76.5	93.4	79.0
84.3	83.0	88.9	84.4	74.6	86.6
89.3	77.2	78.9	87.3	83.1	70.4

A)

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

B)

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

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102) The lengths (in inches) of a random sample of bottlenose dolphins are given below. Truncate each observation by dropping the decimal part, then construct a stem- and- leaf diagram of the truncated data using two lines per stem. 102) _____

97.7	142.2	105.2	110.5	115.8	112.4
136.7	99.9	101.2	124.3	121.9	98.8
121.8	132.7	128.9	117.8	141.9	108.2
118.0	127.3	133.4	116.9	104.4	132.0

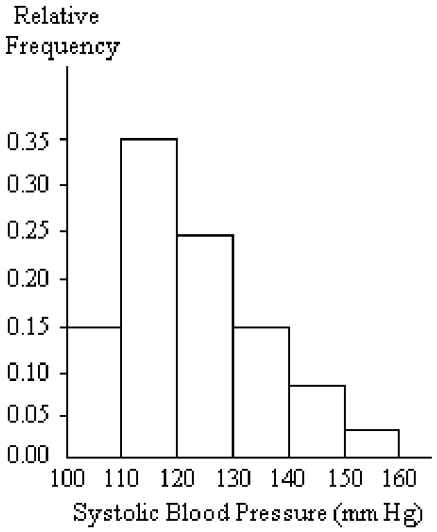
A)

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

B)

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

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. Use the histogram to answe the question. The blood pressure readings were given to the nearest whole number.



103) Approximately what percentage of the people aged 25- 40 had a systolic blood pressure reading between 110 and 119 inclusive? 103) _____

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

104) Approximately what percentage of the people aged 25- 40 had a systolic blood pressure reading between 110 and 139 inclusive? 104) _____

A) 89% B) 39% C) 59% D) 74%

105) Approximately what percentage of the people aged 25- 40 had a systolic blood pressure reading greater than or equal to 130? 105) _____

A) 74% B) 26% C) 23% D) 15%

106) Approximately what percentage of the people aged 25- 40 had a systolic blood pressure reading less than 120? 106) _____

A) 3.5% B) 50% C) 35% D) 5%

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107) Given that 700 people were aged between 25 and 40, approximately how many had a systolic blood pressure reading between 140 and 149 inclusive? 107) _____

A) 560 B) 6 C) 56 D) 8

108) Given that 400 people were aged between 25 and 40, approximately how many had a systolic blood pressure reading of 140 or higher? 108) _____

A) 44 B) 32 C) 8 D) 11

109) Given that 400 people were aged between 25 and 40, approximately how many had a systolic blood pressure reading between 130 and 149 inclusive? 109) _____

A) 9 B) 60 C) 23 D) 92

110) Given that 900 people were aged between 25 and 40, approximately how many had a systolic blood pressure reading less than 130? 110) _____

A) 74 B) 216 C) 666 D) 67

111) Identify the midpoint of the third class. 111) _____

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

112) What common class width was used to construct the frequency distribution? 112) _____

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

Complete the contingency table and use it to solve the problem.

113) The partially filled contingency table gives the frequencies of the data on age (in years) and sex from the residents of a retirement home. 113) _____

	Age (yrs)			
	60- 69	70- 79	Over 79	Total
Male	18	2	5	
Female	2	9	4	
Total				

What is the relative frequency for males in the age group 60- 69?

A) $\frac{9}{20}$ B) $\frac{21}{40}$ C) $\frac{9}{10}$ D) $\frac{17}{40}$

114) The partially filled contingency table gives the frequencies of the data on age (in years) and sex from the residents of a retirement home. 114) _____

	Age (yrs)			
	60- 69	70- 79	Over 79	Total
Male	7	7	5	
Female	13	4	4	
Total				

What is the relative frequency for females in the age group 60- 69?

A) $\frac{7}{20}$ B) $\frac{11}{40}$ C) $\frac{13}{20}$ D) $\frac{13}{40}$

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115) The partially filled contingency table gives the frequencies of the data on age (in years) and sex from the residents of a retirement home. 115) _____

	Age (yrs)			
	60- 69	70- 79	Over 79	Total
Male	16	7	5	
Female	4	4	4	
Total				

What is the relative frequency for males ?

A) $\frac{3}{5}$ B) $\frac{7}{5}$ C) $\frac{7}{10}$ D) $\frac{13}{20}$

116) The partially filled contingency table gives the frequencies of the data on age (in years) and sex from the residents of a retirement home. 116) _____

	Age (yrs)			
	60- 69	70- 79	Over 79	Total
Male	1	9	5	
Female	19	2	4	
Total				

What is the relative frequency for persons in the age group 60- 69 ?

A) $\frac{2}{3}$ B) $\frac{1}{4}$ C) $\frac{1}{2}$ D) $\frac{1}{3}$

117) The partially filled contingency table gives the frequencies of the data on age (in years) and sex from the residents of a retirement home. 117) _____

	Age (yrs)			
	60- 69	70- 79	Over 79	Total
Male	11	10	5	
Female	9	1	4	
Total				

What percentage of residents are males in the age group 60- 69 ?

A) 27.5% B) 27.3% C) 27.6% D) 28%

118) The partially filled contingency table gives the frequencies of the data on age (in years) and sex from the residents of a retirement home. 118) _____

	Age (yrs)			
	60- 69	70- 79	Over 79	Total
Male	3	8	5	
Female	17	3	4	
Total				

What percentage of residents are female ?

A) 60.4% B) 59.5% C) 60% D) 61%

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119) The partially filled contingency table gives the relative frequencies of the data on age (in years) and sex from the residents of a retirement home. 119) _____

	Age (yrs)			
	60- 69	70- 79	Over 79	Total
Male	0.18	0.1	0.12	
Female	0.2	0.2	0.2	
Total				1

What percentage of residents are males over 79?

A) 6.6% B) 11.5% C) 12% D) 14%

120) The partially filled contingency table gives the relative frequencies of the data on age (in years) and sex from the residents of a retirement home. 120) _____

	Age (yrs)			
	60- 69	70- 79	Over 79	Total
Male	0.21	0.1	0.09	
Female	0.2	0.1	0.3	
Total				1

What percentage of residents are in the age group 60- 69?

A) 42.5% B) 44% C) 39% D) 41%

121) The partially filled contingency table gives the relative frequencies of the data on age (in years) and sex from the residents of a retirement home. 121) _____

	Age (yrs)			
	60- 69	70- 79	Over 79	Total
Male	0.21	0.1	0.09	
Female	0.2	0.1	0.3	
Total				1

What percentage of residents are females in the age group 70- 79?

A) 10% B) 9.5% C) 8% D) 12%

122) The partially filled contingency table gives the relative frequencies of the data on age (in years) and sex from the residents of a retirement home. 122) _____

	Age (yrs)			
	60- 69	70- 79	Over 79	Total
Male	0.18	0.1	0.12	
Female	0.2	0.1	0.3	
Total				1

What percentage of residents are males in the age group 60- 79?

