

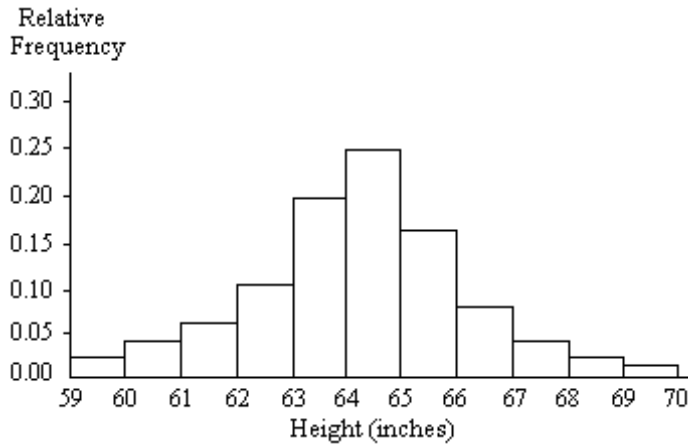
Exam

Name \_\_\_\_\_

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.

- 1) A relative frequency histogram for the heights of a sample of adult women is shown below. 1) \_\_\_\_\_



Which of the following best describes the shape of the distribution?

- A) Skewed to the right
- B) Bimodal
- C) Skewed to the left
- D) Symmetric

Answer: D

Explanation: A)  
B)  
C)  
D)

Provide an appropriate response.

- 2) Each year advertisers spend billions of dollars purchasing commercial time on network sports television. A recent article listed the top 10 leading spenders (in millions of dollars) over a 6 month period:

2) \_\_\_\_\_

Company A	\$72.0	Company F	\$26.9
Company B	63.1	Company G	25.0
Company C	54.7	Company H	23.9
Company D	54.3	Company I	23.0
Company E	29.0	Company J	20.0

Which of the following graphs would not be appropriate for displaying this data?

- A) Stem-and-leaf plot
- B) Dot plot
- C) Histogram
- D) None of these should be used.
- E) Pie chart

Answer: E

Explanation: A)  
B)  
C)  
D)  
E)

Select the most appropriate answer.

- 3) Which of the following graphical methods cannot be used to summarize a quantitative dataset?

3) \_\_\_\_\_

- A) a bar graph
- B) a dot plot
- C) a histogram
- D) a frequency table
- E) a stem-and-leaf plot

Answer: A

Explanation: A)  
B)  
C)  
D)  
E)

- 4) Which of the following numerical summary measures is not sensitive to outliers in a dataset?

4) \_\_\_\_\_

- A) range
- B) interquartile range
- C) mean
- D) standard deviation
- E) none of these

Answer: B

Explanation: A)  
B)  
C)  
D)  
E)

5) The median is equivalent to which quartile?

5) \_\_\_\_\_

- A) Q3
- B) Q1
- C) Q4
- D) None of these.
- E) Q2

Answer: E

- Explanation:
- A)
  - B)
  - C)
  - D)
  - E)

6) A set of data collected over time is called a

6) \_\_\_\_\_

- A) data series.
- B) time series.
- C) None of these.
- D) time bar.
- E) time plot.

Answer: B

- Explanation:
- A)
  - B)
  - C)
  - D)
  - E)

7) A distribution that has a left tail longer than the right tail is considered

7) \_\_\_\_\_

- A) None of these.
- B) skewed to the right.
- C) symmetric.
- D) skewed to the left.
- E) not skewed.

Answer: D

- Explanation:
- A)
  - B)
  - C)
  - D)
  - E)

8) The salaries of the top 10 highest paid CEOs in the U.S. ranged from 249.42 to 68.95 million dollars. These data had  $Q1=71.84$ ,  $median=101.7$  and  $Q3=139.96$ . The full data set is given below.

8) \_\_\_\_\_

249.42 230.55 139.96 135.53 122.67 80.73 75.33 71.84 69.66 68.95

In a boxplot, what would be the values to which the whiskers extend?

- A) -30.34, 242.14
- B) 68.95, 249.42
- C) 68.95, 230.55
- D) -0.48, 203.88

Answer: C

- Explanation:
- A)
  - B)
  - C)
  - D)

Provide an appropriate response.

9) The mean is less than the median

- A) when the data is symmetric
- C) never

- B) when the data is skewed to the left
- D) when the data is skewed to the right

9) \_\_\_\_\_

Answer: B

- Explanation:
- A)
  - B)
  - C)
  - D)

Select the most appropriate answer.

10) The area of New Jersey Counties, in square miles, ranges from 47 to 819 with  $Q_1=228$ , median=329 and  $Q_3=476$ . The full data set follows.

10) \_\_\_\_\_

47 103 130 192 221 228 234 267 307 312 329 362 365 423 468 476 500 527 569 642 819

According to the  $1.5 \times IQR$  criterion, are there any potential outliers in the data set?

- A) yes, 47 and 819
- B) no
- C) yes, 819
- D) yes, 47

Answer: B

- Explanation:
- A)
  - B)
  - C)
  - D)

11) Which of the following numerical summary measures cannot be easily approximated from a box plot?

11) \_\_\_\_\_

- A) median
- B) interquartile range
- C)  $Q_1$
- D) variance
- E) range

Answer: D

- Explanation:
- A)
  - B)
  - C)
  - D)
  - E)

12) What percent of the data falls below  $Q_1$ ?

12) \_\_\_\_\_

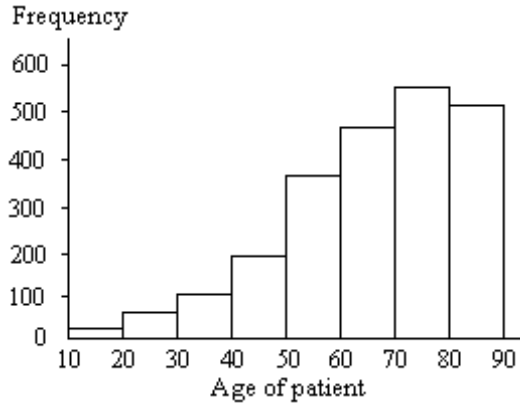
- A) 50%
- B) 25%
- C) 33%
- D) 10%
- E) 75%

Answer: B

- Explanation:
- A)
  - B)
  - C)
  - D)
  - E)

A graphical display of a data set is given. Identify the overall shape of the distribution.

- 13) The ages of a group of patients being treated at one hospital for osteoporosis are summarized in the frequency histogram below. 13) \_\_\_\_\_



Which of the following best describes the shape of the distribution?

- A) Skewed to the right
- B) Multimodal
- C) Skewed to the left
- D) Bimodal
- E) Symmetric

Answer: C

Explanation: A)  
B)  
C)  
D)  
E)

Select the most appropriate answer.

- 14) The characteristics observed to address the questions posed in a study are called 14) \_\_\_\_\_

- A) variables.
- B) parameters.
- C) quantities.
- D) statistics.
- E) categories.

Answer: A

Explanation: A)  
B)  
C)  
D)  
E)

Provide an appropriate response.

- 15) Twenty-four workers were surveyed and asked how long it takes them to travel to work each day. 15) \_\_\_\_\_  
The data below are given in minutes.

20 35 42 52 65 20 60 49 24 37 23 24 22 20 41 25 28 27 50 47 58 30 32 48

Which of the following shows the data in a stem-and-leaf plot?

A)

2		002344578
3		0257
4		12789
5		028
6		05

B)

2		0002344578
3		0257
4		12789
5		028
6		05

C)

2		00002344578
3		0257
4		12789
5		028
6		05

D)

2		0002344578
3		0257
4		12789
5		028
6		0

E)

2		000234457
3		02578
4		12789
5		028
6		05

Answer: B

Explanation: A)  
B)  
C)  
D)  
E)

A graphical display of a data set is given. Identify the overall shape of the distribution.

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

16) \_\_\_\_\_

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

Which of the following best describes the shape of the distribution?

- A) Skewed to the left
- B) Bimodal
- C) Symmetric
- D) Skewed to the right

Answer: A

Explanation: A)  
B)  
C)  
D)

Select the most appropriate answer.

17) A distribution that has the right tail longer than the left tail is considered

17) \_\_\_\_\_

- A) None of these.
- B) symmetric.
- C) skewed to the right.
- D) not skewed.
- E) skewed to the left.

Answer: C

Explanation: A)  
B)  
C)  
D)  
E)

Provide an appropriate response.

18) At a tennis tournament a statistician keeps track of every serve that a player hits. The statistician reported that the mean serve speed of a particular player was 98 miles per hour. Suppose that the statistician indicated that the serve speed distribution was skewed to the left. Which of the following values is most likely the value of the median serve speed?

18) \_\_\_\_\_

- A) 93 mph
- B) 88 mph
- C) 83 mph
- D) 103 mph
- E) 98 mph

Answer: D

Explanation: A)  
B)  
C)  
D)  
E)

Select the most appropriate answer.

19) A common pattern observed over time is called a/an

19) \_\_\_\_\_

- A) time plot.
- B) mode
- C) None of these.
- D) trend.
- E) time series.

Answer: D

Explanation: A)  
B)  
C)  
D)  
E)

20) In human engineering and product design, it is important to consider the weights of people so that airplanes or elevators are not overloaded. The distribution of weights for adult males in the U.S. has a mean weight of 173 pounds and a standard deviation of 30 pounds. Suppose the distribution of weights was skewed to the left. Which of the following values is most likely the value of the median weight?

20) \_\_\_\_\_

- A) 173 pounds
- B) 163 pounds
- C) 188 pounds
- D) 143 pounds
- E) not enough information to determine

Answer: C

Explanation: A)  
B)  
C)  
D)  
E)

Provide an appropriate response.

21) Parking at a large university has become a major issue. University administrators would like to determine the average time it takes a student to find a parking spot in a university lot. Students who are willing to participate in the study were asked to record the time between entering campus and pulling into a parking spot. Which of the following would not be appropriate for displaying the parking time data?

21) \_\_\_\_\_

- A) Pie chart
- B) Box plot
- C) Histogram
- D) None of these should be used.
- E) Stem-and-leaf plot

Answer: A

Explanation: A)  
B)  
C)  
D)  
E)



22) The mean score on the SAT writing section was 497 for the a given graduating class. Noting that this test is scored on a scale of 200 to 800, which of the following is the most plausible value for the standard deviation of the scores?

22) \_\_\_\_\_

- A) 200                      B) 300                      C) -10                      D) 10                      E) 110

Answer: E

Explanation: A)  
B)  
C)  
D)  
E)

Select the most appropriate answer.

23) Which of the following numerical summary measures cannot be negative?

23) \_\_\_\_\_

- A) Q3  
B) z-score  
C) mean  
D) mode  
E) standard deviation

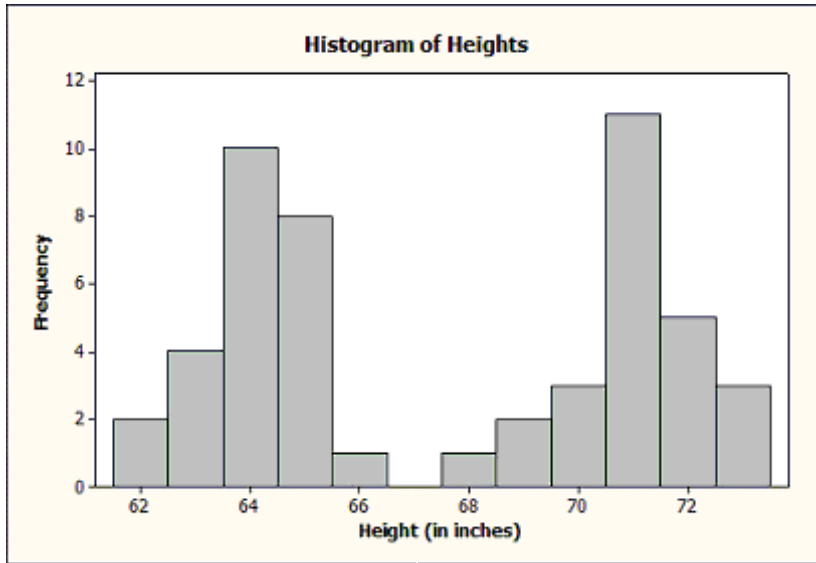
Answer: E

Explanation: A)  
B)  
C)  
D)  
E)

A graphical display of a data set is given. Identify the overall shape of the distribution.

24) The following histogram depicts the heights of 50 women and 50 men.

24) \_\_\_\_\_



Which of the following best describes the shape of the distribution?

- A) Symmetric
- B) Bimodal
- C) Skewed to the right
- D) Skewed to the left

Answer: B

Explanation: A)  
B)  
C)  
D)

Select the most appropriate answer.

25) Which of the following is a continuous variable?

25) \_\_\_\_\_

- A) number of homeruns in a professional baseball player's career
- B) brand of tennis shoe
- C) type of fish caught
- D) daily high temperature in New York City
- E) number of pars in a round of golf

Answer: D

Explanation: A)  
B)  
C)  
D)  
E)

26) What percent of the data falls above Q2?

26) \_\_\_\_\_

- A) 10%
- B) 25%
- C) 90%
- D) 75%
- E) 50%

Answer: E

Explanation: A)  
B)  
C)  
D)  
E)

27) The area of New Jersey Counties, in square miles, ranges from 47 to 819 with  $Q_1=228$ , median=329 and  $Q_3=476$ . The full data set follows. 27) \_\_\_\_\_

47 103 130 192 221 228 234 267 307 312 329 362 365 423 468 476 500 527 569 642 819

In a boxplot, what would be the values to which the whiskers extend

- A) 228, 476                      B) 47, 819                      C) -144, 848                      D) -43, 701

Answer: B

- Explanation: A)  
B)  
C)  
D)

28) A distribution that shows an overall pattern with two mounds is called 28) \_\_\_\_\_

- A) None of the these.  
B) bimodal.  
C) nonmodal.  
D) multimodal.  
E) unimodal.

Answer: B

- Explanation: A)  
B)  
C)  
D)  
E)

29) The salaries of the top 10 highest paid CEOs in the U.S. ranged from 249.42 to 68.95 million dollars. These data had  $Q_1=71.84$ , median=101.7 and  $Q_3=139.96$ . The full data set is given below. 29) \_\_\_\_\_

249.42 230.55 139.96 135.53 122.67 80.73 75.33 71.84 69.66 68.95

Using the 1.5 x IQR criterion, are there any potential outliers in the data set?

- A) yes, 68.95 and 249.42                      B) yes, 249.42  
C) yes, 68.95                      D) no

Answer: B

- Explanation: A)  
B)  
C)  
D)

30) One-fourth of the dataset lies 30) \_\_\_\_\_

- A) below  $Q_3$ .  
B) between  $Q_1$  and  $Q_3$ .  
C) above  $Q_2$ .  
D) above  $Q_1$ .  
E) above  $Q_3$ .

Answer: E

- Explanation: A)  
B)  
C)  
D)  
E)

31) Which of the following is a discrete variable?

31) \_\_\_\_\_

- A) weight of a newborn baby
- B) none of these
- C) amount of coffee in an 8-ounce cup
- D) number of phones per household
- E) time it takes to drive to work

Answer: D

- Explanation:
- A)
  - B)
  - C)
  - D)
  - E)

32) In human engineering and product design, it is important to consider the weights of people so that airplanes or elevators aren't overloaded. The weight for adult males in the U.S. follows a bell-shaped distribution with a mean weight of 173 pounds and a standard deviation of 30 pounds. What proportion of these weights is between 203 pounds and 263 pounds?

32) \_\_\_\_\_

- A) 0.1600
- B) 0.6800
- C) 0.4985
- D) 0.1574
- E) 0.3170

Answer: D

- Explanation:
- A)
  - B)
  - C)
  - D)
  - E)

33) A distribution that shows an overall pattern with a single mound is called

33) \_\_\_\_\_

- A) bimodal.
- B) symmetric.
- C) nonmodal.
- D) unimodal.
- E) multimodal.

Answer: D

- Explanation:
- A)
  - B)
  - C)
  - D)
  - E)

34) In human engineering and product design, it is important to consider the weights of people so that airplanes or elevators are not overloaded. The weight for adult males in the U.S. follows a bell-shaped distribution with a mean weight of 173 pounds and a standard deviation of 30 pounds. Using the z-score approach for detecting outliers, which of the following weights would represent potential outliers in the distribution of U.S. adult male weights? 34) \_\_\_\_\_

- Weights: 110 pounds, 157 pounds, 281 pounds
- A) 110 pounds and 157 pounds are both potential outliers.
  - B) 110 pounds and 281 pounds are both potential outliers.
  - C) 281 pounds is the only potential outlier.
  - D) None of the three weights are potential outliers.
  - E) 110 pounds, 157 pounds, and 281 pounds are all potential outliers.

Answer: C

- Explanation: A)  
B)  
C)  
D)  
E)

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

Provide an appropriate response.

