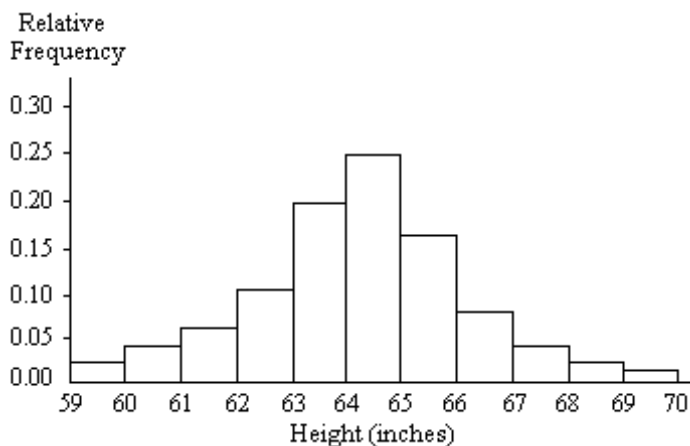Exam

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:

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?
   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?
   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.   8) _____
   These data had Q1=71.84, median=101.7 and Q3=139.96. The full data set is given below.

    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 9) _____
 A) when the data is symmetric   B) when the data is skewed to the left
 C) never   D) when the data is skewed to the right

 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 Q1=228, median=329 10) _____
and Q3=476. The full data set follows.

  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 × 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 11) _____
plot?
 A) median
 B) interquartile range
 C) Q1
 D) variance
 E) range

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

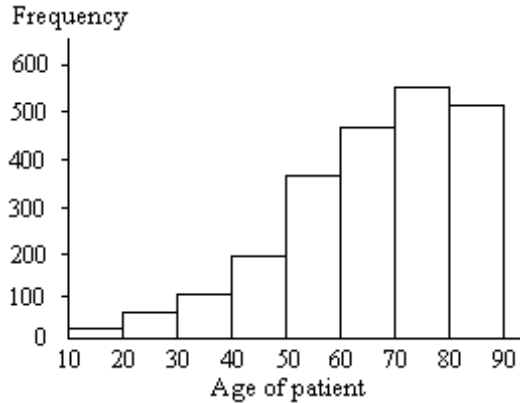12) What percent of the data falls below Q1? 12) _____
 A) 50%   B) 25%   C) 33%   D) 10%   E) 75%

 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. The data below are given in minutes.

15) _____

   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?

5

A)

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

B)

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

C)

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

D)

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

E)

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

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 18) _____
    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?
    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   20) _____
    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?

    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   21) _____
    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?

    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   22) _____
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?

    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) _____

Histogram of Heights

Y-axis: Frequency (0 to 12)
X-axis: Height (in inches) (62, 64, 66, 68, 70, 72)
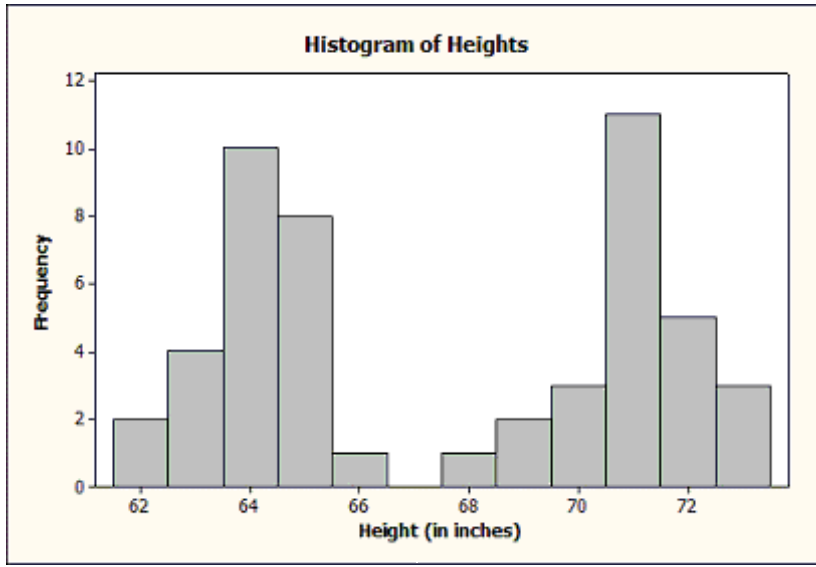
Which of the following best describes the shape of the distribution?
  A) Symmetric   B) Bimodal
  C) Skewed to the right   D) Skewed to the left

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 Q1=228, median=329   27) _____
and Q3=476. The full data set follows.

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.   29) _____
These data had Q1=71.84, median=101.7 and Q3=139.96. The full data set is given below.