A) 29.5% B) 28% C) 30% D) 27%

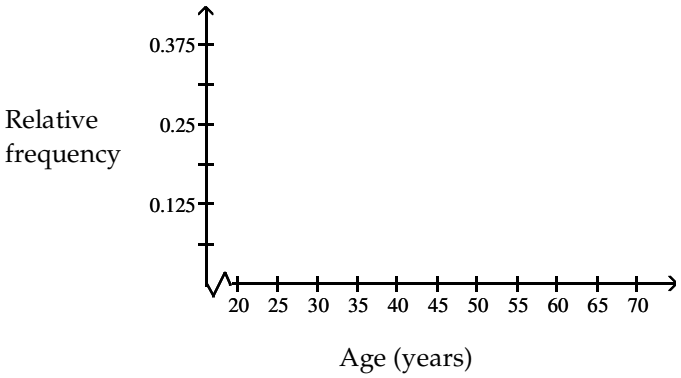
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SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Construct a relative- frequency polygon for the given data.

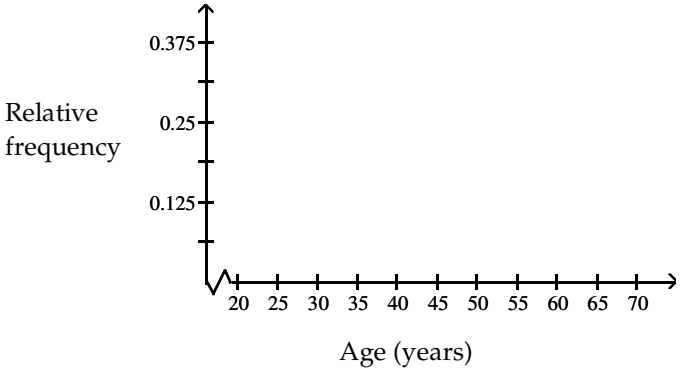
123) The table contains the frequency and relative- frequency distributions for the ages of the employees in a particular company department. 123) _____

Age (years)	Frequency	Relative frequency
20- under 30	6	0.375
30- under 40	3	0.1875
40- under 50	4	0.25
50- under 60	2	0.125
60- under 70	1	0.0625



124) The table contains the frequency and relative- frequency distributions for the ages of the employees in a particular company department. 124) _____

Age (years)	Frequency	Relative frequency
20- under 30	3	0.1875
30- under 40	6	0.375
40- under 50	4	0.25
50- under 60	1	0.0625
60- under 70	2	0.125



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

Provide the requested response.

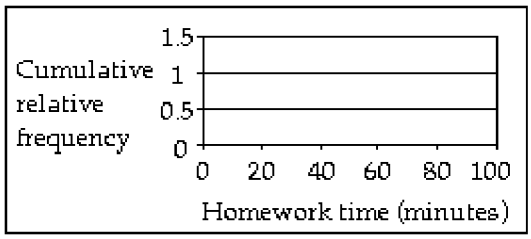
125) The table contains data from a study of daily study time for 40 students from Statistics 101. In constructing an ogive from the data, what quantity should be assigned to each axis. 125) _____

Minutes on homework	Number of students	Relative frequency	Cumulative relative frequency
0- under 15	2	0.05	0.05
15- under 30	4	0.10	0.15
30- under 45	8	0.20	0.35
45- under 60	18	0.45	0.80
60- under 75	4	0.10	0.90
75- under 90	4	0.10	1.00

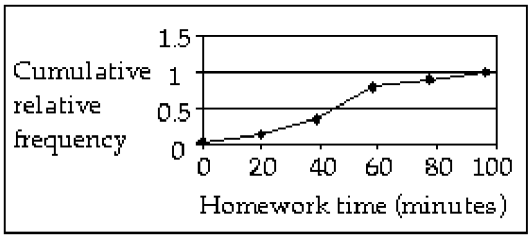
A) Number of students on the x- axis and cumulative relative frequency on the y- axis
B) There is not enough data to decide.
C) Minutes on homework on the x- axis and relative frequency on the y- axis
D) Minutes on homework on the x- axis and cumulative relative frequency on the y- axis

126) The table contains data from a study of daily study time for 40 students from Statistics 101. Construct an ogive from the data. 126) _____

Minutes on homework	Number of students	Relative frequency	Cumulative relative frequency
0- under 15	2	0.05	0.05
15- under 30	4	0.10	0.15
30- under 45	8	0.20	0.35
45- under 60	18	0.45	0.80
60- under 75	4	0.10	0.90
75- under 90	4	0.10	1.00

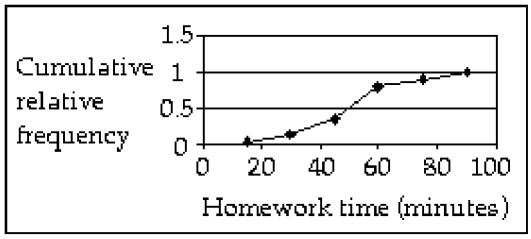


A)



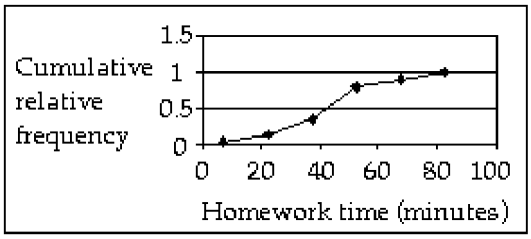
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B)



C) The table does not contain enough information to construct an ogive.

D)



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

Provide an appropriate response.

127) When organizing data into tables, what is the disadvantage of having too many classes? What is the disadvantage of having too few classes? 127) _____

128) Anna set up a frequency distribution with the following classes: 128) _____

Number of sick days taken	Frequency
0- 3	
3- 6	
6- 9	
9- 12	

What is wrong with these classes? Describe two ways the classes could have been correctly depicted.

129) Raul set up a frequency distribution with the following classes: 129) _____

Weight (lb)	Frequency
20- under 25	
25- under 30	
30- under 35	

Give an alternate way of depicting these classes if the original data are given:
a. To the nearest whole number
b. To one decimal place
c. To two decimal places

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130) Maria constructed the frequency distribution shown below. The data represent the heights of 60 randomly selected women. 130) _____

Height	Frequency
54- under 60	7
60- under 61	1
61- under 62	3
62- under 63	5
63- under 64	7
64- under 65	7
65- under 66	6
66- under 72	24

She concluded from her frequency distribution that the heights 66, 67, 68, 69, 70, and 71 inches are the most common for women. What is wrong with her conclusion? How is her frequency distribution misleading and how could the table be improved?