35) In order to reduce pollutants from motor vehicle exhaust emissions, three-way catalytic converters have been installed in new vehicles. However, these converters increase the level of ammonia in the air. A study was published on the ammonia levels near the exit ramp of a highway tunnel. The data below represent daily ammonia concentrations (parts per million) on eight randomly selected days during afternoon drive-time in the summer. 35) \_\_\_\_\_

1.53	1.50	1.37	1.51	1.55	1.42	1.41	1.48
------	------	------	------	------	------	------	------

Find the median.

Answer: median = 1.49

Explanation:

36) A stock broker has been following different stocks over the last month and has recorded whether the various stock values are up, unchanged, or down at the end of the month. The results were 36) \_\_\_\_\_

Stock performance	up	same	down
Count	21	7	12

- a. What is the variable of interest?
- b. Is the variable categorical or quantitative?
- c. Which response is the mode?
- d. Add proportions to this frequency table.

Answer: a. stock performance

- b. categorical
- c. up
- d.

Stock performance	up	same	down
Count	0.525	0.175	0.300

Explanation:

Fill in the blank.

37) A variable is called \_\_\_\_\_ if each observation belongs to one of a set of categories. 37) \_\_\_\_\_

Answer: categorical

Explanation:

38) The five-number summary of a dataset consists of the \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, and \_\_\_\_\_.

Answer: minimum value; Q1; median; Q3; maximum value

Explanation:

Provide an appropriate response.

39) A local school district wants to know the number of children under the age of five living in the district in order to predict future enrollment. Households were randomly sampled in the district, and the head of household was asked to disclose the number of children under the age of five living in the household. The results were 39) \_\_\_\_\_

Number of children under five	0	1	2	3	4
Count	15	18	12	12	3

- What is the variable of interest?
- Is the variable categorical or quantitative?
- Which response is the mode?
- Add proportions to this frequency table.

Answer: a. number of children under five

b. discrete

c. 1

d.

Number of children under five	0	1	2	3	4
Count	0.25	0.30	0.20	0.20	0.05

Explanation:

40) The table below shows the unemployment rate in one city from 2003 to 2012. 40) \_\_\_\_\_

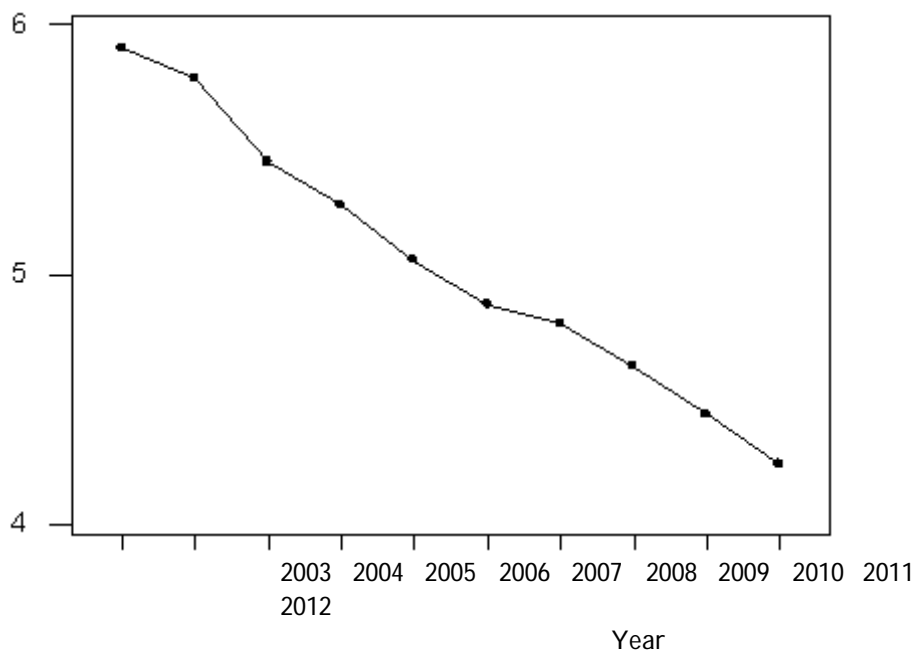
Year	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Unemployment Rate (Percent)	5.90	5.78	5.45	5.28	5.06	4.88	4.80	4.63	4.44	4.24

- Construct a time plot for these data.
- Is there a trend? If so, what kind?
- Would a histogram more clearly describe the above dataset? Explain.

Answer: a.

### Unemployment Rate 2003-2012

Unemployment  
Rate (Percent)



b. There is a clear decreasing trend over time; c. No, a histogram would not depict the trend in this dataset.

Explanation:

41) Why is it beneficial to label each pie slice of a pie chart with its corresponding percent?

41) \_\_\_\_\_

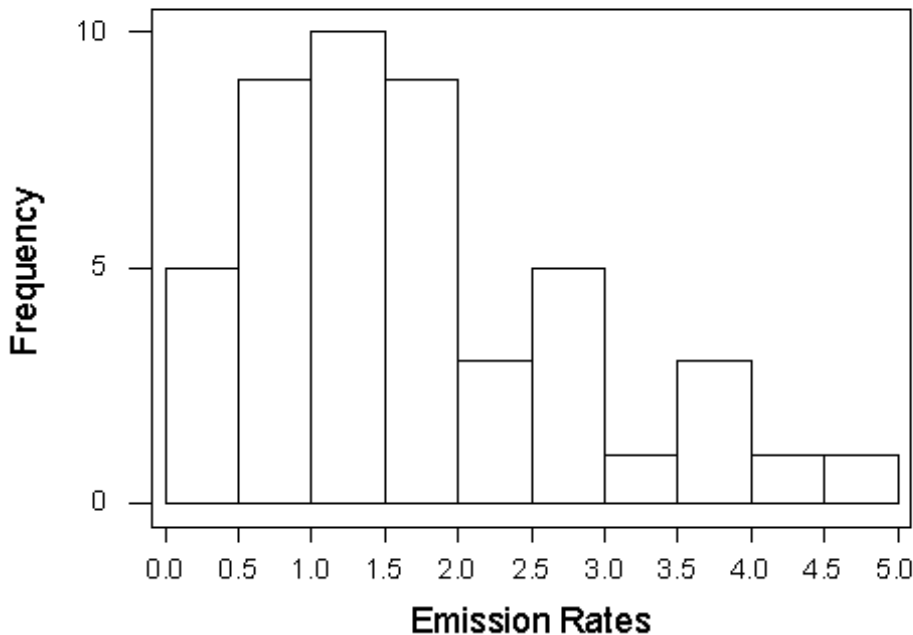
Answer: This clarifies what percent a slice represents and which of two slices is larger.

Explanation:

42) The following frequency histogram provides average SO<sub>2</sub> (sulfur dioxide) emission rates from utility and industrial boilers (lb/million Btu) for 47 states (data for Idaho, Alaska, and Hawaii omitted).

42) \_\_\_\_\_

**Average Sulfur Dioxide Emission Rates**



- Identify the intervals of emission rates used for the plot.
- Describe the shape of the distribution.
- What information can you get from the dot plot or stem-and-leaf plot of these data that you cannot get from this plot?
- This histogram shows frequencies. If you were to construct a histogram using the percentages for each interval, how (if at all) would the shape of this histogram change?

Answer: a. 0 to 0.49, 0.5 to 0.99, 1.0 to 1.49, 1.5 to 1.99, 2.0 to 2.49, 2.5 to 2.99, 3.0 to 3.49, 3.5 to 3.99, 4.0 to 4.49, 4.5 to 4.99; b. The distribution is skewed to the right. c. You can get the actual data values from a dot plot or stem-and-leaf plot. d. The shape would not change.

Explanation:

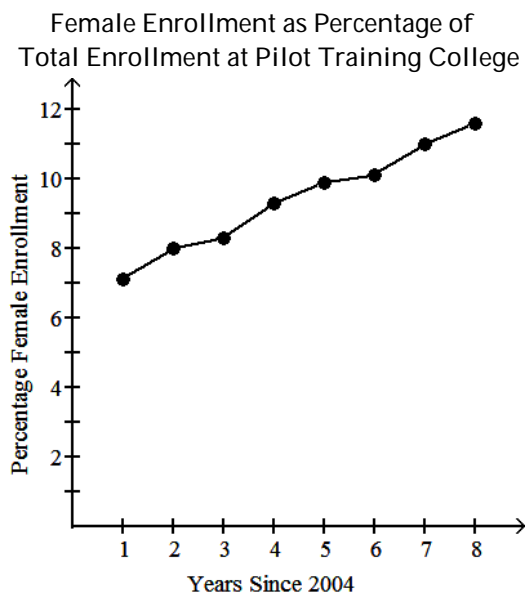
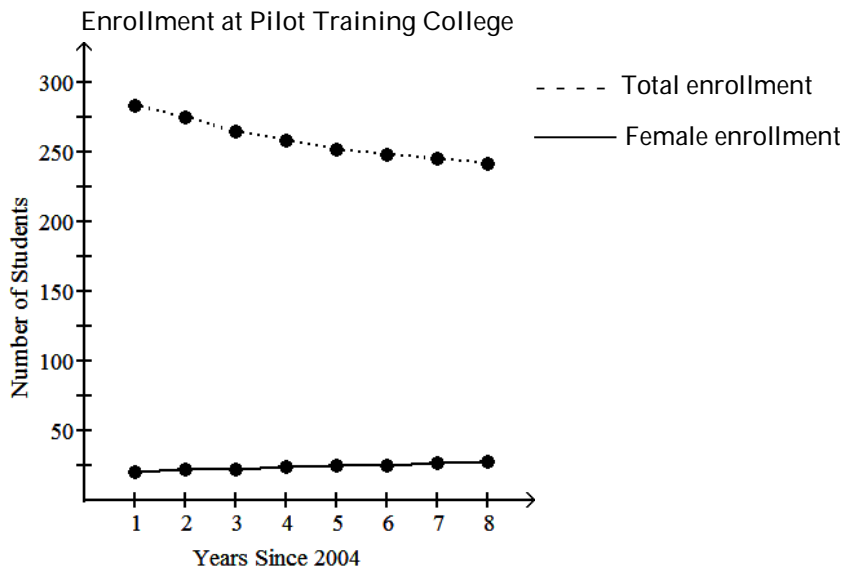
43) The table below summarizes total enrollment and female enrollment at a pilot training college for the years 2005 through 2012. The table has been used to construct two different graphs displayed below the table. Summarize the information that is available from each of the graphs and discuss the advantages and disadvantages of each graph.

43) \_\_\_\_\_

Enrollment at Pilot Training College



Year	Total Number of Students	Number of Female Students
2005	283	20
2006	275	22
2007	265	22
2008	258	24
2009	252	25
2010	248	25
2011	245	27
2012	242	28



Answer: The first graph shows the total numbers of students for each year as well as the number of female students. We can see the downward trend in overall enrollment, the slight upward trend in female enrollment and that female enrollment is small relative to total enrollment.

However, with both total enrollment and female enrollment on the same graph, since female enrollment is small relative to total enrollment, the scale is not suitable for female enrollment and the upward trend in female enrollment is not very clear.

Since both total enrollment and female enrollment are varying with time, the second graph which shows female enrollment as a percentage of total enrollment may be more useful. It is clear from this graph that as a percentage of total enrollment, female enrollment is increasing significantly. However, this graph gives no indication of the absolute number of students (overall or female) and without reference to the first graph, we cannot know whether the percentage female enrollment is increasing because female enrollment is increasing, because male enrollment is decreasing, or both.

Explanation:

44) 1. The data below represent the number of inches of rain in Chicago, Illinois, during the month of April for 20 randomly selected years.

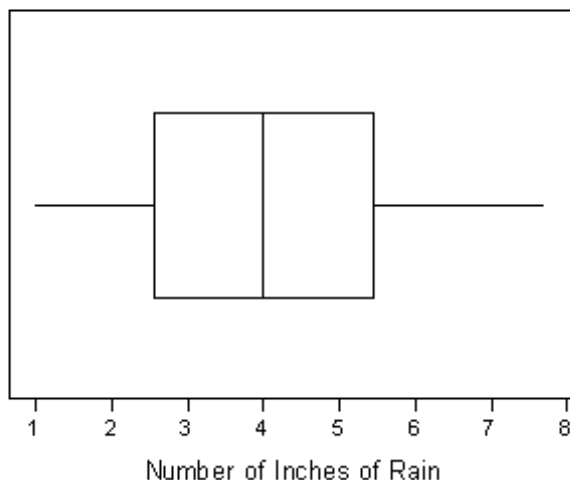
44) \_\_\_\_\_

2.47	3.97	3.94	4.11	1.14
4.02	3.41	1.85	5.22	0.97
6.14	2.34	3.48	4.77	2.78
4.00	6.28	5.50	7.69	5.79

- Construct a box plot for these data.
- Describe the shape of this distribution.
- Compute and interpret the standard deviation.

Answer: a.

April Showers in Chicago



- The distribution is approximately symmetrical; c. standard deviation = 1.779 inches; The typical distance the data falls from the mean is 1.779 inches.

Explanation:

Fill in the blank.

45) The \_\_\_\_\_ is the balance point of the data values; while, the \_\_\_\_\_ is the midpoint of the ordered data values.

45) \_\_\_\_\_

Answer: mean; median

Explanation:

46) The \_\_\_\_\_ is the difference between the largest and the smallest data values.

46) \_\_\_\_\_

Answer: range

Explanation:

47) Extreme observations in the dataset are called \_\_\_\_\_.

47) \_\_\_\_\_

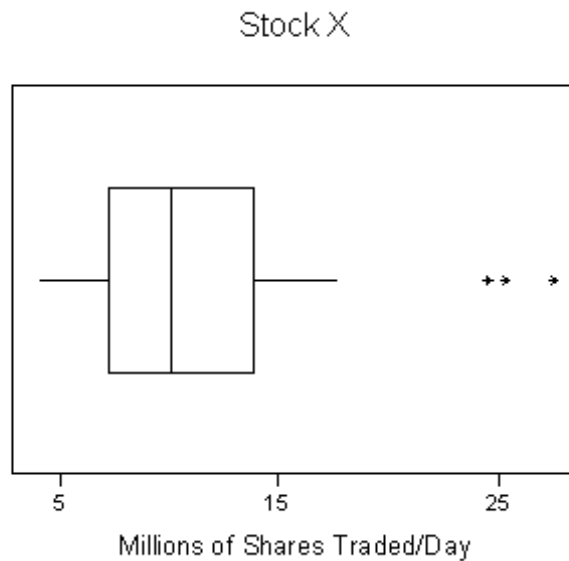
Answer: outliers

Explanation:

Provide an appropriate response.

48) The box plot below represents the volume of stock X traded for a random sample of 35 trading days. The volume of a stock is the number of shares traded on a given day.

48) \_\_\_\_\_



- Approximately, what is the median for this dataset?
- Are there any potential outliers in this dataset? If so, how many?
- Describe the shape of the distribution. Would the standard deviation or the interquartile range be a better measure of spread for this dataset? Explain.

Answer: a. median = about 10 million shares; b. yes, 3; c. The distribution is skewed to the right. The IQR would be a better measure of spread for this dataset, because it is highly skewed and contains 3 potential outliers. The standard deviation is not a resistant measure of variability.

Explanation:

Fill in the blank.

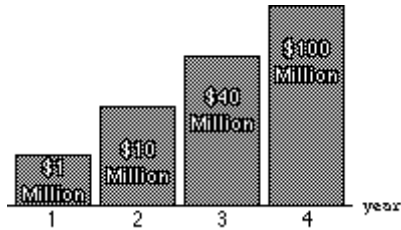
49) A variable is called \_\_\_\_\_ if observations on it take numerical values that represent different magnitudes of the variable. 49) \_\_\_\_\_

Answer: quantitative

Explanation:

Identify the abuse of statistics.

50) The graph shows the increases in a certain expenditure over a four-year period. What is wrong with the graph? 50) \_\_\_\_\_



Answer: The bars are not drawn in the correct proportions.

Explanation:

Provide an appropriate response.

51) The scores for a statistics test are as follows: 51) \_\_\_\_\_

87 76 94 77 95 96 88 85 66 89  
79 98 54 90 83 88 82 55 14 69

Create a stem-and-leaf display for the data. The stem should consist of the tens digit and range from 1 to 9. The leaves should be drawn aside the appropriate stem based on the data values.