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 Q3.
    B) between Q1 and Q3.
    C) above Q2.
    D) above Q1.
    E) above Q3.

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

31) Which of the following is a discrete variable?

    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

31) _____

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

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

33) _____

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?

   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.

34) _____

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
_____.

38) _____

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

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. 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

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

14

Answer: a.

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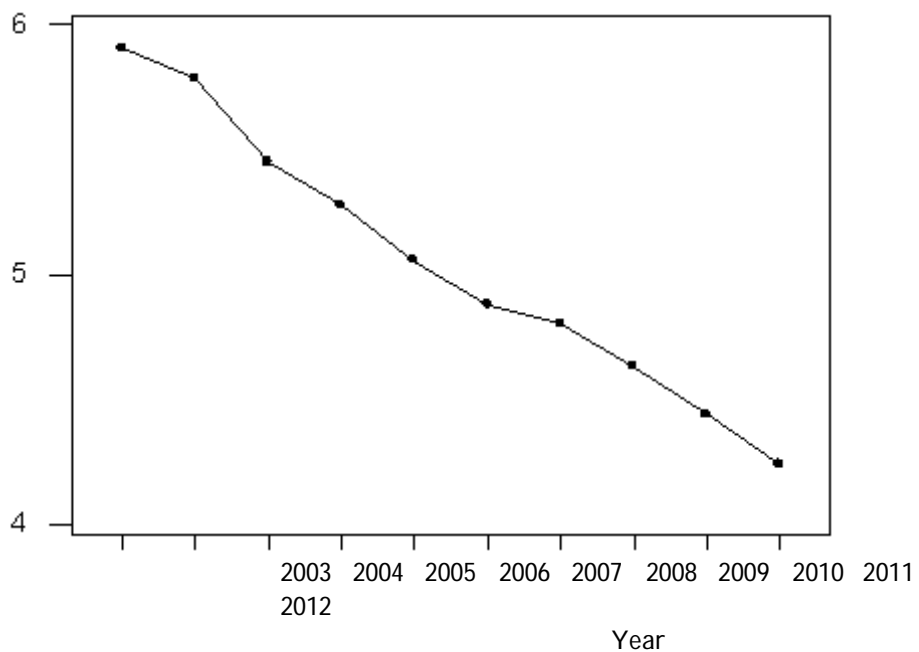
b. There is a clear decreasing trend over time; c. No, a histogram would not depict the trend in this dataset.

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$_2$ (sulfur dioxide) emission rates from utility and industrial boilers (lb/million Btu) for 47 states (data for Idaho, Alaska, and Hawaii omitted).

Average Sulfur Dioxide Emission Rates
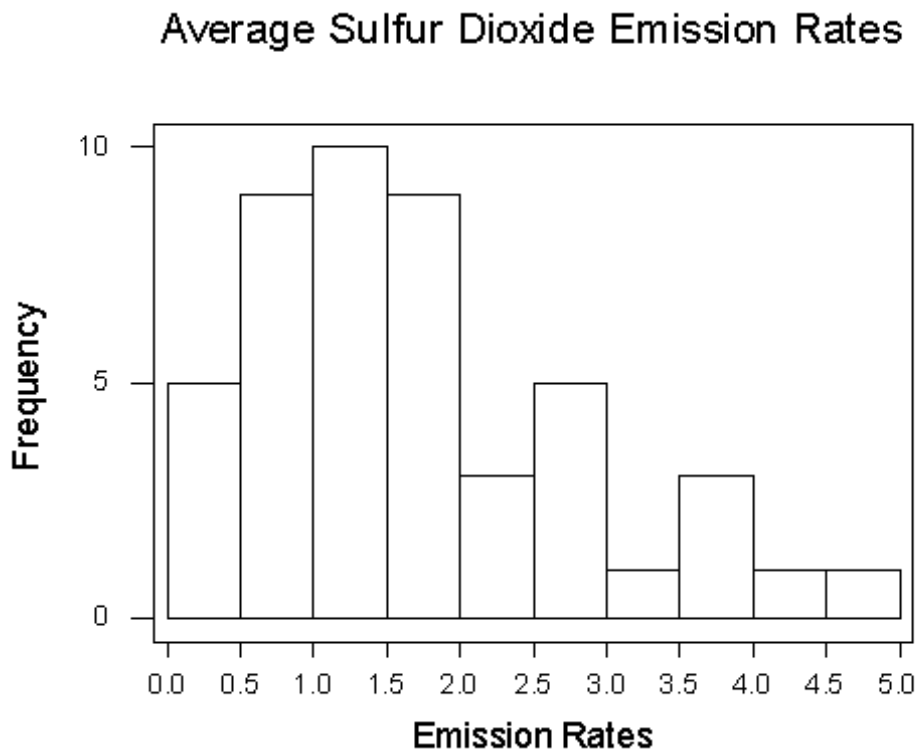
a. Identify the intervals of emission rates used for the plot.
b. Describe the shape of the distribution.
c. What information can you get from the dot plot or stem-and-leaf plot of these data that you
   cannot get from this plot?
d. This histogram shows frequencies. If you were to construct a histogram 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.