131) For a given data set, why might a researcher prefer to study organized data rather than the original data? Can you think of any circumstances in which a researcher may prefer to use the original data rather than organized data? 131) _____

132) Suppose that a data set has a minimum value of 28 and a maximum value of 73 and that you want 5 classes. Explain how to find the class width for this frequency distribution. What happens if you mistakenly use a class width of 9 instead of 10? 132) _____

133) Which type of graph, a stem- and- leaf diagram or a frequency histogram, would be more useful for the data set below? Explain your thinking. 133) _____

2.3 3.2 5.1 6.3 7.3 7.7 8.1 8.9 9.3
9.5 10.2 11.1 12.7 14.7 15.6 16.4 18.6 19.1

134) Suppose you wanted to construct a stem- and- leaf diagram for the data set below. What leaf unit would you use? What numbers would the stems represent and how many stems would there be? 134) _____

3.13 3.24 3.37 3.28 3.16 3.42 3.44 3.39
3.24 3.14 3.35 3.21 3.45 3.37 3.10 3.40

135) Suppose that you wish to construct a stem- and- leaf diagram for the data set below. What would the stems be? 135) _____

98 103 146 118 92 128 135 141 136
143 126 111 109 97 124 147 114 119
140 122 92 130 101 148 138 90 123

136) Construct a stem- and- leaf diagram for the data set below. Round each number to the nearest whole number before constructing the diagram. Why is it necessary to first round the numbers? 136) _____

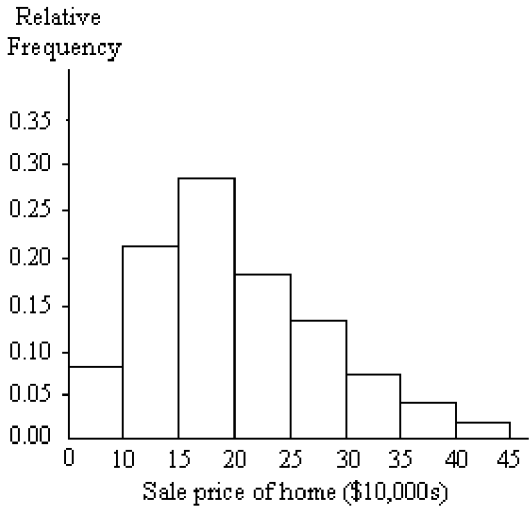
192.3 213.2 235.1 216.7 187.9 231.7 238.1 188.9 209.3
219.4 190.2 191.1 212.7 224.7 195.6 187.0 220.6 207.1

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

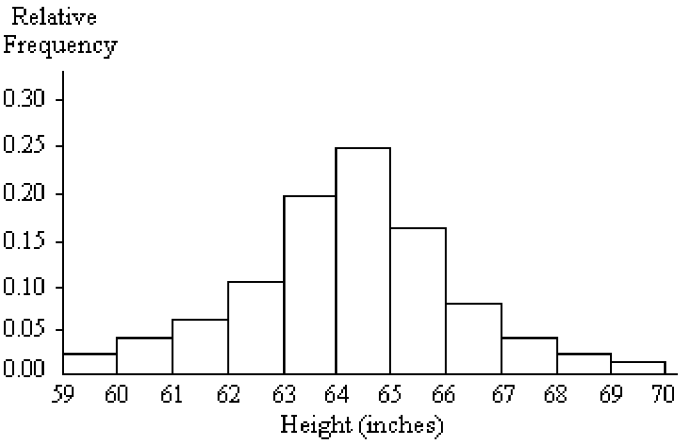
A graphical display of a data set is given. Identify the overall shape of the distribution as (roughly) bell- shaped, triangular, uniform, reverse J- shaped, J- shaped, right skewed, left skewed, bimodal, or multimodal.

137) A relative frequency histogram for the sale prices of homes sold in one city during 2006 is shown below. 137) _____



A) Reverse J- shaped
B) Left skewed
C) Right skewed
D) J- shaped

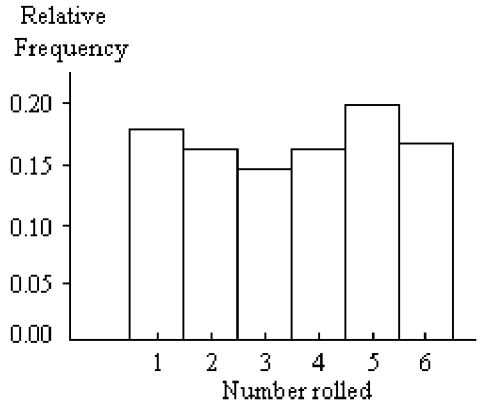
138) A relative frequency histogram for the heights of a sample of adult women is shown below. 138) _____



A) J- shaped
B) Left skewed
C) Triangular
D) Bell- shaped

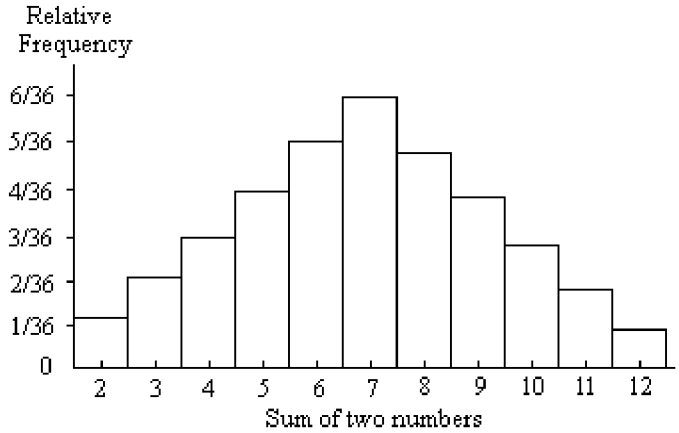
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139) A die was rolled 200 times and a record was kept of the numbers obtained. The results are shown in the relative frequency histogram below. 139) _____



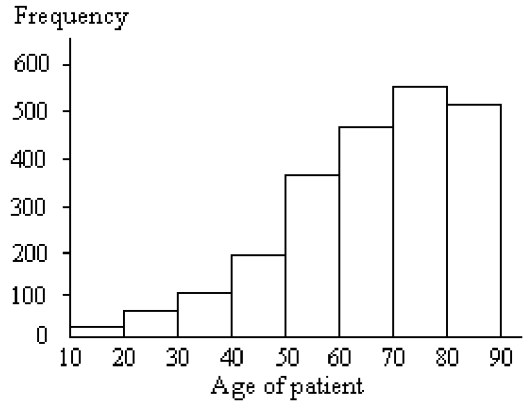
A) Uniform B) Triangular C) J- shaped D) Left skewed

140) Two dice were rolled and the sum of the two numbers was recorded. This procedure was repeated 400 times. The results are shown in the relative frequency histogram below. 140) _____