Answer:

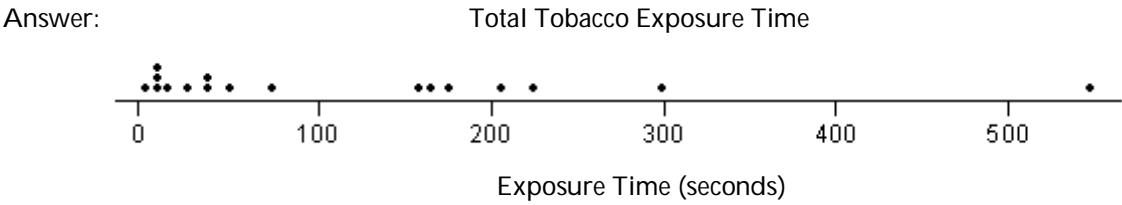
```
1 | 4
2 |
3 |
4 |
5 | 4 5
6 | 6 9
7 | 6 7 9
8 | 2 3 5 7 8 8 9
9 | 0 4 5 6 8
```

Explanation:

52) A survey investigated exposure to tobacco use in a series of G-rated animated films. Data on the total tobacco exposure time (in seconds) is below. 52) \_\_\_\_\_

223	176	548	37	158	51	299	37	11
165	74	9	2	9	23	206	9	

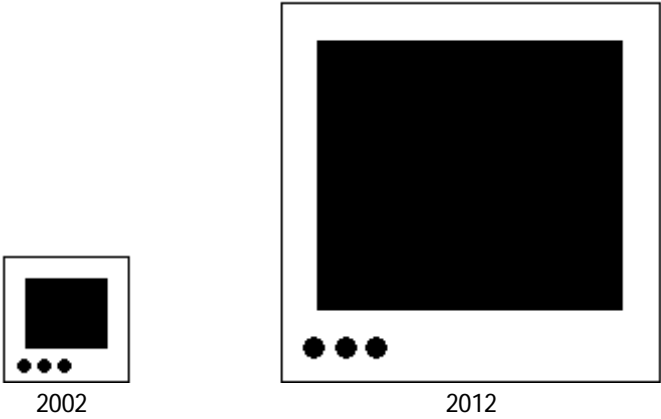
Construct a dot plot for these data. Comment on the shape of the distribution.



This distribution appears to be skewed to the right.

Explanation:

53) A television manufacturer sold three times as many televisions in 2012 as it did in 2002. 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. 53) \_\_\_\_\_



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

Answer: 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 2012 were nine times the sales in 2002.

Explanation:

Fill in the blank.

54) A \_\_\_\_\_ is a graph that uses bars to portray the frequencies or the relative frequencies of the possible outcomes for a quantitative variable. 54) \_\_\_\_\_

Answer: histogram

Explanation:

Provide an appropriate response.

- 55) A recent survey investigated exposure to tobacco and alcohol use in a series of G-rated animated films. Data on the total tobacco exposure time (in seconds) is below.

55) \_\_\_\_\_

223	176	548	37	158	51	299	37	11
165	74	9	2	6	23	206	9	

Find the Five-Number Summary of Positions.

Answer: minimum = 2 seconds, Q1 = 10 seconds, median = 51 seconds, Q3 = 191 seconds, and maximum = 548 seconds

Explanation:

- 56) In order to reduce pollutants from motor vehicle exhaust emissions, three-way catalytic converters have been installed in new vehicles. However, these converters increase the level of ammonia in the air. A study was published on the ammonia levels near the exit ramp of a highway tunnel. The data below represent daily ammonia concentrations (parts per million) on eight randomly selected days during afternoon drive-time in the summer.

56) \_\_\_\_\_

1.53	1.50	1.37	1.51	1.55	1.42	1.41	1.48
------	------	------	------	------	------	------	------

Find the mean.

Answer: mean = 1.471

Explanation:

- 57) The following data represent the number of grams of fat in various breakfast foods.

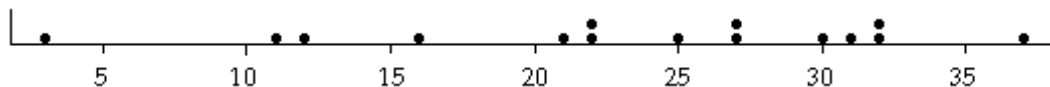
57) \_\_\_\_\_

Breakfast Food	Fat (in grams)
Muffin and egg sandwich	12
Muffin, egg, and ham sandwich	22
Muffin, egg, and bacon sandwich	27
Muffin and sausage sandwich	22
Bagel, egg, and ham sandwich	25
Bagel, egg, and bacon sandwich	30
Bagel, egg, and sausage sandwich	32
Bagel, egg, sausage, and cheese sandwich	37
Bagel, egg, ham, and cheese sandwich	27
Bagel, egg, bacon, and cheese sandwich	31
Bagel	11
Pancakes platter	16
Pancakes and eggs platter	21
Pancakes, eggs, and bacon platter	32
Yogurt	2

Construct a dot plot for these data.

Answer:

**Grams of Fat in Breakfast Food Items**



Explanation:

Fill in the blank.

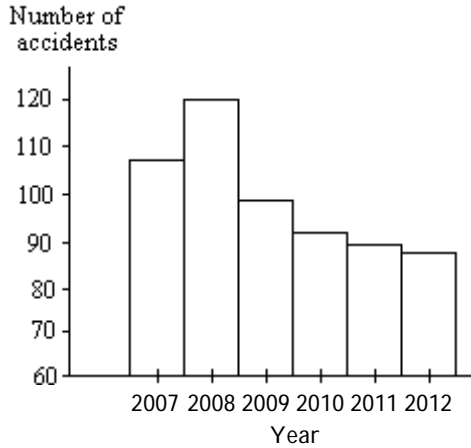
58) The \_\_\_\_\_ for a data value is the number of standard deviations that it falls from the mean. 58) \_\_\_\_\_

Answer: z-score

Explanation:

Provide an appropriate response.

59) The histogram below shows the number of car accidents occurring in one city in each of the years 2007 through 2012. The number of accidents dropped in 2009 after a new speed limit was imposed. Why is the graph misleading? How would you redesign the graph to be less misleading? 59) \_\_\_\_\_



Answer: 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.

Explanation:

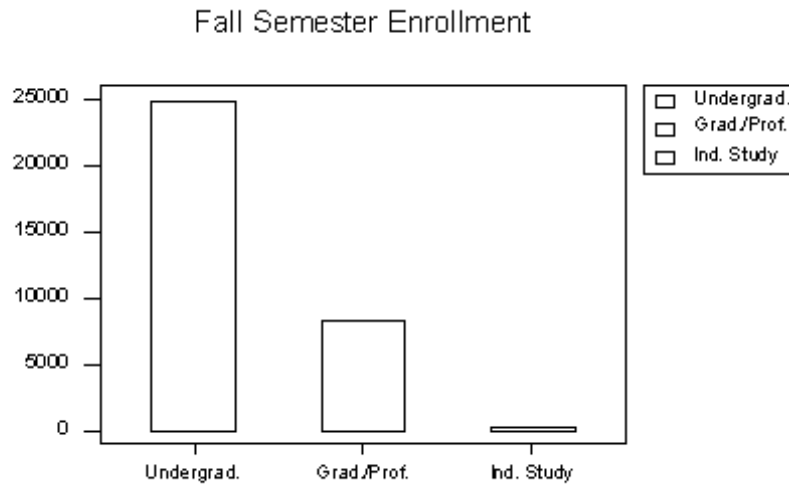
60) The enrollment for fall semester at University X is as follows.

60) \_\_\_\_\_

Enrollment	Count
Undergraduate	24,814
Graduate/Professional	8386
Independent Study	20

- Construct a bar graph for these data.
- Would a dot plot or a stem-and-leaf plot make sense for these data? Explain.

Answer: a.



- No, both a dot plot and a stem-and-leaf plot are used on small quantitative datasets.

Explanation:

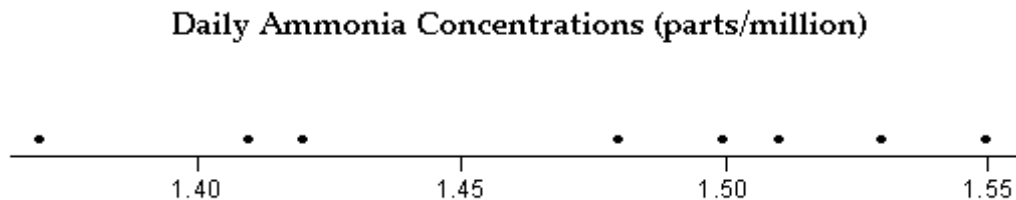
61) In order to reduce pollutants from motor vehicle exhaust emissions, three-way catalytic converters have been installed in new vehicles. However, these converters increase the level of ammonia in the air. A study was published on the ammonia levels near the exit ramp of a highway tunnel. The data below represent daily ammonia concentrations (parts per million) on eight randomly selected days during afternoon drive-time in the summer.

61) \_\_\_\_\_

1.53	1.50	1.37	1.51	1.55	1.42	1.41	1.48
------	------	------	------	------	------	------	------

Construct a dot plot for these data.

Answer:



Explanation:



62) A sample of 324 randomly selected doctors was asked to indicate the category that best described how often they used the Internet. The results follow.

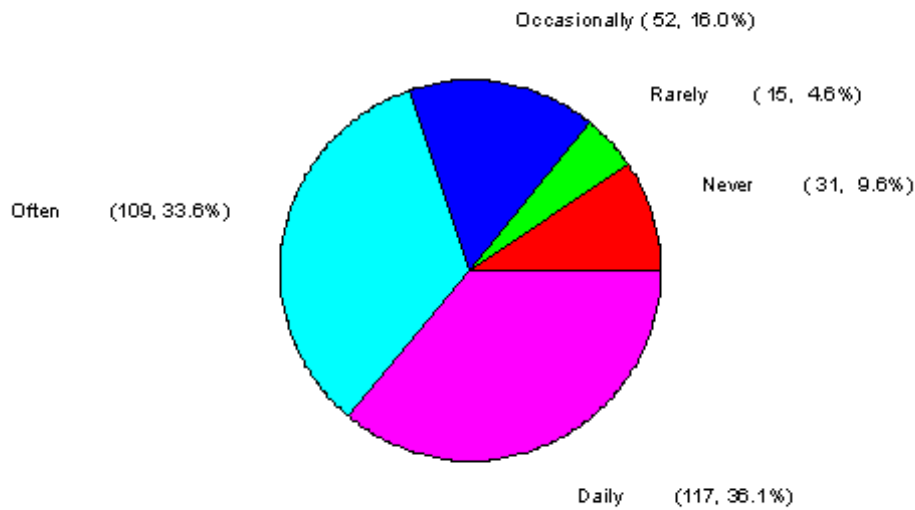
62) \_\_\_\_\_

Internet Usage Pattern	Count
Never	31
Rarely (about 3 times per year)	15
Occasionally (about once a month)	52
Often (about once a week)	109
Daily	117

- Construct a pie chart for these data.
- In creating a bar graph of these data, would it be more useful to list the patterns as given in the table above or in the order of a Pareto chart?

Answer: a.

### Internet Usage Pattern



- Since the categories of Internet usage pattern have a natural order from never to daily, it makes more sense to leave the categories in this natural order rather than ordering them from the tallest bar to the shortest bar.

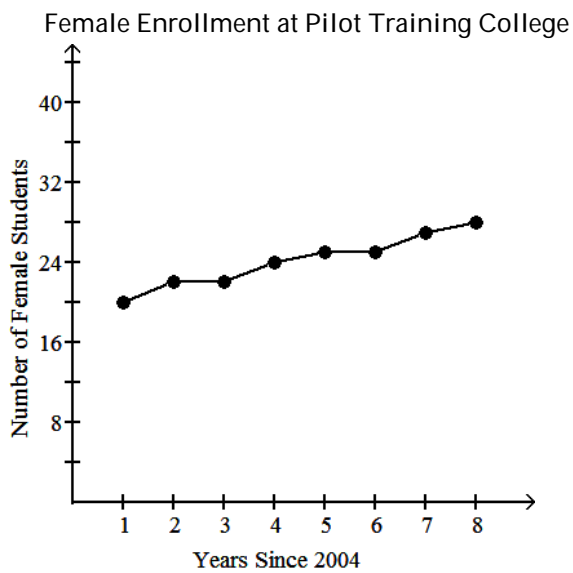
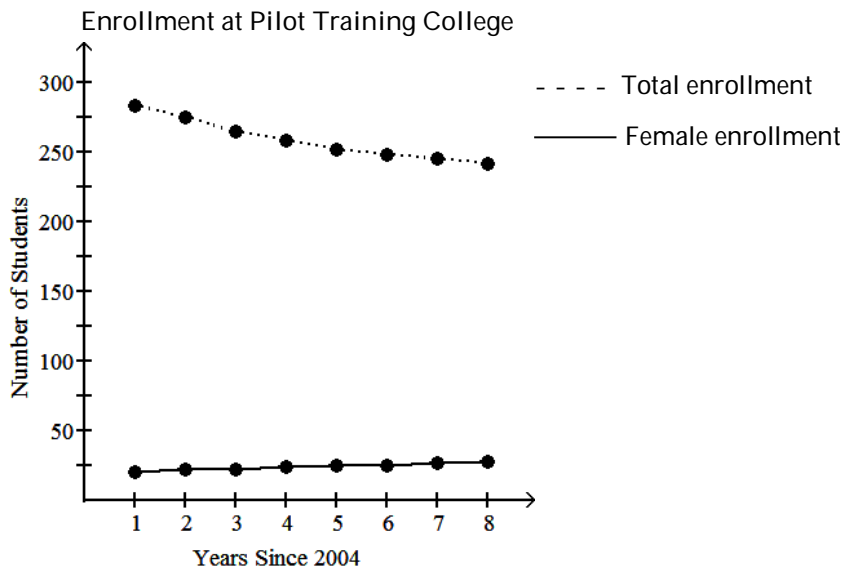
Explanation:

63) The table below summarizes total enrollment and female enrollment at a pilot training college for the years 2005 through 2012. The table has been used to construct two different graphs displayed below the table. Summarize the information that is available from each of the graphs and discuss the advantages and disadvantages of each graph.

63) \_\_\_\_\_

Enrollment at Pilot Training College

Year	Total Number of Students	Number of Female Students
2005	283	20
2006	275	22
2007	265	22
2008	258	24
2009	252	25
2010	248	25
2011	245	27
2012	242	28



Answer: The first graph shows the total numbers of students for each year as well as the number of female students. We can see the downward trend in overall enrollment, the slight upward trend in female enrollment and that female enrollment is small relative to total enrollment. However, with both total and female enrollment on the same graph, since female enrollment is small relative to total enrollment, the scale is not suitable for female enrollment and the upward trend in female enrollment is not very clear. This upward trend is much clearer from the second graph which shows female enrollment alone, However this graph gives no indication of how female enrollment compares to total enrollment.

Explanation:

- 64) The following data provide the daily protein intake (in grams of protein per kilogram of body weight) for 20 competitive athletes. 64) \_\_\_\_\_

1.4	2.2	2.7	1.5	2.3	1.7	2.3	1.5	1.8	2.8
1.8	1.9	2.0	2.3	1.5	1.9	1.7	1.8	1.6	3.0

Find the mean and the median. Which measure of center seems more appropriate for this dataset? Explain.

Answer: mean = 1.985, median = 1.85; The median seems more appropriate for this dataset, because this dataset is highly skewed to the right.

Explanation:

65) A sample of recent car buyers was asked to identify what they considered to be the most useful source of information about the cars they purchased. The results follow.

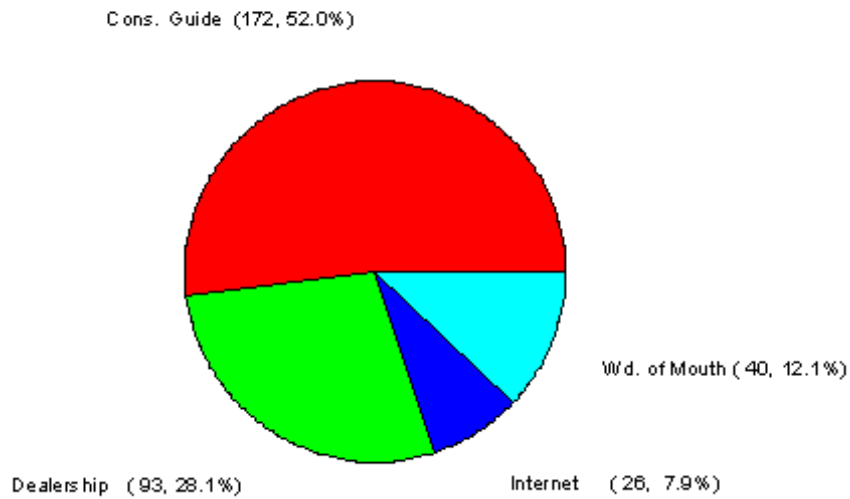
65) \_\_\_\_\_

Source	Count
Consumer guide	172
Dealership	93
Word of mouth	40
Internet	26

- a. Construct a pie chart for these data.
- b. In creating a bar graph of these data, would it be more useful to list the sources of consumer information in the same order in which they appear in the table above or in the form of a Pareto chart?