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

Enrollment at Pilot Training College

- - - - Total enrollment

———— Female enrollment

Female Enrollment as Percentage of Total Enrollment at Pilot Training College

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

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

Answer: a.

April Showers in Chicago
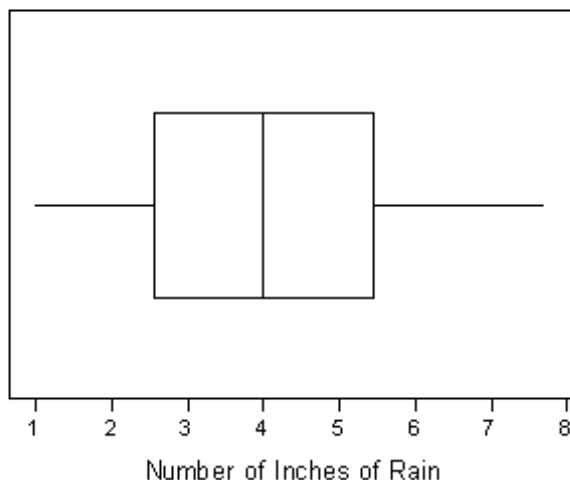
Number of Inches of Rain

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.

Explanation:

18

Fill in the blank.

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

Answer: mean; median
Explanation:

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

Answer: range
Explanation:
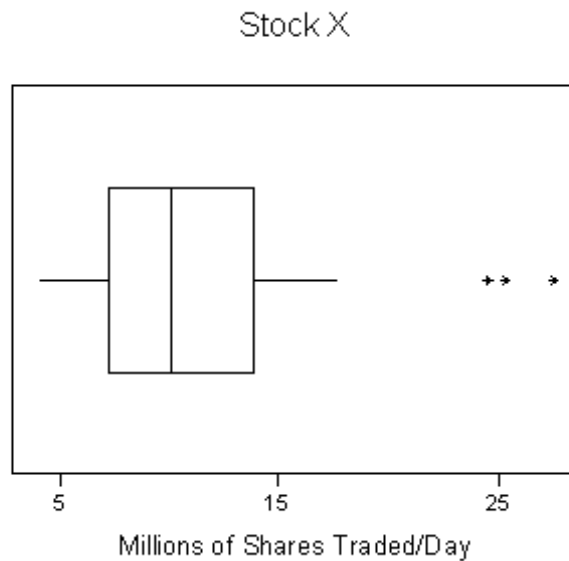
47) Extreme observations in the dataset are called _____.

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.

Stock X

Millions of Shares Traded/Day

   a. Approximately, what is the median for this dataset?
   b. Are there any potential outliers in this dataset? If so, how many?
   c. 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) _____
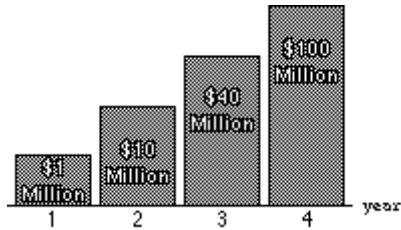
Answer: The bars are not drawn in the correct proportions.
Explanation:

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:

20

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.

Answer: Total Tobacco Exposure Time

Exposure Time (seconds)
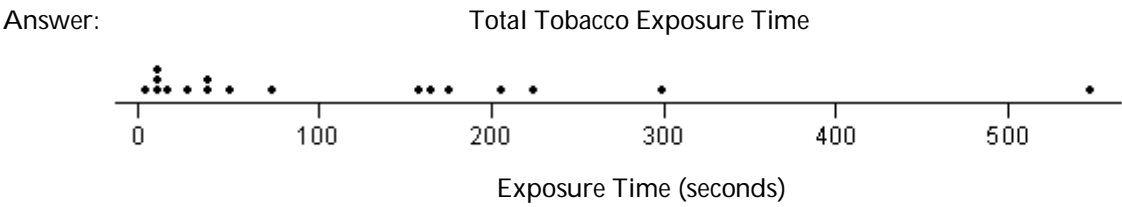
This distribution appears to be skewed to the right.