A) Triangular B) Left skewed C) Right- skewed D) Bell- shaped

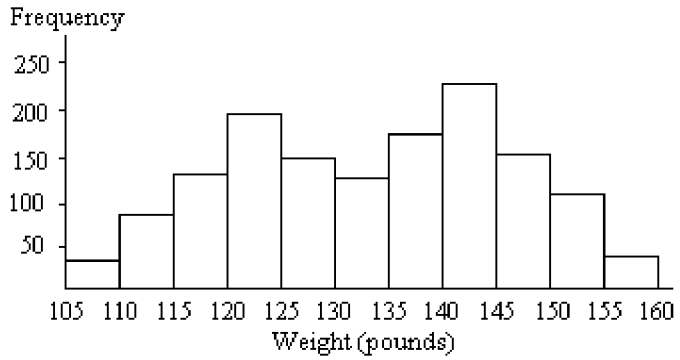
141) The ages of a group of patients being treated at one hospital for osteoporosis are summarized in the frequency histogram below. 141) _____



A) Right skewed B) Left skewed
C) Reverse J- shaped D) Bell- shaped

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142) A frequency histogram is given below for the weights of a sample of college students. 142) _____



A) Bimodal B) Bell- shaped C) Uniform D) Multimodal

143) A stem- and- leaf diagram is given below for the number of vacation days taken in 2006 by the employees of an electronics company. 143) _____

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

A) Left skewed B) Reverse J- shaped
C) J- shaped D) Right skewed

144) A stem- and- leaf diagram is given below for the ages of the patients at a hospital. 144) _____

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

A) Left skewed B) Reverse J- shaped
C) J- shaped D) Right skewed

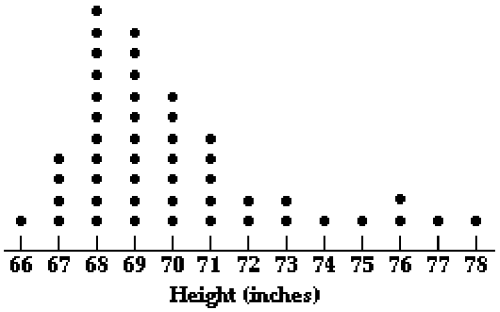
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145) A stem- and- leaf diagram is given below for the annual precipitation in one U.S. city for 28 consecutive years. Precipitation data are in inches. 145) _____

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

A) Left skewed B) Bell- shaped C) Right skewed D) Triangular

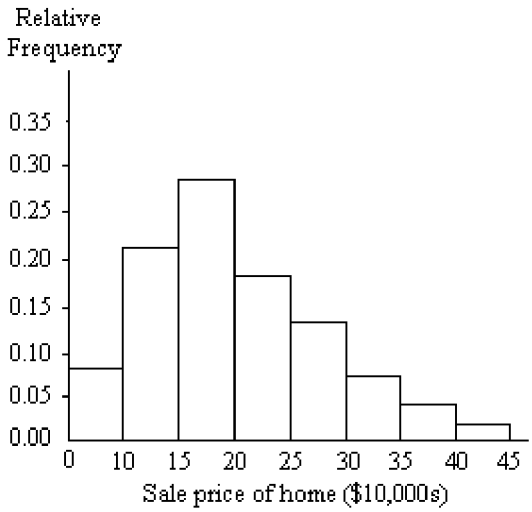
146) The dotplot shows heights of wrestlers. 146) _____



A) Reverse J- shaped B) J- shaped
C) Right skewed D) Left skewed

A graphical display of a data set is given. State whether the distribution is (roughly) symmetric, right skewed, or left skewed.

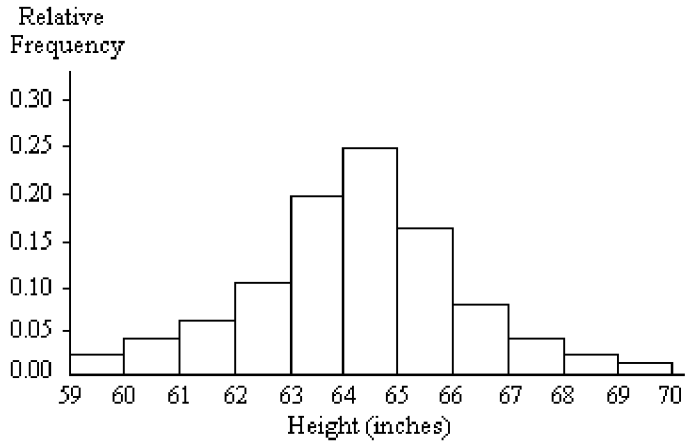
147) A relative frequency histogram for the sale prices of homes sold in one city during 2006 is shown below. 147) _____



A) Right skewed B) Symmetric C) Left skewed

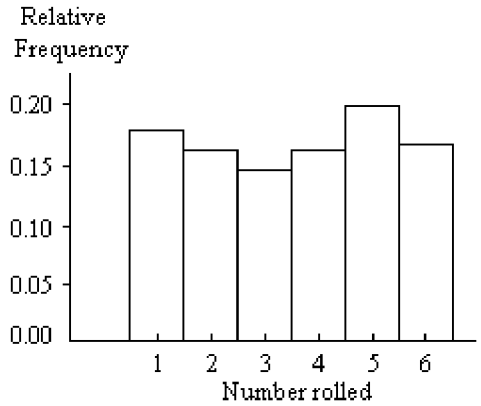
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148) A relative frequency histogram for the heights of a sample of adult women is shown below. 148) _____



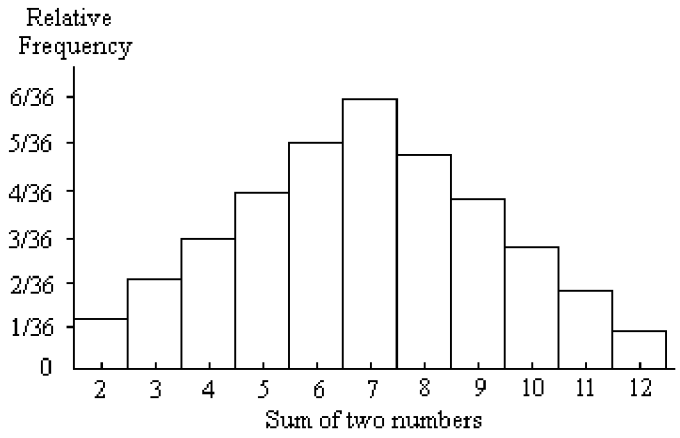
A) Right skewed B) Left skewed C) Symmetric

149) A die was rolled 200 times and a record was kept of the numbers obtained. The results are shown in the relative frequency histogram below. 149) _____



A) Right skewed B) Symmetric C) Left skewed

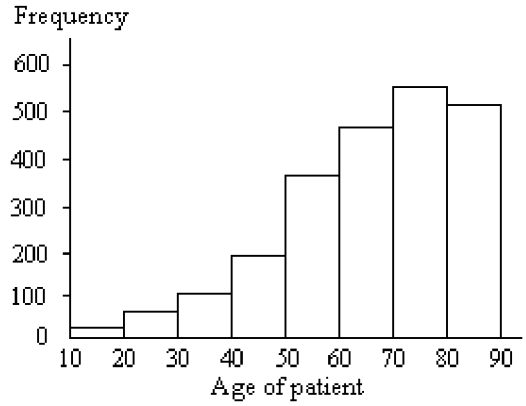
150) Two dice were rolled and the sum of the two numbers was recorded. This procedure was repeated 400 times. The results are shown in the relative frequency histogram below. 150) _____