Answer: a.

### Consumer Information about Cars



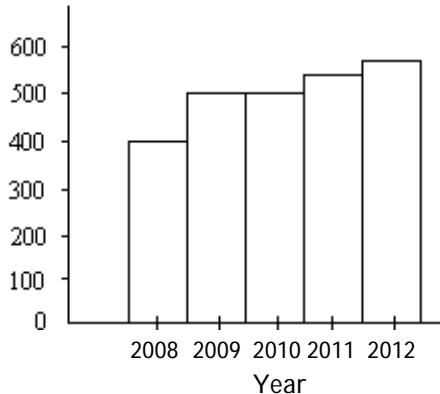
- b. Since it is of interest to know which categories were more useful to consumers, ordering the categories as in a Pareto chart would be more appropriate than listing them alphabetically.

Explanation:

66) The bar graph below shows the average cost of renting a studio in one city in each of the years 2008 through 2012.

66) \_\_\_\_\_

Average cost to rent studio (\$)



By what percentage does the average price increase from 2008 to 2009? 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 2008 to 2009? Why is the truncated graph misleading?

Answer: Possible answer: The average price increases by 25% from 2008 to 2009. Using the truncated graph, the price appears to double from 2008 to 2009 (i.e. it appears to increase by 100%). Using the truncated graph, the differences between the bars seem bigger (relatively) than they really are.

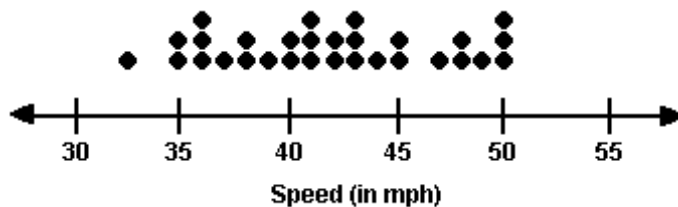
Explanation:

67) The Highway Patrol, using radar, clocked the speeds (in mph) of 30 passing motorists at a checkpoint. The results are listed below. Construct a dot plot for the data.

67) \_\_\_\_\_

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

Answer:



Explanation:

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

68) The heights (in inches) of 20 adult males are listed below. Find the range of the data.

68) \_\_\_\_\_

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

A) 7

B) 6.5

C) 5.5

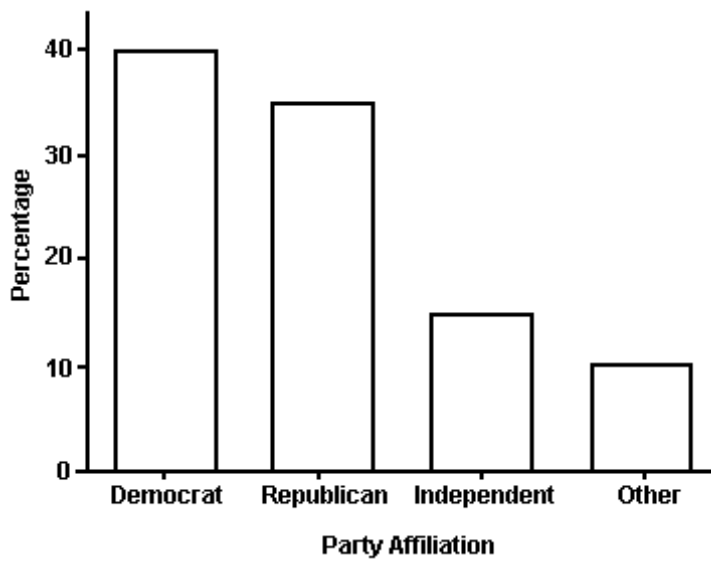
D) 6

E) 5

Answer: A

Explanation: A)  
B)  
C)  
D)  
E)

The bar graph below shows the political party affiliation of 1000 registered U.S. voters.



69) What percentage of the 1000 registered U.S. voters belongs to one of the two traditional parties (Democratic and Republican)?

69) \_\_\_\_\_

A) 40%

B) 75%

C) 35%

D) 25%

E) 50%

Answer: B

Explanation: A)  
B)  
C)  
D)  
E)

A survey was conducted to determine how people rated the quality of programming available on television. Respondents were asked to rate the overall quality from 0 (no quality at all) to 100 (extremely good quality). The stem-and-leaf display of the data is shown below.

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

70) Identify the minimum quality rating.

A) 2

B) 32

C) 26

D) 0

70) \_\_\_\_\_

Answer: B

Explanation: A)  
B)  
C)  
D)

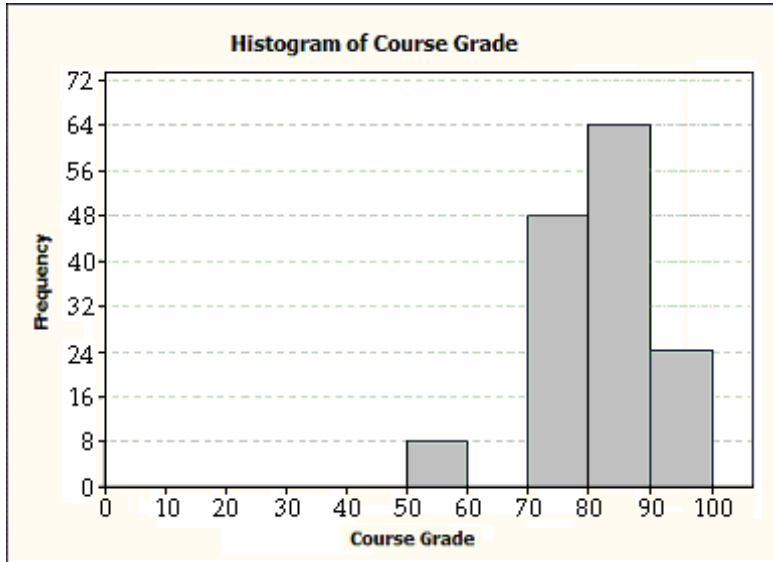
Provide an appropriate response.

71) The following is a partial histogram illustrating the final course grade distribution for an introductory level statistics class with 160 students. No student scored below 50. The grading scale is as follows.

71) \_\_\_\_\_

Course Grading Scale

90-99	A
80-89	B
70-79	C
60-69	D
50-59	F



The data for a grade of "D" is missing. What percentage of the students received a grade of "D?"

- A) 5%
- B) 16%
- C) cannot be determined from the information given
- D) 10%

Answer: D

Explanation: A)  
B)  
C)  
D)



A sporting goods retailer conducted a customer survey to determine its customers primary reason for shopping at their store. The results are shown in the graph below.



72) What percentage of the customers gave "prices" or "merchandise" as their answer?

72) \_\_\_\_\_

- A) 0.10                      B) 0.71                      C) 0.20                      D) 0.30                      E) 0.14

Answer: B

Explanation: A)  
B)  
C)  
D)  
E)

Provide an appropriate response.

73) According to the Empirical Rule, approximately 95% of the data values from a bell-shaped distribution fall within \_\_\_\_\_ standard deviations of the mean.

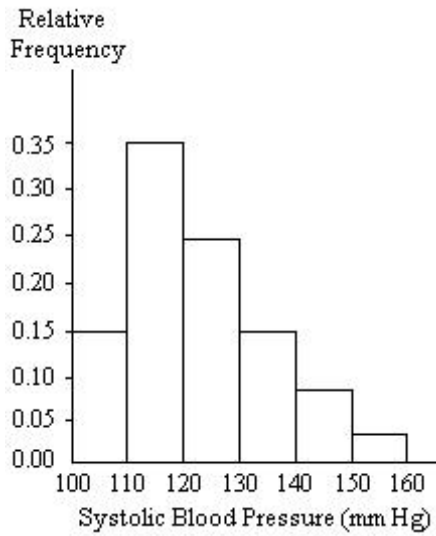
73) \_\_\_\_\_

- A) 1                      B) 0.5                      C) 3                      D) 2.5                      E) 2

Answer: E

Explanation: A)  
B)  
C)  
D)  
E)

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 25 to 40. Use the histogram to answer the question. The blood pressure readings were given to the nearest whole number.



- 74) Approximately what percentage of the people aged 25-40 had a systolic blood pressure reading of at least 110 but less than 120? 74) \_\_\_\_\_
- A) 35%                      B) 3.5%                      C) 30%                      D) 15%                      E) 0.35%

Answer: A

Explanation: A)  
B)  
C)  
D)  
E)

A sporting goods retailer conducted a customer survey to determine its customers primary reason for shopping at their store. The results are shown in the graph below.



75) What response represents the mode? 75) \_\_\_\_\_  
 A) Prices B) Other C) Merchandise D) Convenience

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

Identify potential outliers, if any, for the given data. 76) \_\_\_\_\_  
 76) The test scores of 15 students are listed below.

36 40 48 65 67  
 69 70 73 75 76  
 79 82 87 90 99

A) 36, 40 B) None C) 36 D) 36, 99 E) 90, 99  
 Answer: C  
 Explanation: A)  
                   B)  
                   C)  
                   D)  
                   E)

The following data show the number of laps run by each participant in a timed running race:

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

77) If the stems are 3, 4, 5 and 6, how many leaves are on the "4 stem"? 77) \_\_\_\_\_  
 A) 5 B) 0 C) 4 D) 1

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

The heights (in inches) of 30 adult males are listed below. A frequency distribution show the frequency and relative frequency using five classes.

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

<u>Height (in inches)</u>	<u>Frequency</u>	<u>Relative Frequency</u>
67.0-68.4	6	0.20
68.5-69.9	5	0.167
70.0-71.4	13	0.433
71.5-72.9	2	0.067
73.0-74.4	4	0.133

78) What percentage of the 30 adult males had heights between 73 and 74.4 inches?

78) \_\_\_\_\_

- A) 0.133
- B) 13.3
- C) 4
- D) 0.04
- E) none of these

Answer: B

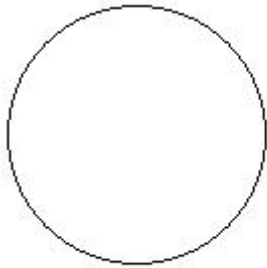
Explanation: A)  
B)  
C)  
D)  
E)

Construct a pie chart illustrating the given data set.

79) After reviewing a movie, 900 people rated the movie as excellent, good, or fair. The following data give the rating distribution.

79) \_\_\_\_\_

Excellent	Good	Fair
180	450	270



A)



B)



C)



D)



Answer: C

Explanation: A)  
B)  
C)  
D)

Answer true or false.

80) Dot plots and stem-and-leaf plots are often used to summarize small quantitative datasets.

80) \_\_\_\_\_

A) True

B) False

Answer: A

Explanation: A)  
B)

Provide an appropriate response.

- 81) SAT verbal scores are normally distributed with a mean of 433 and a standard deviation of 90. Use the Empirical Rule to determine what percent of the scores lie between 433 and 523. 81) \_\_\_\_\_
- A) 51%                      B) 34%                      C) 68%                      D) 49.9%                      E) 47.5%

Answer: B

Explanation: A)  
B)  
C)  
D)  
E)

Classify as categorical or qualitative data.

- 82) Your statistics teacher has gathered information on each of the students in your class in order to illustrate the difference between categorical and quantitative variables. For each student, she has recorded their major, gender, age and height. The variable "age" is an example of what type of variable? 82) \_\_\_\_\_
- A) Quantitative    B) Categorical

Answer: A

Explanation: A)  
B)

The heights (in inches) of 30 adult males are listed below. A frequency distribution show the frequency and relative frequency using five classes.

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

<u>Height (in inches)</u>	<u>Frequency</u>	<u>Relative Frequency</u>
67.0-68.4	6	0.20
68.5-69.9	5	0.167
70.0-71.4	13	0.433
71.5-72.9	2	0.067
73.0-74.4	4	0.133

- 83) Identify the variable. 83) \_\_\_\_\_
- A) Relative frequency  
B) Number of classes  
C) Frequency  
D) Height  
E) Number of adult males

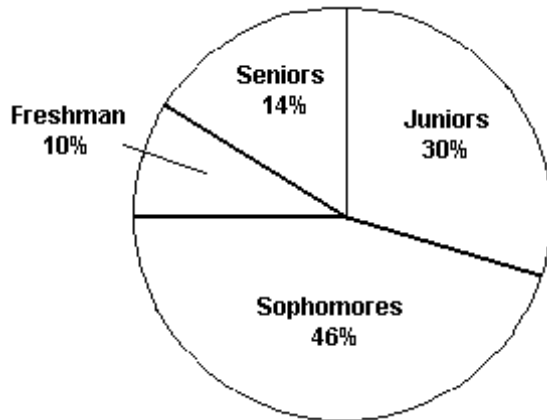
Answer: D

Explanation: A)  
B)  
C)  
D)  
E)

Provide an appropriate response.

84) The professor of economics at a small Texas University wanted to determine what year in school students were taking his tough economics course. Shown below is a pie chart of the results.

84) \_\_\_\_\_



What percentage of the class took the course prior to reaching their senior year?

- A) 14%      B) 54%      C) 86%      D) 30%      E) 44%

Answer: C

Explanation: A)  
B)  
C)  
D)  
E)

85) A competency test has scores with a mean of 69 and a standard deviation of 4. A histogram of the data shows that the distribution is normal. Use the Empirical Rule to find the percentage of scores between 61 and 77.

85) \_\_\_\_\_

- A) 68%      B) 77%      C) 99.7%      D) 50%      E) 95%

Answer: E

Explanation: A)  
B)  
C)  
D)  
E)

Classify the variable as either discrete or continuous.

86) Your statistics teacher has gathered information on each of the students in your class in order to illustrate the difference between discrete and continuous variables. For each student, she has recorded their height, number of credit hours completed and the time it took for them to complete their last exam. The variable "number of credit hours completed" is

86) \_\_\_\_\_

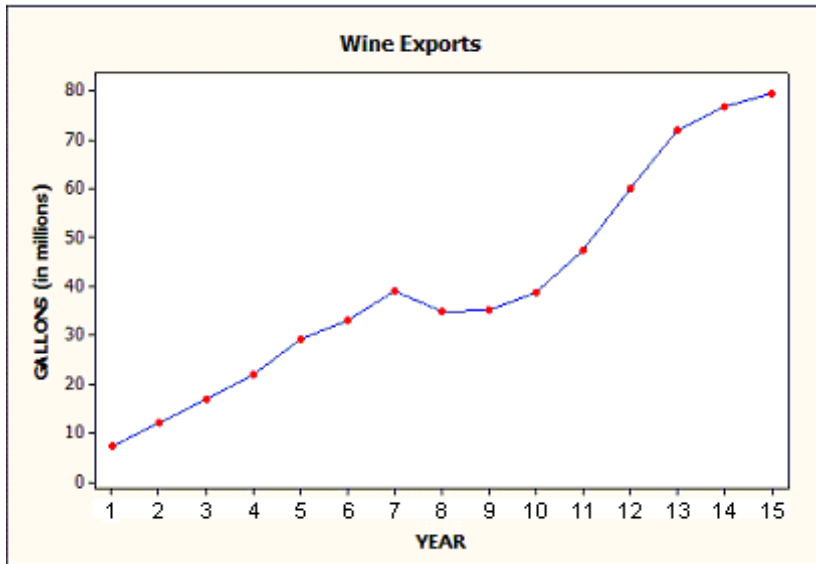
- A) Discrete      B) Continuous

Answer: A

Explanation: A)  
B)

Provide an appropriate response.

87) The following is a time plot of wine exports (in millions of gallons) in a certain country for the past 15 years. Is there a trend evident in the data? 87) \_\_\_\_\_



- A) yes, decreasing trend      B) no trend evident      C) yes, increasing trend

Answer: C

Explanation: A)  
B)  
C)

Answer true or false.

88) If a distribution is very highly skewed, the mean is usually preferred over the mean because it better represents what is typical. 88) \_\_\_\_\_

- A) True      B) False

Answer: B

Explanation: A)  
B)

Find the original data from the stem-and-leaf plot.

89) 

Stem	Leaves
8	5 8
9	1 8
10	5 5

 89) \_\_\_\_\_

- A) 81, 88, 81, 98, 105, 105  
B) 85, 88, 91, 91, 105, 105  
C) 85, 81, 88, 91, 101, 105  
D) 85, 88, 91, 98, 105, 105  
E) 81, 85, 81, 98, 108, 105

Answer: D

Explanation: A)  
B)  
C)  
D)  
E)



Provide an appropriate response.

- 90) The weight at birth of males has a mean value of 3.53 kg with a standard deviation of 0.58. What birth weight has a z-score of 0.81? 90) \_\_\_\_\_
- A) -3.06 kg                      B) -4 kg                      C) 2.52 kg                      D) 4 kg

Answer: D

Explanation: A)  
B)  
C)  
D)

Find the median for the given sample data.