A) Left skewed B) Symmetric C) Right skewed

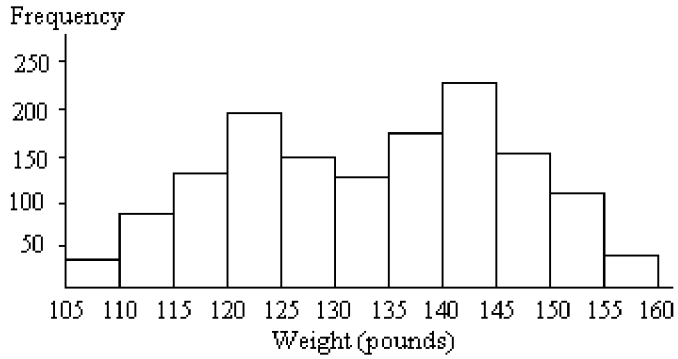
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151) The ages of a group of patients being treated at one hospital for osteoporosis are summarized in the frequency histogram below. 151) _____



A) Symmetric B) Left skewed C) Right skewed

152) A frequency histogram is given below for the weights of a sample of college students. 152) _____



A) Right skewed B) Left skewed C) Symmetric

153) A stem- and- leaf diagram is given below for the number of vacation days taken in 2006 by the employees of an electronics company. 153) _____

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

A) Symmetric B) Right skewed C) Left skewed

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154) A stem- and- leaf diagram is given below for the ages of the patients at a hospital. 154) _____

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

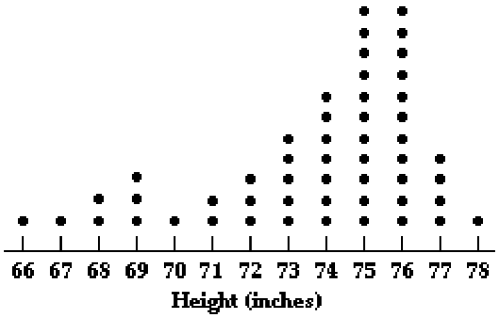
A) Symmetric B) Left skewed C) Right skewed

155) A stem- and- leaf diagram is given below for the annual precipitation in one U.S. city for 28 consecutive years. Precipitation data are in inches. 155) _____

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

A) Left skewed B) Right skewed C) Symmetric

156) The dotplot shows heights of football players. 156) _____



A) Right skewed B) Symmetric C) Left skewed

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

Provide an appropriate response.

157) The heights of adult women have a bell- shaped distribution. Give an example of a data set whose distribution is likely to be right skewed. Explain why you think the distribution will be skewed to the right. 157) _____

158) The heights of adult women have a bell- shaped distribution. Give examples of three other data sets whose distributions are likely to be bell- shaped. 158) _____

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159) A random sample of federal income tax returns is selected from the 2006 returns and a frequency histogram is constructed for the amount of federal income tax paid in 2006. The classes used to construct the histogram are $0 \leq 3000, 3000 \leq 6000, 6000 \leq 9000$, and so on. What do you think the shape of the histogram will be? Explain your thinking. 159) _____

160) Suppose that a group of professional athletes consists of 100 gymnasts and 100 basketball players. What kind of distribution do you think the heights of the athletes would have? Explain your thinking. 160) _____

161) Give an example of a data set whose distribution is likely to be bimodal. Describe the population from which the sample is selected and the variable that is measured for each person. Explain why you think the distribution will be bimodal. 161) _____

162) A high school teacher keeps a record of the number of days that each student attended school last year and then she constructs a relative frequency histogram. What do you think the shape of the distribution will be? Why? 162) _____

163) A population has a J- shaped distribution. Two different samples of size 12 are picked from the population. Two different samples of size 1000 are then picked from the population. Do you think that the distribution of the two samples of size 12 will have roughly the same shape? Do you think that the distribution of the two samples of size 1000 will have roughly the same shape? Explain your thinking. 163) _____

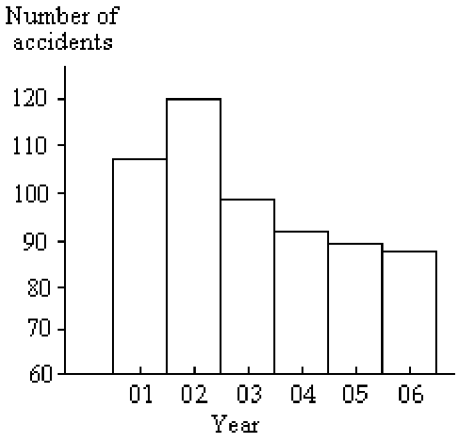
164) Hospital records show the age at death of patients who die while in the hospital. A frequency histogram is constructed for the age at death of the people who have died at the hospital in the past five years. Roughly what shape would you expect for the distribution? Why? 164) _____

165) A table of random numbers is used to generate 100 random integers between 0 and 9. Do you think that the distribution of the numbers will be roughly uniform? Why or why not? In a second experiment, a table of random numbers is used to generate two random integers between 0 and 9 and the sum of the two numbers is recorded. This procedure is repeated 100 times. Do you think that the distribution of the sums will be roughly uniform? Why or why not? 165) _____

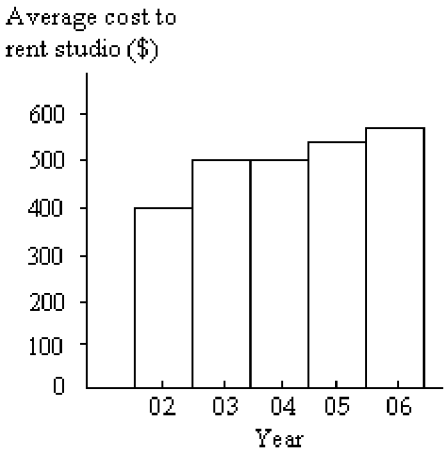
166) Explain in your own words why a truncated bar graph can be misleading. 166) _____

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167) The bar 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. Why is the graph misleading? How would you redesign the graph to be less misleading? 167) _____



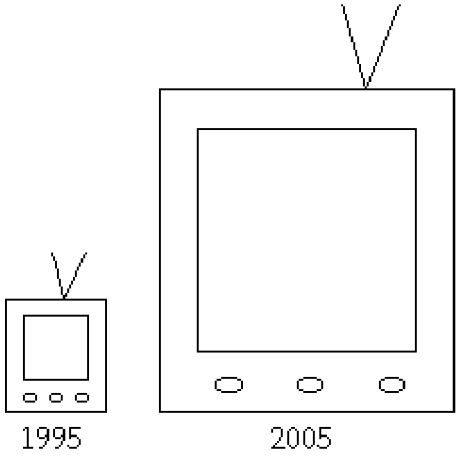
168) The bar graph below shows the average cost of renting a studio in one city in each of the years 2002 through 2006. 168) _____



By what percentage does the average price increase from 2002 to 2003? Obtain a truncated version of the graph by sliding a piece of paper over the bottom of the graph so that the bars start at 300. In the truncated graph, by what percentage does the price appear to increase from 2002 to 2003? Why is the truncated graph misleading?