- 91) A store manager kept track of the number of newspapers sold each week over a seven-week period. The results are shown below. 91) \_\_\_\_\_
- 95, 38, 221, 122, 258, 237, 233

Find the median number of newspapers sold.

- A) 172 newspapers  
B) 233 newspapers  
C) 122 newspapers  
D) 258 newspapers  
E) 221 newspapers

Answer: E

Explanation: A)  
B)  
C)  
D)  
E)

Answer true or false.

- 92) A numerical summary of the observations is called resistant if extreme observations have little, if any, influence on its value. 92) \_\_\_\_\_
- A) True                                      B) False

Answer: A

Explanation: A)  
B)

Classify as categorical or qualitative data.

- 93) Your statistics teacher has gathered information on each of the students in your class in order to illustrate the difference between categorical and quantitative variables. For each student, she has recorded their major, gender, age and height. The variable "major" is an example of what type of variable? 93) \_\_\_\_\_
- A) Quantitative                                      B) Categorical

Answer: B

Explanation: A)  
B)

The following data show the number of laps run by each participant in a timed running race:

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

94) What is the mode for number of laps run?

A) 30

B) 65

C) 3

D) 43

94) \_\_\_\_\_

Answer: D

Explanation: A)  
B)  
C)  
D)

Provide an appropriate response.

95) The age at inauguration for 15 presidents of various organizations are below. Find the median age.

95) \_\_\_\_\_

Smith	54
Williams	46
Blake	64
Carroll	69
Carter	52
Johnson	61
Jones	56
Brown	55
Davis	43
Miller	62
Wilson	60
Taylor	51
Anderson	54
Thomas	51
White	55

A) 54.5 years

B) 56 years

C) 55.5 years

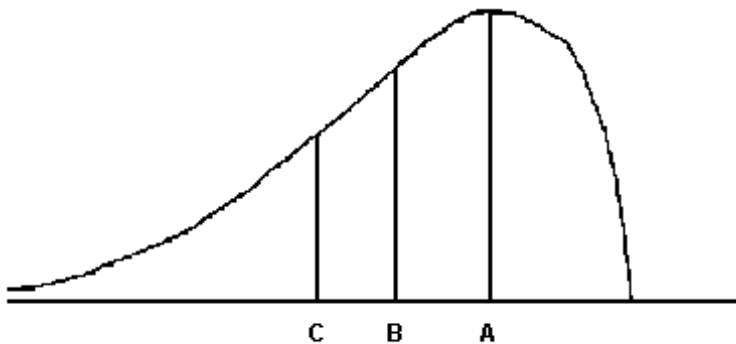
D) 55 years

Answer: D

Explanation: A)  
B)  
C)  
D)

96) For the distribution shown below, identify the mean, median, and mode

96) \_\_\_\_\_



- A) A = mode, B = median, C = mean
- B) A = median, B = mean, C = mode
- C) A = median, B = mode, C = mean
- D) A = mean, B = mode, C = median
- E) A = mode, B = mean, C = median

Answer: A

- Explanation:
- A)
  - B)
  - C)
  - D)
  - E)

The heights (in inches) of 30 adult males are listed below. A frequency distribution show the frequency and relative frequency using five classes.

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

<u>Height (in inches)</u>	<u>Frequency</u>	<u>Relative Frequency</u>
67.0-68.4	6	0.20
68.5-69.9	5	0.167
70.0-71.4	13	0.433
71.5-72.9	2	0.067
73.0-74.4	4	0.133

97) Which category of heights represents the mode?

97) \_\_\_\_\_

- A) 73.0-74.4
- B) 70.0-71.4
- C) 71.5-72.9
- D) 68.5-69.9
- E) 67.0-68.4

Answer: B

- Explanation:
- A)
  - B)
  - C)
  - D)
  - E)

Answer true or false.

98) The median is always the midpoint of Q1 and Q3.

98) \_\_\_\_\_

A) True

B) False

Answer: B

Explanation: A)

B)

Find the five-number summary for the given data.

99) The normal annual precipitation (in inches) is given below for 21 different U.S. cities.

99) \_\_\_\_\_

39.1 32.9 18.5 35.6 27.1 27.8 8.6  
23.5 42.6 34.7 20.2 12.0 5.1 13.9  
22.6 10.9 16.4 25.4 17.2 14.7 51.7

A) 5.1, 14.1, 22.6, 31.625, 51.7 inches

B) 5.1, 14.1, 21.3, 31.625, 51.7 inches

C) 5.1, 14.7, 21.3, 33.8, 51.7 inches

D) 5.1, 14.7, 22.6, 35.6, 51.7 inches

E) 5.1, 14.3, 22.6, 33.8, 51.7 inches

Answer: E

Explanation: A)

B)

C)

D)

E)

Determine the quartile, percentile or interquartile range as specified.

100) The test scores of 15 students are listed below. Find the first quartile,  $Q_1$ .

100) \_\_\_\_\_

44 46 51 57 60  
63 65 70 75 76  
85 87 90 94 95

A) 53.4

B) 54.0

C) 57.0

D) 58.5

E) 55.5

Answer: C

Explanation: A)

B)

C)

D)

E)

Provide an appropriate response.

101) The normal monthly precipitation (in inches) for September is listed for 20 different U.S. cities. Find the mean of the data. 101) \_\_\_\_\_

3.5 1.6 2.4 3.7 4.1  
3.9 1.0 3.6 4.2 3.4  
3.7 2.2 1.5 4.2 3.4  
2.7 0.4 3.7 2.0 3.6

- A) 2.70 in.      B) 2.80 in.      C) 3.27 in.      D) 2.94 in.      E) 3.09 in.

Answer: D

Explanation: A)  
B)  
C)  
D)  
E)

Classify the variable as either discrete or continuous.

102) Your statistics teacher has gathered information on each of the students in your class in order to illustrate the difference between discrete and continuous variables. For each student, she has recorded their height, number of credit hours completed and the time it took for them to complete their last exam. The variable "height" is 102) \_\_\_\_\_

- A) Discrete      B) Continuous

Answer: B

Explanation: A)  
B)

Answer true or false.

103) The frequency for a particular category is the proportion of observations that fall in the category. 103) \_\_\_\_\_

- A) True      B) False

Answer: B

Explanation: A)  
B)

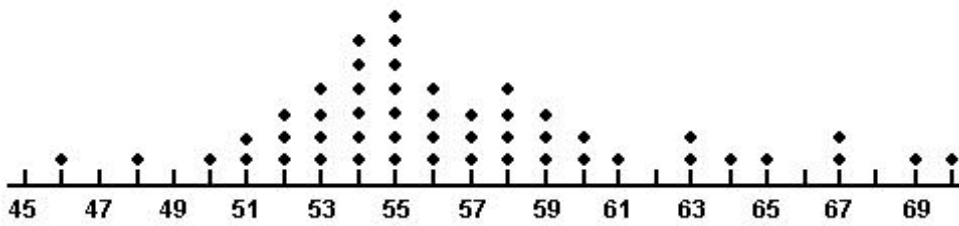
104) The sum of the deviations, the differences between the observations and the sample mean  $\sum(x - \bar{x})$ , is always equal to zero. 104) \_\_\_\_\_

- A) True      B) False

Answer: A

Explanation: A)  
B)

A sample of fifty motorists was taken on a Federal highway where the speed limit was 60 miles per hour. A dot plot of their speeds is shown below.



105) Would a pie chart be appropriate for displaying this data? 105) \_\_\_\_\_  
 A) Yes B) No

Answer: B  
 Explanation: A)  
 B)

Provide an appropriate response.

106) Use the following summary information for a data set of 100 observations to determine whether the data set is likely to be bell-shaped, skewed to the right or skewed to the left. 106) \_\_\_\_\_  
 Mean = 120,  $s=22$ , Minimum=37, Maximum=136

- A) bell-shaped
- B) unable to determine from the information given
- C) skewed to the right
- D) skewed to the left

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

Classify the variable as either discrete or continuous.

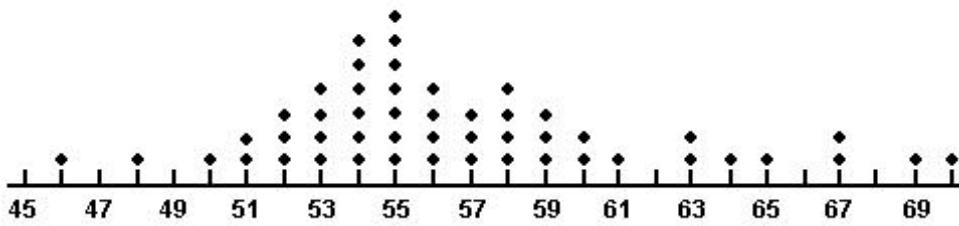
107) The following table shows the heights of the five tallest mountains in North America. 107) \_\_\_\_\_

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

The heights given in the second column represent what type of data?  
 A) Discrete B) Continuous

Answer: B  
 Explanation: A)  
 B)

A sample of fifty motorists was taken on a Federal highway where the speed limit was 60 miles per hour. A dot plot of their speeds is shown below.



108) What is the variable of interest? 108) \_\_\_\_\_

- A) number of speeding motorists
- B) motorist's speed
- C) whether or not a motorist was speeding
- D) number of motorists on the Federal highway

Answer: B

- Explanation:
- A)
  - B)
  - C)
  - D)

Provide an appropriate response.

109) The distribution of salaries of professional basketball players is skewed to the right. Which measure of central tendency would be the best measure to determine the location of the center of the distribution? 109) \_\_\_\_\_

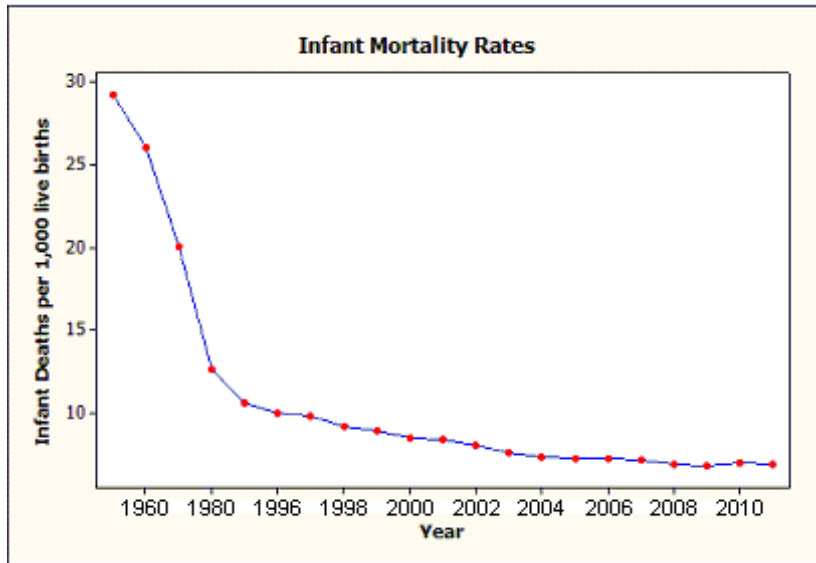
- A) Standard Deviation
- B) Mode
- C) Range
- D) Mean
- E) Median

Answer: E

- Explanation:
- A)
  - B)
  - C)
  - D)
  - E)

110) The following is a time plot of infant mortality rates in a certain country from the years 1960 to 2011. Is there an obvious trend in the data?

110) \_\_\_\_\_



- A) yes, increasing trend      B) no trend evident      C) yes, decreasing trend

Answer: C

Explanation: A)  
B)  
C)

Answer true or false.

111) Bar graphs and pie charts are graphical methods that are often used in summarizing quantitative data.

111) \_\_\_\_\_

- A) False      B) True

Answer: A

Explanation: A)  
B)

Find the five-number summary for the given data.

112) The salaries (in millions of dollars) of the top 10 highest paid CEOs in the U.S.

112) \_\_\_\_\_

249.42 230.55 139.96 135.53 122.67 80.73 75.33 71.84 69.66 68.95

- A) 68.95, 71.84, 122.67, 139.96, 230.55  
B) 0, 71.84, 122.67, 139.96, 230.55  
C) 68.95, 71.84, 101.7, 139.96, 230.55  
D) -0.48, 71.84, 101.7, 139.96, 203.88  
E) 68.95, 71.84, 101.7, 139.96, 249.42

Answer: C

Explanation: A)  
B)  
C)  
D)  
E)



Provide an appropriate response.

- 113) Use the following summary information for a data set of 100 observations to determine whether the data set is likely to be bell-shaped, skewed to the right or skewed to the left. 113) \_\_\_\_\_

Mean = 120,  $s=22$ , Minimum=103, Maximum=170

- A) skewed to the left
- B) unable to determine from the information given
- C) skewed to the right
- D) bell-shaped

Answer: C

Explanation: A)  
B)  
C)  
D)

- 114) Brandon kept track of the number of hours he spent exercising each week for four months. The results are shown below. Find the mean number of hours Brandon spent exercising per week. Round your answer to two decimal places. 114) \_\_\_\_\_

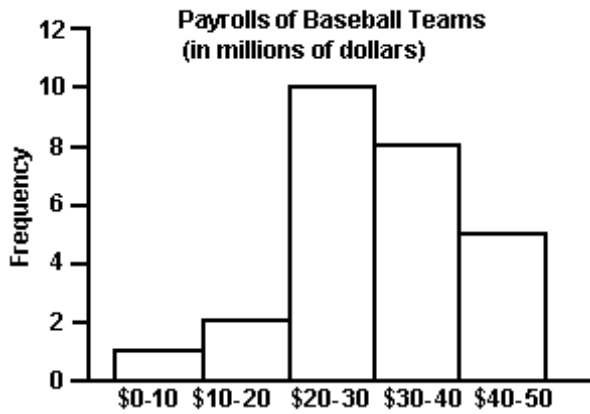
7.50 8.20 7.10 7.90 8.00 7.50  
7.80 7.10 7.30 7.50 7.90 8.90  
7.10 8.20 8.20 8.20 8.00 7.80

- A) 8.01
- B) 7.38
- C) 8.25
- D) 7.30
- E) 7.79

Answer: E

Explanation: A)  
B)  
C)  
D)  
E)

The payroll amounts for several major-league baseball teams are shown below. Answer the following question concerning this graph.



115) What percentage of the payrolls exceed \$30 million? (Assume that no payroll is exactly \$30 million.)

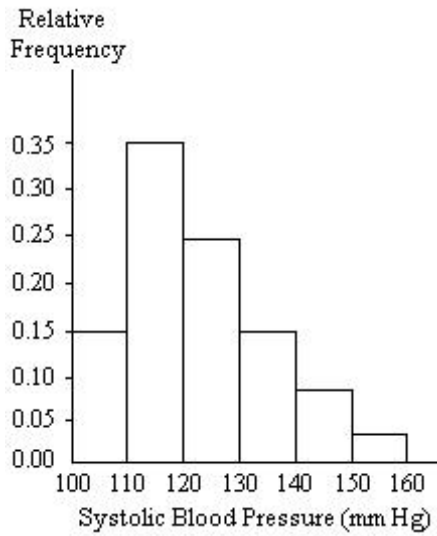
115) \_\_\_\_\_

- A) 46%                      B) 19%                      C) 50%                      D) 12                      E) 13

Answer: C

Explanation: A)  
B)  
C)  
D)  
E)

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 25 to 40. Use the histogram to answer the question. The blood pressure readings were given to the nearest whole number.



116) Given that 200 people were aged between 25 and 40, approximately how many had a systolic blood pressure reading less than 130? 116) \_\_\_\_\_

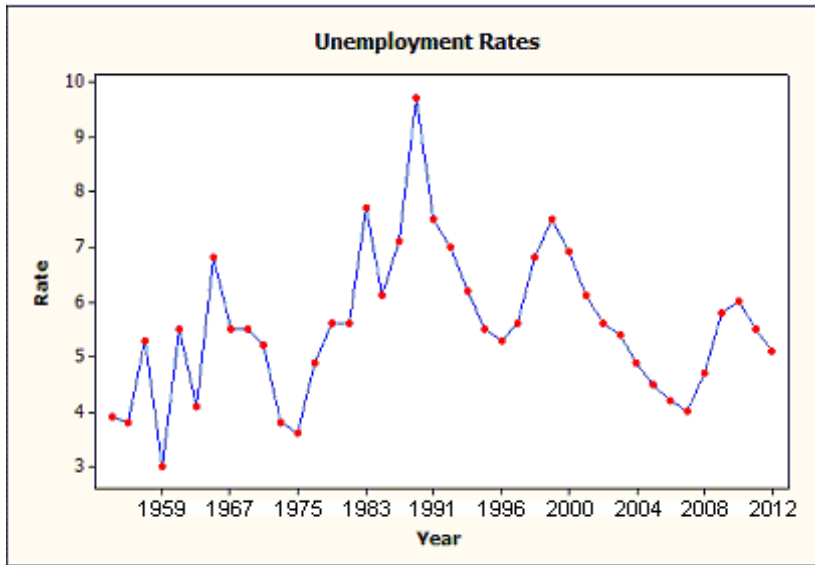
- A) 150                      B) 25                      C) 100                      D) 50                      E) 75

Answer: A

Explanation: A)  
B)  
C)  
D)  
E)

Provide an appropriate response.