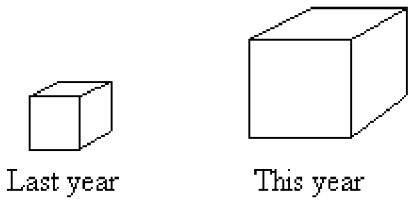
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169) A television manufacturer sold three times as many televisions in 2005 as it did in 1995. To illustrate this fact, the manufacturer draws a pictogram as shown below. The television on the right is three times as tall and three times as wide as the television on the left. 169) _____



Why is this pictogram misleading? What visual impression is portrayed by the pictogram?

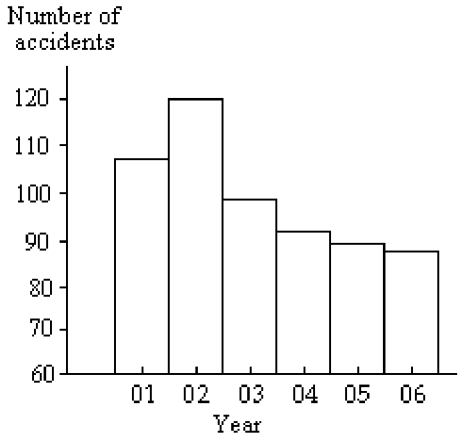
170) A parcel delivery service lowered its prices and finds that it has delivered twice as many parcels this year as it did last year. To illustrate this fact, the manager draws a pictogram as shown below. Each cube depicts a parcel. The side length of the "parcel" on the right is twice the side length of the "parcel" on the left. 170) _____



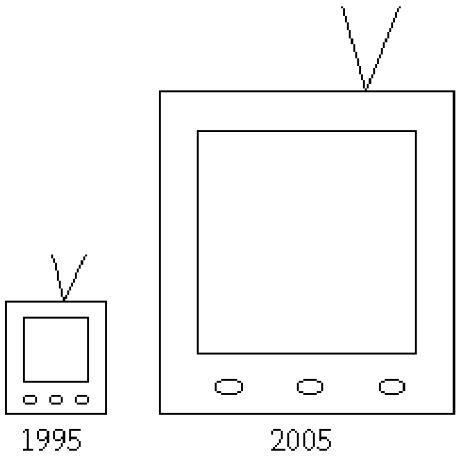
Why is this pictogram misleading? What visual impression is portrayed by the pictogram?

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171) The bar graph below shows the number of car accidents occurring in one city in each of the years 2001 through 2006. The vertical axis is truncated and as a result the graph is misleading. Construct an improved version of the graph which is less misleading. Use the symbol //in your graph. Explain what the symbol //means. 171) _____



172) A television manufacturer sold three times as many televisions in 1995 as it did in 1985. To illustrate this fact, the manufacturer draws a pictogram as shown below. The television on the right is three times as tall and three times as wide as the television on the left. 172) _____



This pictogram is misleading because it actually gives the visual impression that nine times as many televisions were sold in 2005 as in 1995. How can the manufacturer correctly illustrate the fact that sales in 2005 were three times sales in 1995?

173) The mayor of one city has been conducting an anti- smoking campaign in high schools. Each year local government researchers estimate the number of teenagers in the city who smoke. The number of smokers has declined steadily in each of the past five years. The mayor's office constructs a bar graph showing the number of teenage smokers in each of the past five years. If the mayor wished to exaggerate the success of his anti- smoking campaign, would it be to his advantage to truncate the bar graph? Explain your thinking. 173) _____

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1) A
2) B
3) B
4) B
5) A
6) A
7) B
8) A
9) B
10) A
11) B
12) B
13) A
14) B
15) A
16) B
17) A
18) A
19) B
20) A
21) D
22) B
23) B
24) C
25) C
26) A
27) C
28) D
29) A
30) B
31) A
32) B
33) B
34) B
35) A
36) B
37) A
38) A
39) B
40)

Class	Frequency	Relative Frequency
Large	345	0.190
Medium	830	0.456
Small	645	0.354

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41)

Response	Frequency	Relative Frequency
Strongly Favor	20	0.1
Favor	24	0.12
Neutral	5	0.025
Oppose	9	0.045
Strongly Oppose	142	0.71

42)

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

43) A
44) B
45) B
46) A
47) A
48) B
49) C
50) C
51) Answers will vary. Possible answer: The frequency distribution and the relative frequency distribution for a given set of data both have the same shape but have different scales on the vertical axis. Given the scale for the frequency distribution, the scale for the relative frequency distribution is obtained by dividing each number on the vertical axis by n (the size of the data set).
52) Answers will vary. Possible answer: First calculate the relative frequency for the blood type O. Relative frequency = 90/200 = 0.45. The angle is 45% of 360°, or 162°.
53) Answers will vary. Possible answer: A histogram is used for quantitative data, has a continuous numerical scale on the horizontal axis, and there are no gaps between the bars. A bar graph is used to represent qualitative data. It does not have a continuous numerical scale on the horizontal axis, but names of the different categories. There are gaps between the bars. Examples of data will vary.
54) Answers will vary. Possible answer: A pie chart would be more useful. A pie chart clearly shows the proportion of the whole "pie" represented by each piece of pie. A bar chart is more useful for comparing the sizes of different categories with each other.
55) Answers will vary. Possible answer: A bar graph would be more useful. A bar graph is useful for comparing the sizes of different categories with each other, since it is easy to compare the heights of different bars.
56) Answers will vary. Possible answer: A pie chart would be more useful. A pie chart is useful for comparing the size of each category with the *whole* (ie the proportion of the whole population falling in each category). A bar graph is more useful for comparing the sizes of different categories with each other.
57) Answers will vary. Possible answer: Since the two groups are of different sizes, comparing the number (frequency) of managers falling into a given class with the number of employees falling in the same class would not be very meaningful. It would be more useful to compare the proportion (relative frequency) of managers falling into a given class with the proportion of employees falling in the same class.
58) C
59) B
60) D
61) D
62) C

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63) C

64)

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

65)

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

66)

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

67)

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

68)

Age	Frequency
25- under 30	3
30- under 35	3
35- under 40	6
40- under 45	4
45- under 50	5
50- under 55	3
55- under 60	5
60- under 65	5

69)

Hours	Frequency
3- under 5	3
5- under 7	13
7- under 9	7
9- under 11	1

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70)

Hours	Frequency
8- under 10	3
10- under 12	13
12- under 14	7
14- under 16	1

71)