117) The following plot illustrates a time series of unemployment rates in a certain country between the years 1953 and 2012. Is a trend evident in the data set? 117) \_\_\_\_\_



- A) yes, increasing trend                      B) no trend evident                      C) yes, decreasing trend

Answer: B

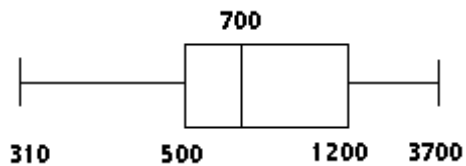
Explanation: A)  
B)  
C)

Construct a boxplot as specified.

118) The weekly salaries (in dollars) of 24 randomly selected employees of a company are shown below. 118) \_\_\_\_\_  
Construct a boxplot for the data set. What is the shape of the distribution?

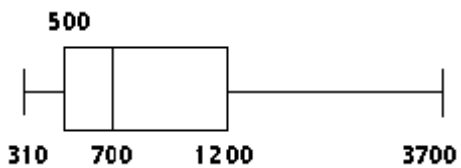
310 320 450 460 470 500 520 540  
580 600 650 700 710 840 870 900  
1000 1200 1250 1300 1400 1720 2500 3700

A)



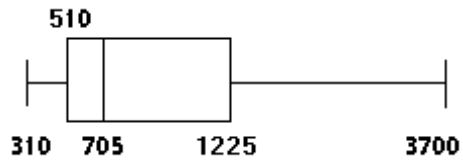
Bell-shaped

B)



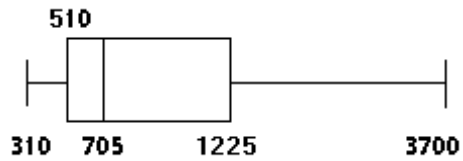
Skewed-right

C)



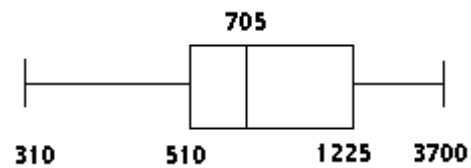
Skewed-left

D)



Skewed-right

E)



Skewed-left

Answer: D

Explanation: A)  
B)  
C)  
D)  
E)

Provide an appropriate response.

119) Last year, batting averages in the National League averaged 0.257 with a high of 0.323 and a low of 0.250 (minimum 250 at bats). Based on this information, which measure of variation could be calculated? 119) \_\_\_\_\_

- A) none of the above
- B) range
- C) standard deviation
- D) variance
- E) mode

Answer: B

Explanation: A)  
B)  
C)  
D)  
E)

Determine the quartile, percentile or interquartile range as specified.

120) The test scores of 19 students are listed below. Find the interquartile range.

120) \_\_\_\_\_

91 46 86 70 61  
63 97 56 90 77  
82 83 52 88 74  
43 92 94 67

- A) 27                      B) 28.5                      C) 25.5                      D) 29.5                      E) 29

Answer: E

Explanation: A)  
B)  
C)  
D)  
E)

Classify the variable as either discrete or continuous.

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

121) \_\_\_\_\_

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

The ranks given in the third column represent what type of data?

- A) Continuous                      B) Discrete

Answer: B

Explanation: A)  
B)

Classify as categorical or qualitative data.

122) A survey of automobiles parked in the student and staff lots at a large college recorded the make and model of the automobiles. The variable "make" is:

122) \_\_\_\_\_

- A) Categorical                      B) Quantitative

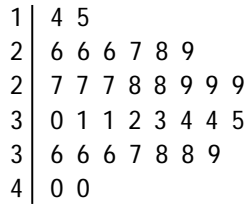
Answer: A

Explanation: A)  
B)

Provide an appropriate response.

123) For the stem-and-leaf plot below, find the range of the data set.

123) \_\_\_\_\_



- A) 26                      B) 40                      C) 36                      D) 34                      E) 14

Answer: A

Explanation: A)  
B)  
C)  
D)  
E)

124) The cost for one semester's books (in dollars) are given below for a sample of five college students. Calculate the sample standard deviation,  $s$ , of the book costs. Round to the nearest hundredth when necessary.

124) \_\_\_\_\_

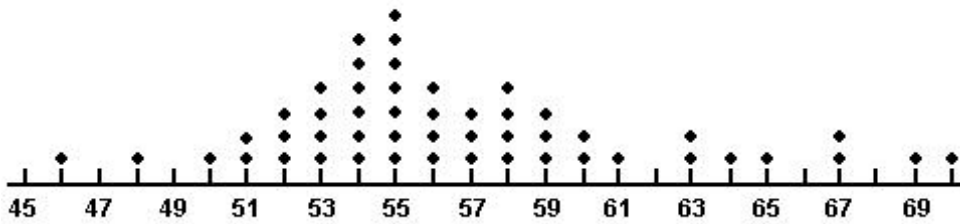
340, 170, 145, 420, 120

- A) 118.93                      B) 132.97                      C) 17,680                      D) 300

Answer: B

Explanation: A)  
B)  
C)  
D)

A sample of fifty motorists was taken on a Federal highway where the speed limit was 60 miles per hour. A dot plot of their speeds is shown below.



125) What proportion of the motorists were speeding?

125) \_\_\_\_\_

- A) 0.22                      B) 2                      C) 0.04                      D) 0.72                      E) 0.18

Answer: E

Explanation: A)  
B)  
C)  
D)  
E)

Determine the quartile, percentile or interquartile range as specified.

126) The cholesterol levels (in milligrams per deciliter) of 30 adults are listed below. Find the interquartile range for the cholesterol level of the 30 adults.

126) \_\_\_\_\_

154 156 165 165 170 171 172 180 184 185  
189 189 190 192 195 198 198 200 200 200  
205 205 211 215 220 220 225 238 255 265

A) 30

B) 31

C) 211

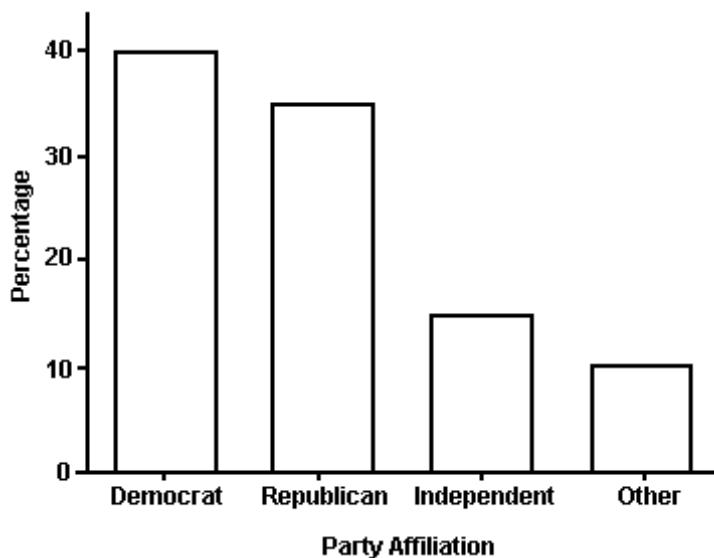
D) 111

E) 180

Answer: B

Explanation: A)  
B)  
C)  
D)  
E)

The bar graph below shows the political party affiliation of 1000 registered U.S. voters.



127) Which response represents the mode?

127) \_\_\_\_\_

- A) Independent
- B) Democrat
- C) 40%
- D) 10%
- E) Republican

Answer: B

Explanation: A)  
B)  
C)  
D)  
E)



A survey was conducted to determine how people rated the quality of programming available on television. Respondents were asked to rate the overall quality from 0 (no quality at all) to 100 (extremely good quality). The stem-and-leaf display of the data is shown below.

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

- 128) What percentage of the respondents rated overall television quality as very good (regarded as ratings of 80 and above)? 128) \_\_\_\_\_
- A) 4%                      B) 3%                      C) 12%                      D) 1%                      E) 32%

Answer: A

Explanation: A)  
B)  
C)  
D)  
E)

Provide an appropriate response.

- 129) The heights (in inches) of 10 adult males are listed below. Find the standard deviation,  $s$ . Round to the nearest hundredth. 129) \_\_\_\_\_

70 72 71 70 69 73 69 68 70 71

- A) 2.23                      B) 2.01                      C) 20.10                      D) 1.42                      E) 1.49

Answer: E

Explanation: A)  
B)  
C)  
D)  
E)

Find the median for the given sample data.

130) Health care issues are receiving much attention in both academic and political arenas. A sociologist recently conducted a survey of senior citizens whose net worth is too high to qualify for Medicaid but who have no private health insurance. The ages of 25 uninsured senior citizens were as follows: 130) \_\_\_\_\_

67 72 65 75 85 73  
60 88 64 89 68 91  
75 61 80 62 67 80  
69 72 59 86 74 63 81

Find the median of the observations.

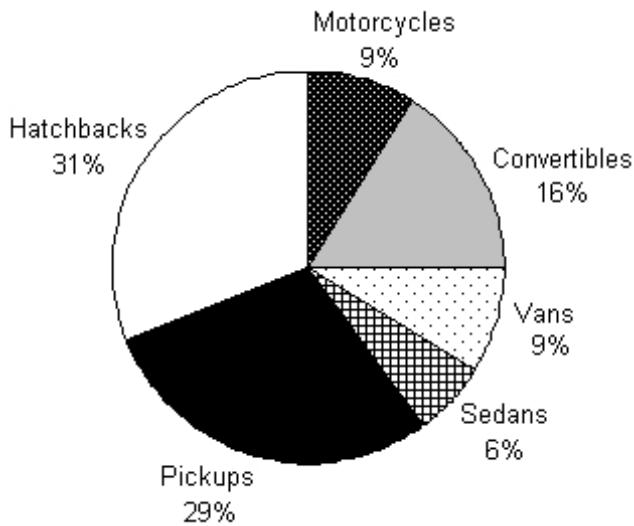
- A) 68                      B) 73                      C) 72                      D) 69                      E) 72.5

Answer: C

Explanation: A)  
B)  
C)  
D)  
E)

Provide an appropriate response.

131) Results from a survey of 7116 vehicle types on the campus of State College are summarized in the following pie chart. 131) \_\_\_\_\_



How many of the vehicles were sedans? Give your answer to the nearest whole number.

- A) 4270                      B) 600                      C) 60                      D) 6                      E) 427

Answer: E

Explanation: A)  
B)  
C)  
D)  
E)

132) The age at inauguration for 15 presidents of various organizations are below. Find the mean age. 132) \_\_\_\_\_

Smith	54
Williams	46
Blake	64
Carroll	69
Carter	52
Johnson	61
Jones	56
Brown	55
Davis	43
Miller	62
Wilson	60
Taylor	51
Anderson	54
Thomas	51
White	55

- A) 55.5 years                      B) 46.5 years                      C) 54 years                      D) 55 years

Answer: A

Explanation: A)  
 B)  
 C)  
 D)

The heights (in inches) of 30 adult males are listed below. A frequency distribution show the frequency and relative frequency using five classes.

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

<u>Height (in inches)</u>	<u>Frequency</u>	<u>Relative Frequency</u>
67.0-68.4	6	0.20
68.5-69.9	5	0.167
70.0-71.4	13	0.433
71.5-72.9	2	0.067
73.0-74.4	4	0.133

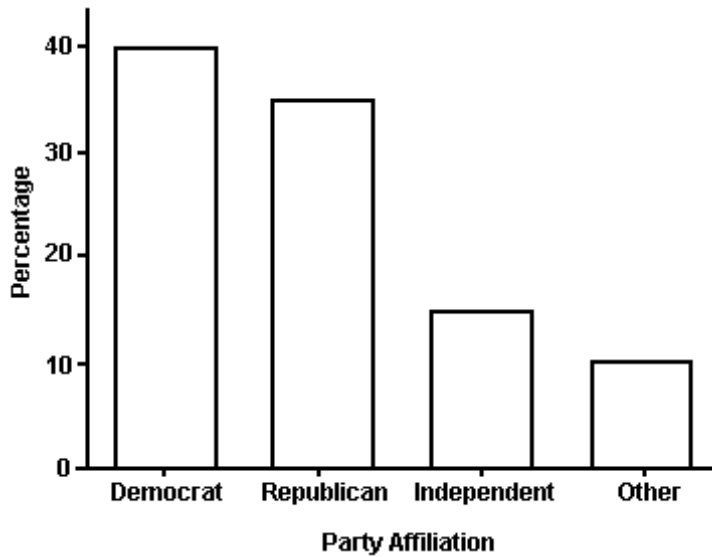
133) Is the variable "height" continuous or discrete? 133) \_\_\_\_\_

- A) Continuous                      B) Discrete

Answer: A

Explanation: A)  
 B)

The bar graph below shows the political party affiliation of 1000 registered U.S. voters.



134) About how many of the registered U.S. voters stated "Independent" as their political party affiliation? \_\_\_\_\_

- A) 15%
- B) 150
- C) cannot be determined from the information given
- D) 15

Answer: B

Explanation: A)  
B)  
C)  
D)

Identify potential outliers, if any, for the given data.

135) The normal annual precipitation (in inches) is given below for 21 different U.S. cities. \_\_\_\_\_

32.4	29.4	34.6	65.3	22.1	31.8	16.6
28.2	36.2	59.4	24.3	47.2	45.6	9.2
27.1	18.9	13.6	31.4	24.2	12.3	35.4

- A) 9.2, 12.3
- B) 59.4, 65.3
- C) 65.3
- D) None
- E) 9.2, 59.4, 65.3

Answer: B

Explanation: A)  
B)  
C)  
D)  
E)

Provide an appropriate response.

- 136) The weight at birth of males has a mean value of 3.53 kg with a standard deviation of 0.58. For a male child weighing 2.75 kg at birth, what is the corresponding z-score? 136) \_\_\_\_\_
- A) -1.34                      B) -0.78                      C) 0.78                      D) 1.34

Answer: A

Explanation: A)  
B)  
C)  
D)

Classify the variable as either discrete or continuous.

- 137) The time it takes an athlete to run 100 meters. 137) \_\_\_\_\_
- A) Discrete                      B) Continuous

Answer: B

Explanation: A)  
B)

A sporting goods retailer conducted a customer survey to determine its customers primary reason for shopping at their store. The results are shown in the graph below.



- 138) Is the variable "reason for shopping at our store" categorical or quantitative? 138) \_\_\_\_\_
- A) Quantitative                      B) Categorical

Answer: B

Explanation: A)  
B)

Provide an appropriate response.

- 139) The age at inauguration for 15 presidents of various organizations are below. Find the range of the ages. 139) \_\_\_\_\_

Smith	54
Williams	46
Blake	64
Carroll	69
Carter	52
Johnson	61
Jones	56
Brown	55
Davis	43
Miller	62
Wilson	60
Taylor	51
Anderson	54
Thomas	51
White	55

- A) 10 years      B) 26 years      C) 18 years      D) 55.5 years      E) 55 years

Answer: B

Explanation: A)  
B)  
C)  
D)  
E)

- 140) Last year, U.S. consumers redeemed 6.12 billion manufacturers' coupons and saved themselves \$2.86 billion. Calculate and interpret the mean savings of U.S. consumers per coupon. 140) \_\_\_\_\_

- A) Half of all U.S. consumers who used coupons saved more than 214.0 cents per coupon.  
B) The average savings of all U.S. consumers was \$47 per coupon.  
C) Half of all U.S. consumers who used coupons saved more than \$0.47 per coupon.  
D) The average savings of all U.S. consumers was \$0.47 per coupon.  
E) The average savings of all U.S. consumers was 214.0 cents per coupon.

Answer: D

Explanation: A)  
B)  
C)  
D)  
E)

Answer true or false.

- 141) In skewed distributions, we expect the values of the mean, median, and mode to be approximately equal, since they are all measures of center. 141) \_\_\_\_\_

- A) False      B) True

Answer: A

Explanation: A)  
B)

Provide an appropriate response.

- 142) A safety engineer wishes to use the following data to show the number of deaths in a year from the collision of passenger cars with trucks on a particular highway. 142) \_\_\_\_\_

Year	Number of Deaths
1	12
2	17
3	22
4	21
5	16
6	13
7	11
8	12

What is the mode of the number of deaths?

- A) 16                      B) 15.5                      C) 22                      D) 12                      E) 13

Answer: D

Explanation: A)  
B)  
C)  
D)  
E)

Classify the variable as either discrete or continuous.

- 143) The number of calls received between 8 a.m. and 5 p.m. by a technical support professional. 143) \_\_\_\_\_  
A) Continuous                      B) Discrete

Answer: B

Explanation: A)  
B)

Provide an appropriate response.