Score	Frequency
60- under 70	3
70- under 80	12
80- under 90	7
90- under 100	2

72)

Charges	Frequency
7.00- under 10	2
10.00- under 13	3
13.00- under 16	5
16.00- under 19	2

73)

Salary	Frequency
20- under 24	3
24- under 28	7
28- under 32	7
32- under 36	4
36- under 40	2
40- under 44	4
44- under 48	1
48- under 52	2

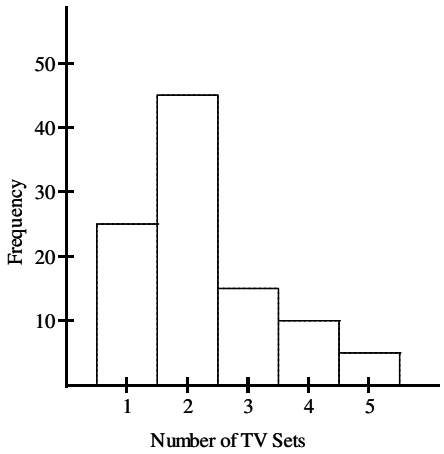
74)

Share price	Frequency
10- under 20	5
20- under 30	8
30- under 40	3
40- under 50	4
50- under 60	8
60- under 70	3
70- under 80	1

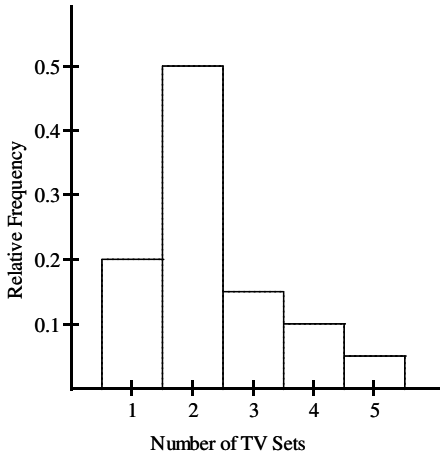
75) A
76) A
77) B
78) C

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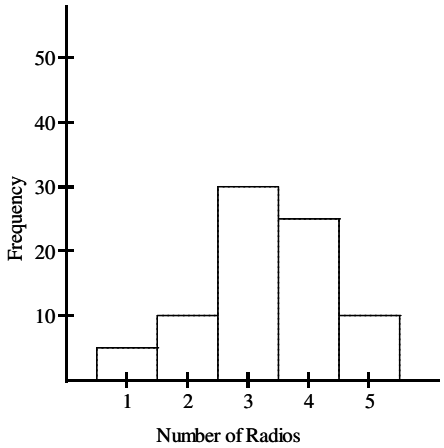
79)



80)

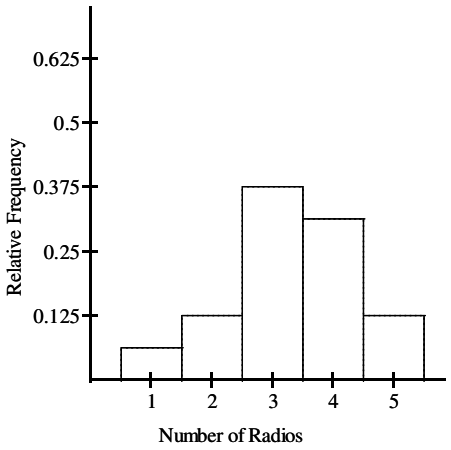


81)

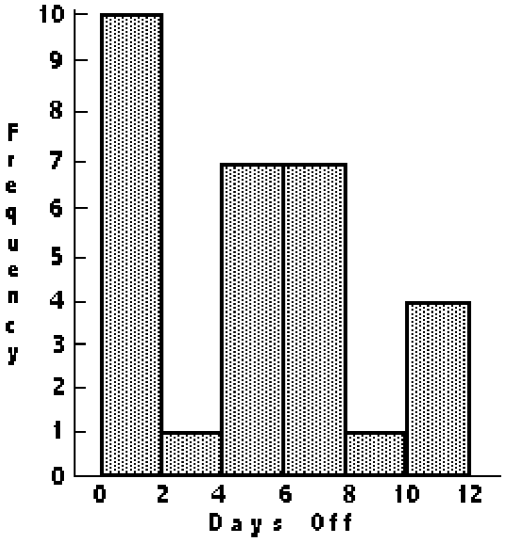


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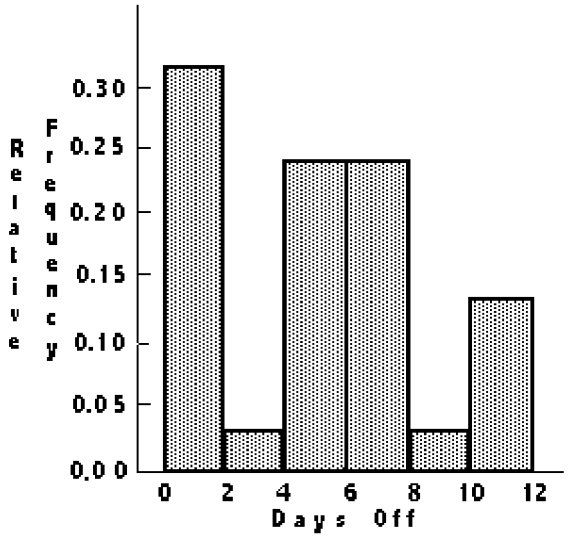
82)



83)

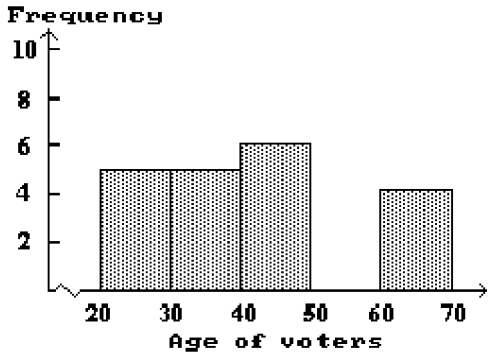


84)

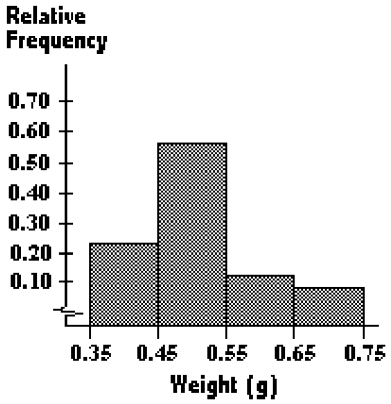


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85)



86)



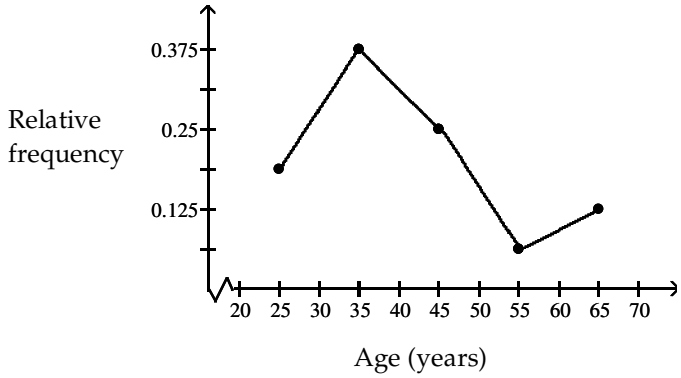
87) A
88) C
89) A
90) A
91) B
92) A
93) A
94) B
95) B
96) B
97) B
98) B
99) B
100) A
101) A
102) B
103) A
104) D
105) B
106) B
107) C
108) A
109) D
110) C
111) D

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112) B
113) A
114) D
115) C
116) C
117) A
118) C
119) C
120) D
121) A
122) B
123)



124)



125) D
126) B
127) Answers will vary. Possible answer: With too many classes it may be difficult to get a clear picture of the data and to see trends in the data - the amount of information may be overwhelming. With too few classes, it may also be difficult to see important characteristics in the data as the data may have been over- summarized and too much information may have been lost.

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128) Answers will vary. Possible answer: In a frequency distribution, each observation must belong to one and only one class. In Anna's table, there is overlap of the classes - it is not clear, for example, to which class the value 3 belongs. The classes could have been depicted in either of the following ways:

Number of sick days taken	Frequency
0- under 3	
3- under 6	
6- under 9	
9- under 12	

Number of sick days taken	Frequency
0- 2	
3- 5	
6- 8	
9- 11	

129) **a**.

Weight (lb)	Frequency
20- 24	
25- 29	
30- 34	

b.

Weight (lb)	Frequency
20- 24.9	
25- 29.9	
30- 34.9	

c.

Weight (lb)	Frequency
20- 24.99	
25- 29.99	
30- 34.99	

130) Answers will vary. Possible answer: The classes do not have equal width, so it is not meaningful to compare the frequencies for the different classes. The class 66- under 72 has the highest frequency because this class includes a larger range of heights than the other classes. The table should be set up with equal- width classes. (Although there may be one open- ended class).

131) Answers will vary. Possible answer: If the data set is very large, it may be hard to get a picture of the data from the original data. Organized data summarizes the data and may enable the researcher to see patterns and trends in the data. Since the organized data is only a summary of the data and does not give the exact data values, it may sometimes be preferable to use the original data, for example to find the exact value for the average.

132) Answers can vary. Possible answer: Each of the five classes should have the same width, and there are 46 values (including the minimum of 28 and the maximum of 73) to be distributed evenly among the 5 classes. If 46 values are distributed evenly among 5 classes, the width must be at least 9.2, so a round width of 10 is a good choice. If a width of 9 is used, then the five classes will not cover the range of the data.

133) Answers will vary. Possible answer: A frequency histogram would be more useful. A stem- and- leaf diagram would not be useful because there would be too many stems and only one or two leaves per stem. If a frequency histogram was used, the data could first be grouped into an appropriate number of classes such as
2- under 6, 6- under 0, 10- under 14, 14- under 18, 18- under 22.

134) The leaf unit would be 0.01. There would be four stems representing 3.1, 3.2, 3.3, 3.4.

135) The stems would be 9, 10, 11, 12, 13, 14.

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136)

18	8 9 7
19	2 0 1 6
20	9 7
21	3 7 9 3
22	5 1
23	5 2 8

Stem- and- leaf diagrams are awkward with data containing many digits. In this case, the data contain too many digits and must be rounded to a suitable number of digits before constructing the diagram.

137) C
138) D
139) A
140) A
141) B
142) A
143) B
144) A
145) B
146) C
147) A
148) C
149) B
150) B
151) B
152) C
153) B
154) B
155) C
156) C
157) Answers will vary. An example of a right skewed distribution might be the ages of all members (e.g. athletes, coaches) of a gymnastics team. A majority of the members would be quite young, however the older athletes and coaches will skew the distribution to the right.
158) Answers will vary. Other examples besides the heights of adult women that are likely to be bell- shaped distributions would be their weights, their hat sizes, and their shoe measurements.
159) Answers will vary. Possible answer: The distribution will probably be reverse J- shaped. The relative frequency corresponding to the first class ($0 \leq 3000$) will be the highest, the relative frequency for the second class ($3000 \leq 6000$) will be somewhat smaller and the relative frequencies of the remaining classes will continue to decrease from one class to the next.
160) Answers will vary. Possible answer: The distribution will be bimodal. The population consists of two very different groups. The mean height for the gymnasts will be very different from the mean height of the basketball players. There will be two distinct peaks - one at the average height of the gymnasts and one at the average height of the basketball players.
161) Answers will vary. Typically a bimodal distribution occurs when the population has two distinct subgroups each with its own mean.
162) Answers will vary. The distribution will be either left skewed or J- shaped.
163) Answers will vary. The two samples of size 1000 are likely to have similar distributions because the sample size is large. Because of the large sample size, the distribution of both samples is likely to be close to the distribution of the population. The two samples of size 12 may not have similar distributions because the sample size is so small.
164) Answers will vary. The distribution will probably be left skewed.

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165) Answers will vary. Possible answer: The distribution of the single numbers will be roughly uniform since each integer is likely to occur 10% of the time in the long run. The distribution of the sums will not be uniform since sums such as 0 and 18 will occur less often than sums such as 9.
166) Answers will vary. Possible answer: If a bar graph is truncated, the heights of the bars will not be in the correct proportions. This can create a misleading impression.
167) Answers will vary. Possible answer: The graph is misleading because it is truncated. The scale on the vertical axis should start at zero so that the bars will be in the correct proportions. A part of the vertical axis could be omitted but the symbol //should then be used to warn the reader of the modified axis.
168) Answers will vary. Possible answer: The average price increases by 25% from 2002 to 2003. Using the truncated graph, the price appears to double from 1994 to 1995 (i.e. it appears to increase by 100%). Using the truncated graph, the differences between the bars seem bigger (relatively) than they really are.
169) Answers will vary. Possible answer: The area of the television on the right is nine times (not three times) the area of the television on the left. The pictogram gives the visual impression that sales in 2005 were nine times the sales in 1995.
170) Answers will vary. Possible answer: The volume of the cube on the right is eight times (not twice) the volume of the cube on the left. The pictogram gives the visual impression that eight times as many parcels were delivered this year as last year.
171) Answers will vary. Check students' graphs. The new graph will be truncated at some point: part of the vertical axis will be omitted and this should be indicated by the symbol //, to alert the reader to this fact.
172) Answers will vary. Possible answer: The television on the right should have three times the area of the television on the left. This does not mean that its dimensions will be three times as big. (In fact, its dimensions will be $\sqrt{3}$ times the dimensions of the television on the left).
173) Answers will vary. Possible answer: Yes, when a bar graph is truncated, differences between the bars appear exaggerated.

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