- 144) Test scores for a history class had a mean of 79 with a standard deviation of 4.5. Test scores for a physics class had a mean of 69 with a standard deviation of 3.7. Suppose a student gets a 68 on the history test and a 87 on the physics test. Calculate the z-score for each test. On which test did the student perform better? 144) \_\_\_\_\_

- A) history; 4.86  
B) physics; -2.44  
C) history; 2.44  
D) physics; 4.86  
E) history; -2.44

Answer: D

Explanation: A)  
B)  
C)  
D)  
E)

- 145) The proportion of adults aged 15-49 who are living with HIV/AIDS is 0.5% in Latin America, 1.0% in the Caribbean, 0.9% in Eastern Europe and Central Asia and 0.6% in North America. Suppose we include the proportion for Sub-Saharan Africa (5.0%) to this data set and calculate the standard deviation. Would you expect it to be significantly larger, smaller or remain about the same as the standard deviation of the proportions WITHOUT the observation from Sub-Saharan Africa? 145) \_\_\_\_\_
- A) significantly smaller
  - B) remain about the same
  - C) unable to determine from the information given
  - D) significantly larger

Answer: D

Explanation: A)  
B)  
C)  
D)

A survey was conducted to determine how people rated the quality of programming available on television. Respondents were asked to rate the overall quality from 0 (no quality at all) to 100 (extremely good quality). The stem-and-leaf display of the data is shown below.

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

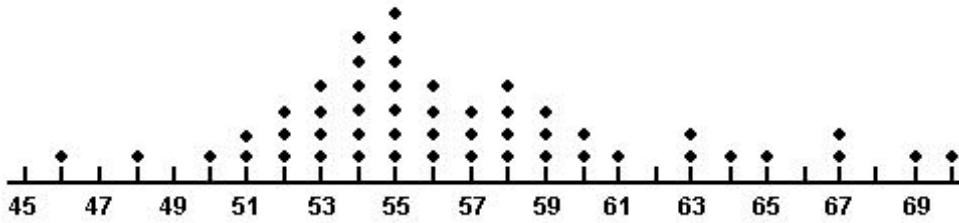
- 146) What is the mode rating? 146) \_\_\_\_\_
- A) 9
  - B) 49
  - C) 93
  - D) 51

Answer: B

Explanation: A)  
B)  
C)  
D)



A sample of fifty motorists was taken on a Federal highway where the speed limit was 60 miles per hour. A dot plot of their speeds is shown below.



147) What is the mode for speed?

147) \_\_\_\_\_

- A) 70
- B) 55
- C) 7
- D) none of these
- E) 60

Answer: B

Explanation: A)  
B)  
C)  
D)  
E)

Answer true or false.

148) A frequency table is a listing of possible values for a variable, together with their frequencies and/or relative frequencies.

148) \_\_\_\_\_

- A) False
- B) True

Answer: B

Explanation: A)  
B)

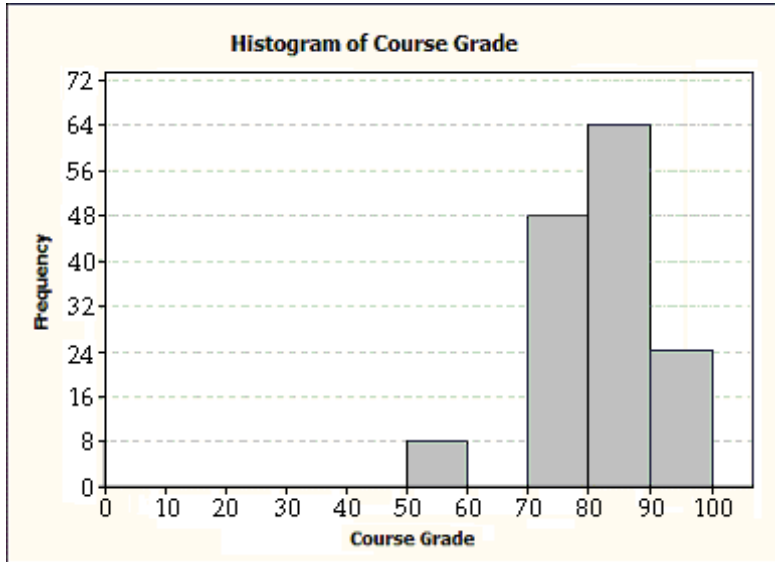
Provide an appropriate response.

149) The following is a partial histogram illustrating the final course grade distribution for an introductory level statistics class with 160 students. No student scored below 50. The grading scale is as follows.

149) \_\_\_\_\_

Course Grading Scale

90-99	A
80-89	B
70-79	C
60-69	D
50-59	F



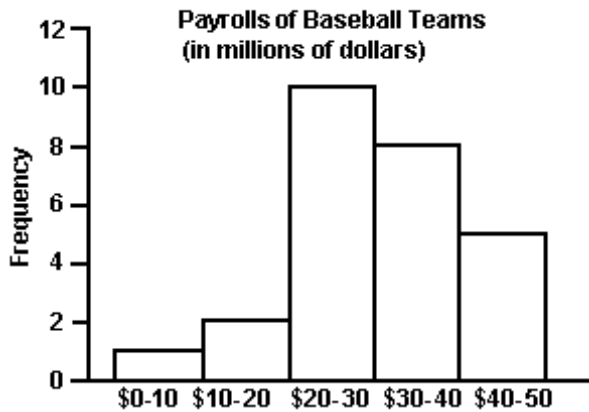
The data for a grade of "D" is missing. What is the correct frequency for the grade of "D?"

- A) 0
- B) 10
- C) 16
- D) cannot be determined from the information given

Answer: C

Explanation: A)  
B)  
C)  
D)

The payroll amounts for several major-league baseball teams are shown below. Answer the following question concerning this graph.



150) How many of the major-league payrolls exceed \$20 million? (Assume that no payroll is exactly \$20 million.) 150) \_\_\_\_\_

- A) 24 payrolls
- B) 3 payrolls
- C) 10 payrolls
- D) 14 payrolls
- E) 23 payrolls

Answer: E

Explanation: A)  
B)  
C)  
D)  
E)

Classify as categorical or qualitative data.

151) The amount of time spent watching television or playing video games is considered a significant factor on predicting childhood obesity. 290 parents of school-aged children were asked to estimate the number of hours per week that their child spent watching television or playing video games. This is an example of what type of variable? 151) \_\_\_\_\_

- A) Quantitative
- B) Categorical

Answer: A

Explanation: A)  
B)

The heights (in inches) of 30 adult males are listed below. A frequency distribution show the frequency and relative frequency using five classes.

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

<u>Height (in inches)</u>	<u>Frequency</u>	<u>Relative Frequency</u>
67.0-68.4	6	0.20
68.5-69.9	5	0.167
70.0-71.4	13	0.433
71.5-72.9	2	0.067
73.0-74.4	4	0.133

152) A height of 69 inches belongs to the class having what frequency? 152) \_\_\_\_\_  
 A) 0.20                      B) 11                      C) 6                      D) 0.167                      E) 5

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

A survey was conducted to determine how people rated the quality of programming available on television. Respondents were asked to rate the overall quality from 0 (no quality at all) to 100 (extremely good quality). The stem-and-leaf display of the data is shown below.

<u>Stem</u>	<u>Leaves</u>
3	2 6
4	0 3 4 7 8 9 9 9
5	0 1 1 2 3 4 5
6	1 2 5 6 6
7	1 7
8	
9	3

153) The variable "quality" is 153) \_\_\_\_\_  
 A) Categorical                      B) Quantitative

Answer: B  
 Explanation: A)  
                   B)

The heights (in inches) of 30 adult males are listed below. A frequency distribution show the frequency and relative frequency using five classes.

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

<u>Height (in inches)</u>	<u>Frequency</u>	<u>Relative Frequency</u>
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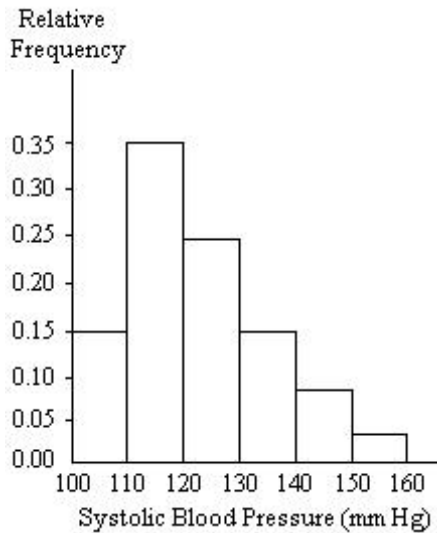
154) What proportion of the 30 adult males had heights less than 70 inches?  
A) 0.167                      B) 36.7                      C) 16.7%                      D) 0.433

E) 0.367                      154) \_\_\_\_\_

Answer: E

Explanation: A)  
B)  
C)  
D)  
E)

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 25 to 40. Use the histogram to answer the question. The blood pressure readings were given to the nearest whole number.



155) Approximately what percentage of the people aged 25-40 had a systolic blood pressure reading less than 120? 155) \_\_\_\_\_

- A) 15%                      B) 50%                      C) 5%                      D) 35%                      E) 3.5%

Answer: B

Explanation: A)  
B)  
C)  
D)  
E)

A survey was conducted to determine how people rated the quality of programming available on television. Respondents were asked to rate the overall quality from 0 (no quality at all) to 100 (extremely good quality). The stem-and-leaf display of the data is shown below.

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

156) Identify the maximum quality rating. 156) \_\_\_\_\_

- A) 49                      B) 93                      C) 100                      D) 3

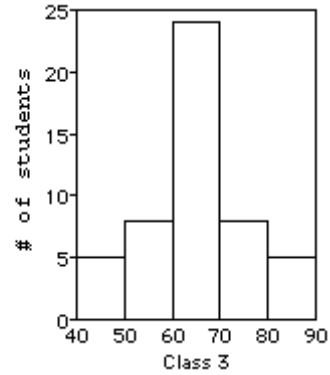
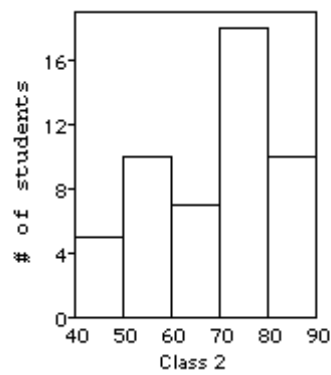
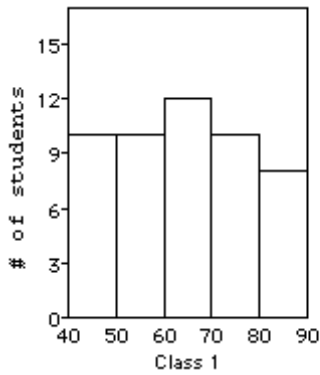
Answer: B

Explanation: A)  
B)  
C)  
D)

Provide an appropriate response.

157) Three statistics classes (each of 50 students) took the same test. Shown below are histograms of the scores for the classes. Which class had the smallest standard deviation? Which class had the largest standard deviation?

157) \_\_\_\_\_



A) 1, 3

B) 3, 2

C) 2, 1

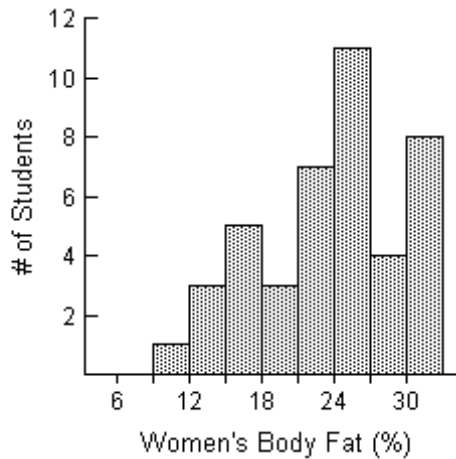
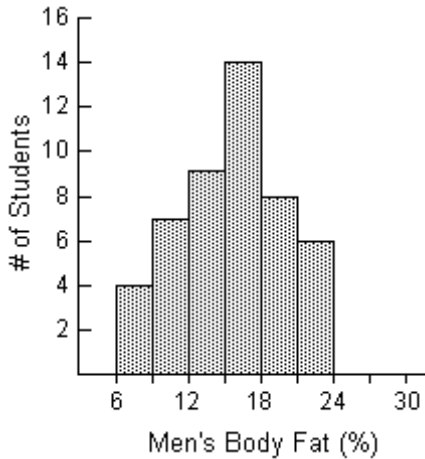
D) 3, 1

Answer: D

Explanation: A)  
B)  
C)  
D)

158) The histograms below display the body fat percentages of 42 female students and 48 male students taking a college health course.

158) \_\_\_\_\_



Do the female or male students have a larger standard deviation?

A) male students

B) female students

Answer: B

Explanation: A)  
B)

The following data show the number of laps run by each participant in a timed running race:

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

159) If the stems are 3, 4, 5 and 6, what are the values of the leaves are on the "4 stem"?

159) \_\_\_\_\_

A) 5

B) 3, 6, 8, 9

C) 0

D) 3, 3, 6, 8, 9

Answer: D

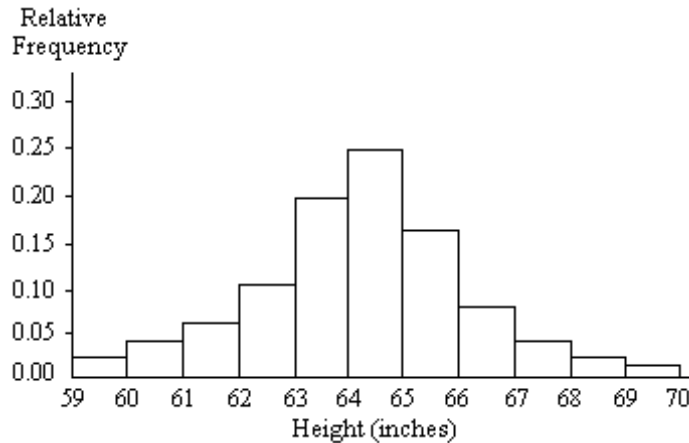
Explanation: A)  
B)  
C)  
D)

Provide an appropriate response.

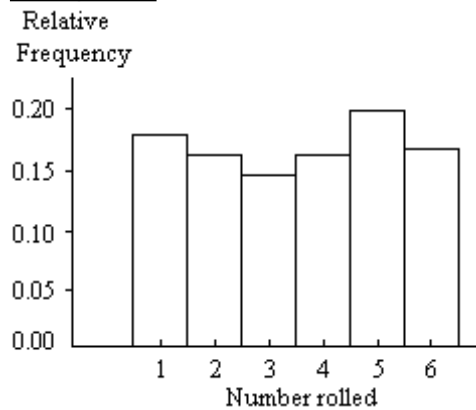
160) Histograms are presented below for three different samples. To which of the samples does the empirical rule apply?

160) \_\_\_\_\_

Histogram I

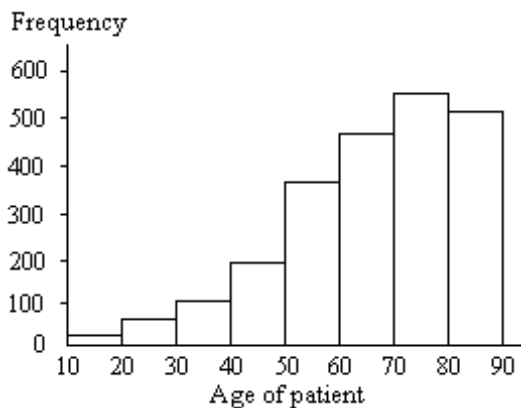


Histogram II



Histogram III





A) I and II

B) II only

C) I only

D) I and III

Answer: C

Explanation: A)  
B)  
C)  
D)

Determine the quartile, percentile or interquartile range as specified.

161) When Scholastic Achievement Scores (SAT's) are sent to test-takers, the percentiles associated with their scores are also given. Suppose a test-taker scored at the 75th percentile for their verbal grade and at the 37th percentile for their quantitative grade. Interpret these results.

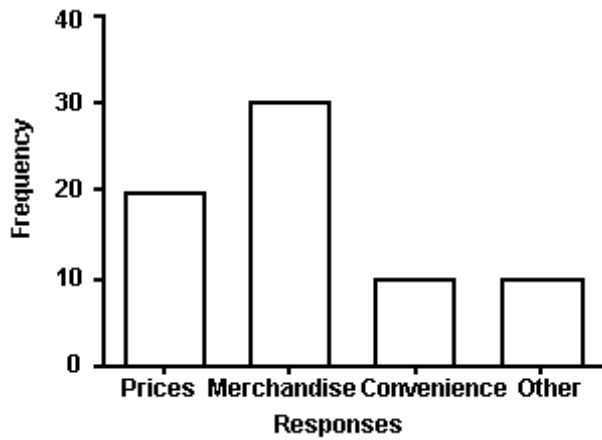
161) \_\_\_\_\_

- A) This student performed better than 75% of the other test-takers in the verbal part and better than 63% in the quantitative part.
- B) This student performed better than 25% of the other test-takers in the verbal part and better than 37% in the quantitative part.
- C) This student performed better than 25% of the other test-takers in the verbal part and better than 63% in the quantitative part.
- D) This student performed better than 75% of the other test-takers in the quantitative part and better than 37% in the verbal part.
- E) This student performed better than 75% of the other test-takers in the verbal part and better than 37% in the quantitative part.

Answer: E

Explanation: A)  
B)  
C)  
D)  
E)

A sporting goods retailer conducted a customer survey to determine its customers primary reason for shopping at their store. The results are shown in the graph below.



162) What proportion of the customers responded that the merchandise was the reason they shopped at the store? 162) \_\_\_\_\_

- A) none of these
- B) 0.30
- C) 0.43
- D) 0.50
- E) 30

Answer: C

Explanation: A)  
B)  
C)  
D)  
E)

The following data show the number of laps run by each participant in a timed running race:

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

163) Is the variable "number of laps run" discrete or continuous? 163) \_\_\_\_\_

- A) Continuous
- B) Neither
- C) Discrete

Answer: C

Explanation: A)  
B)  
C)

## Answer Key

Testname: C2

- 1) D
- 2) E
- 3) A
- 4) B
- 5) E
- 6) B
- 7) D
- 8) C
- 9) B
- 10) B
- 11) D
- 12) B
- 13) C
- 14) A
- 15) B
- 16) A
- 17) C
- 18) D
- 19) D
- 20) C
- 21) A
- 22) E
- 23) E
- 24) B
- 25) D
- 26) E
- 27) B
- 28) B
- 29) B
- 30) E
- 31) D
- 32) D
- 33) D
- 34) C
- 35) median = 1.49
- 36) a. stock performance  
b. categorical  
c. up  
d.

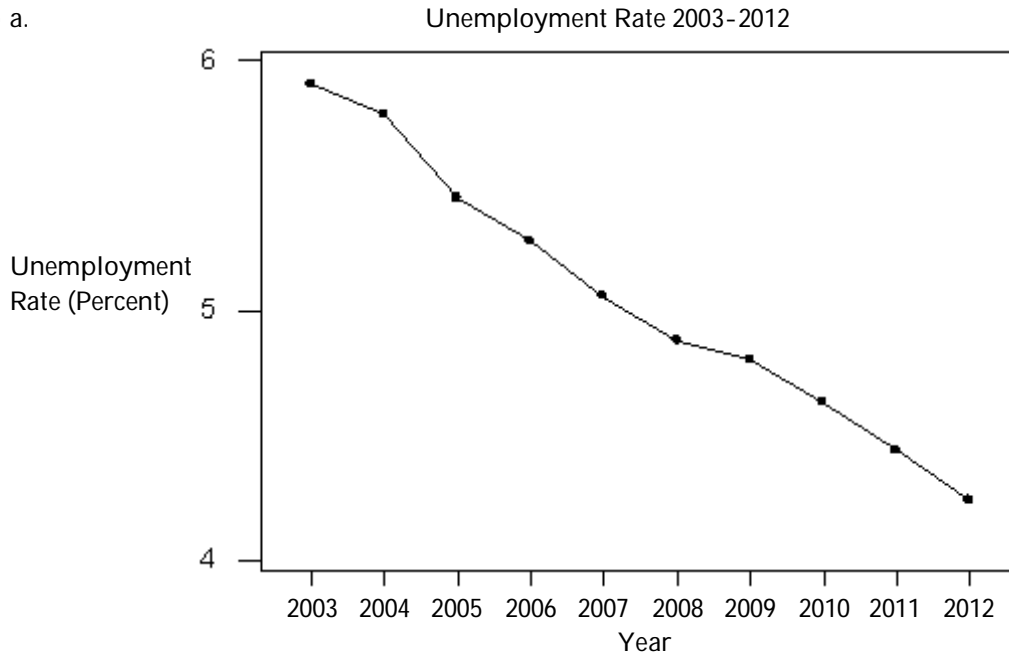
Stock performance	up	same	down
Count	0.525	0.175	0.300

- 37) categorical
- 38) minimum value; Q1; median; Q3; maximum value

- 39) a. number of children under five  
 b. discrete  
 c. 1  
 d.

Number of children under five	0	1	2	3	4
Count	0.25	0.30	0.20	0.20	0.05

- 40) a.

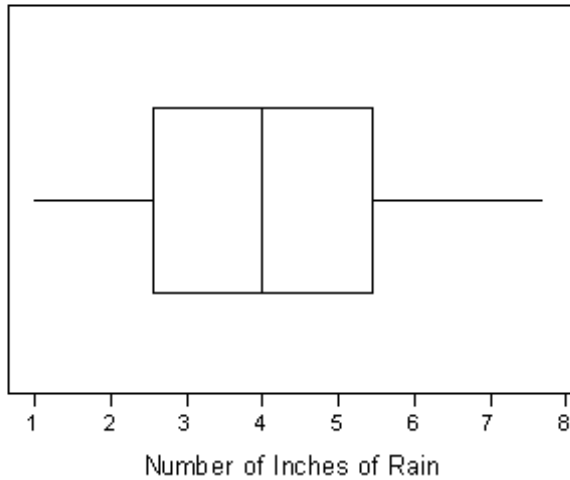


- b. There is a clear decreasing trend over time; c. No, a histogram would not depict the trend in this dataset.
- 41) This clarifies what percent a slice represents and which of two slices is larger.
- 42) a. 0 to 0.49, 0.5 to 0.99, 1.0 to 1.49, 1.5 to 1.99, 2.0 to 2.49, 2.5 to 2.99, 3.0 to 3.49, 3.5 to 3.99, 4.0 to 4.49, 4.5 to 4.99; b. The distribution is skewed to the right. c. You can get the actual data values from a dot plot or stem-and-leaf plot. d. The shape would not change.
- 43) The first graph shows the total numbers of students for each year as well as the number of female students. We can see the downward trend in overall enrollment, the slight upward trend in female enrollment and that female enrollment is small relative to total enrollment. However, with both total enrollment and female enrollment on the same graph, since female enrollment is small relative to total enrollment, the scale is not suitable for female enrollment and the upward trend in female enrollment is not very clear.

Since both total enrollment and female enrollment are varying with time, the second graph which shows female enrollment as a percentage of total enrollment may be more useful. It is clear from this graph that as a percentage of total enrollment, female enrollment is increasing significantly. However, this graph gives no indication of the absolute number of students (overall or female) and without reference to the first graph, we cannot know whether the percentage female enrollment is increasing because female enrollment is increasing, because male enrollment is decreasing, or both.

44) a.

April Showers in Chicago



b. The distribution is approximately symmetrical; c. standard deviation = 1.779 inches; The typical distance the data falls from the mean is 1.779 inches.

45) mean; median

46) range

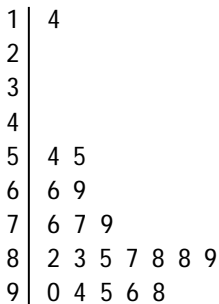
47) outliers

48) a. median = about 10 million shares; b. yes, 3; c. The distribution is skewed to the right. The IQR would be a better measure of spread for this dataset, because it is highly skewed and contains 3 potential outliers. The standard deviation is not a resistant measure of variability.

49) quantitative

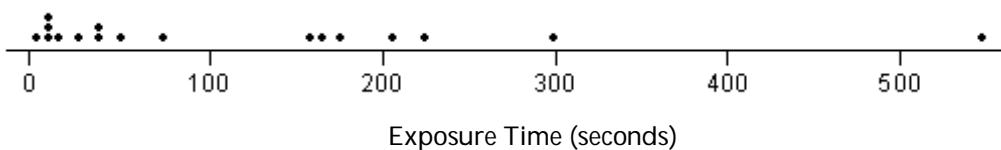
50) The bars are not drawn in the correct proportions.

51)



52)

Total Tobacco Exposure Time



This distribution appears to be skewed to the right.

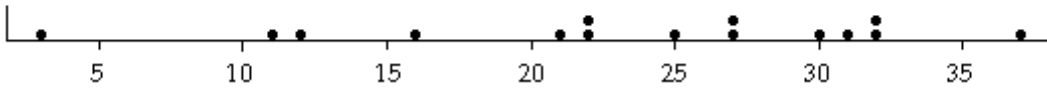
53) Possible answer: The area of the television on the right is nine times (not three times) the area of the television on the left. The pictogram gives the visual impression that sales in 2012 were nine times the sales in 2002.

54) histogram

55) minimum = 2 seconds, Q1 = 10 seconds, median = 51 seconds, Q3 = 191 seconds, and maximum = 548 seconds

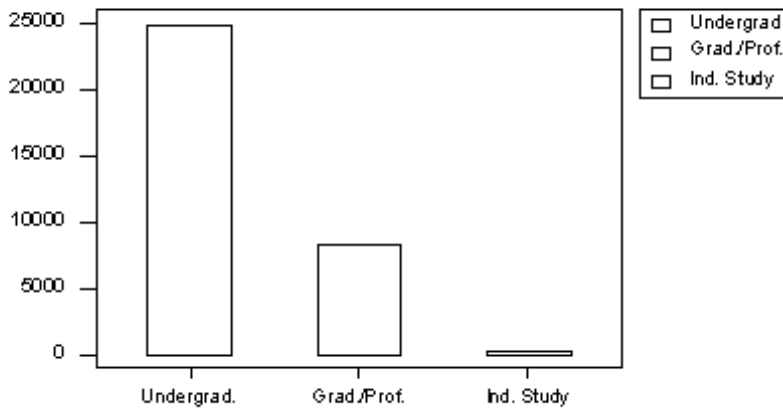
- 56) mean = 1.471  
 57)

**Grams of Fat in Breakfast Food Items**



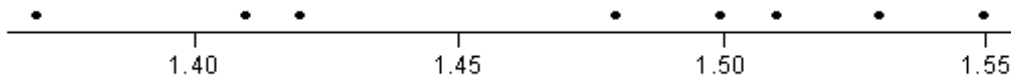
- 58) z-score  
 59) Possible answer: The graph is misleading because it is truncated. The scale on the vertical axis should start at zero so that the bars will be in the correct proportions. A part of the vertical axis could be omitted but the symbol // should then be used to warn the reader of the modified axis.  
 60) a.

**Fall Semester Enrollment**



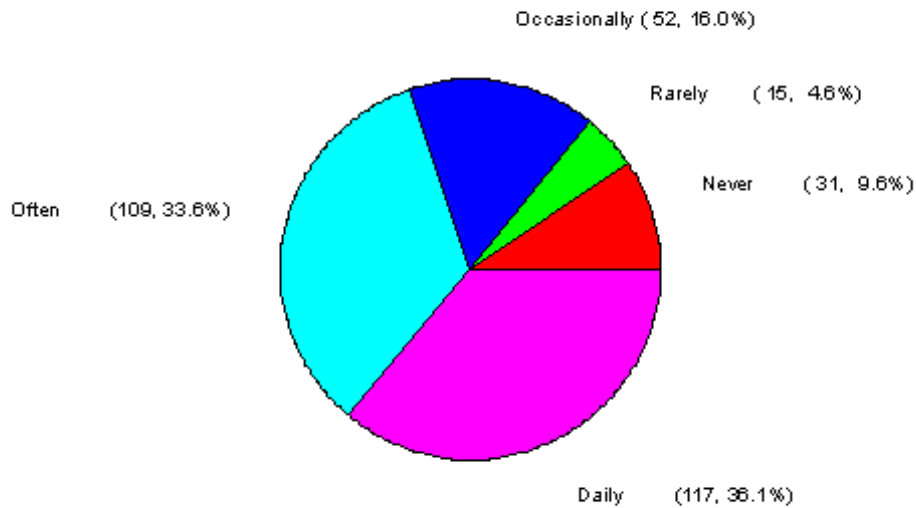
- b. No, both a dot plot and a stem-and-leaf plot are used on small quantitative datasets.  
 61)

**Daily Ammonia Concentrations (parts/million)**



62) a.

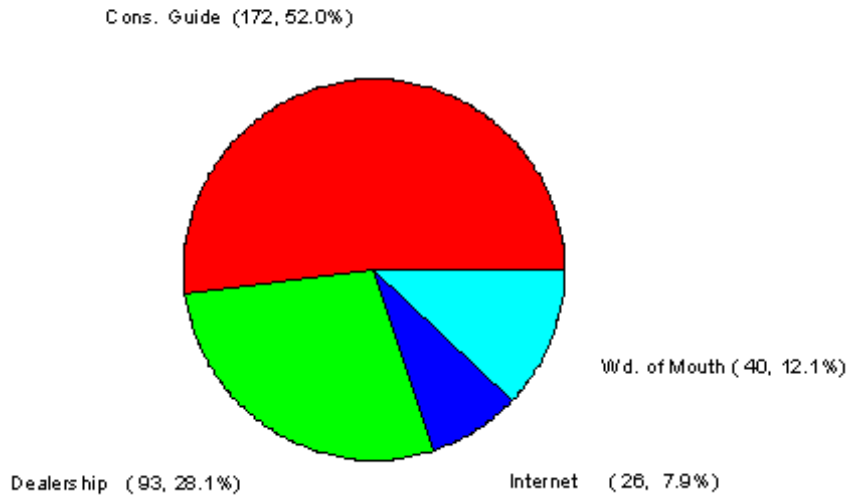
### Internet Usage Pattern



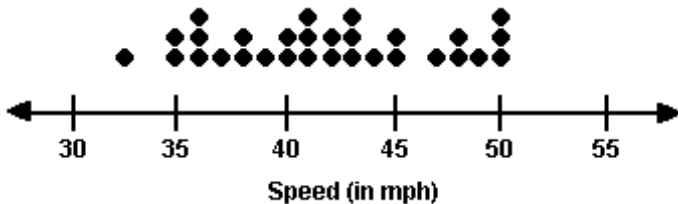
- b. Since the categories of Internet usage pattern have a natural order from never to daily, it makes more sense to leave the categories in this natural order rather than ordering them from the tallest bar to the shortest bar.
- 63) The first graph shows the total numbers of students for each year as well as the number of female students. We can see the downward trend in overall enrollment, the slight upward trend in female enrollment and that female enrollment is small relative to total enrollment. However, with both total and female enrollment on the same graph, since female enrollment is small relative to total enrollment, the scale is not suitable for female enrollment and the upward trend in female enrollment is not very clear. This upward trend is much clearer from the second graph which shows female enrollment alone, However this graph gives no indication of how female enrollment compares to total enrollment.
- 64) mean = 1.985, median = 1.85; The median seems more appropriate for this dataset, because this dataset is highly skewed to the right.

65) a.

### Consumer Information about Cars



- b. Since it is of interest to know which categories were more useful to consumers, ordering the categories as in a Pareto chart would be more appropriate than listing them alphabetically.
- 66) Possible answer: The average price increases by 25% from 2008 to 2009. Using the truncated graph, the price appears to double from 2008 to 2009 (i.e. it appears to increase by 100%). Using the truncated graph, the differences between the bars seem bigger (relatively) than they really are.
- 67)



- 68) A
- 69) B
- 70) B
- 71) D
- 72) B
- 73) E
- 74) A
- 75) C
- 76) C
- 77) A
- 78) B
- 79) C
- 80) A
- 81) B
- 82) A
- 83) D



Answer Key  
Testname: C2

- 84) C
- 85) E
- 86) A
- 87) C
- 88) B
- 89) D
- 90) D
- 91) E
- 92) A
- 93) B
- 94) D
- 95) D
- 96) A
- 97) B
- 98) B
- 99) E
- 100) C
- 101) D
- 102) B
- 103) B
- 104) A
- 105) B
- 106) D
- 107) B
- 108) B
- 109) E
- 110) C
- 111) A
- 112) C
- 113) C
- 114) E
- 115) C
- 116) A
- 117) B
- 118) D
- 119) B
- 120) E
- 121) B
- 122) A
- 123) A
- 124) B
- 125) E
- 126) B
- 127) B
- 128) A
- 129) E
- 130) C
- 131) E
- 132) A
- 133) A

Answer Key

Testname: C2

- 134) B
- 135) B
- 136) A
- 137) B
- 138) B
- 139) B
- 140) D
- 141) A
- 142) D
- 143) B
- 144) D
- 145) D
- 146) B
- 147) B
- 148) B
- 149) C
- 150) E
- 151) A
- 152) E
- 153) B
- 154) E
- 155) B
- 156) B
- 157) D
- 158) B
- 159) D
- 160) C
- 161) E
- 162) C
- 163) C