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) _____

2002   2012
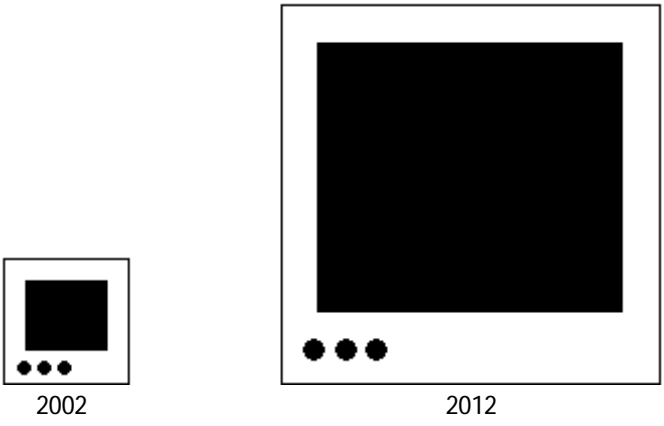
Why is this pictogram misleading? What visual impression is portrayed by the pictogram?

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
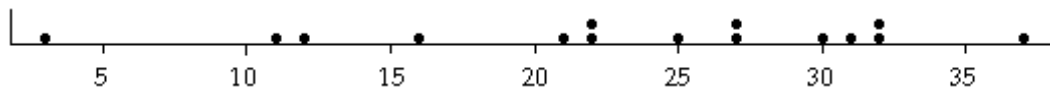
Explanation:

Fill in the blank.

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

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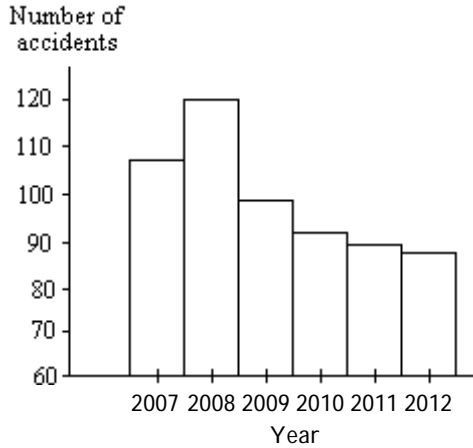
Answer: Possible answer: The graph is misleading because it is truncated. The scale on the
vertical axis should start at zero so that the bars will be in the correct proportions. A
part of the vertical axis could be omitted but the symbol // should then be used to
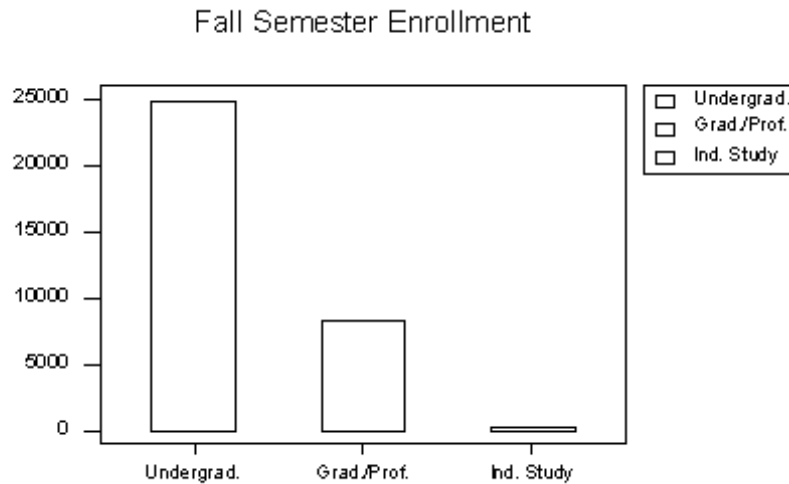warn the reader of the modified axis.

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

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

Answer: a.

Fall Semester Enrollment

b. 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   61) _____
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.

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

Construct a dot plot for these data.

Answer:

Daily Ammonia Concentrations (parts/million)
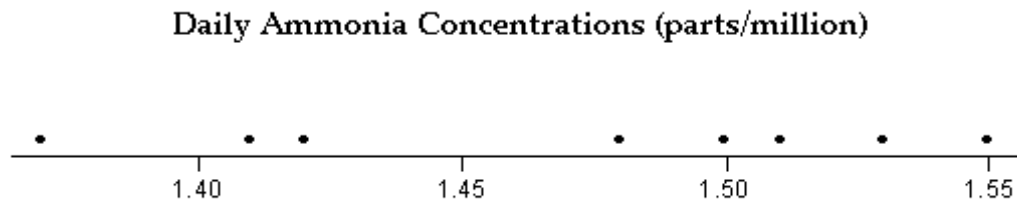
Explanation:

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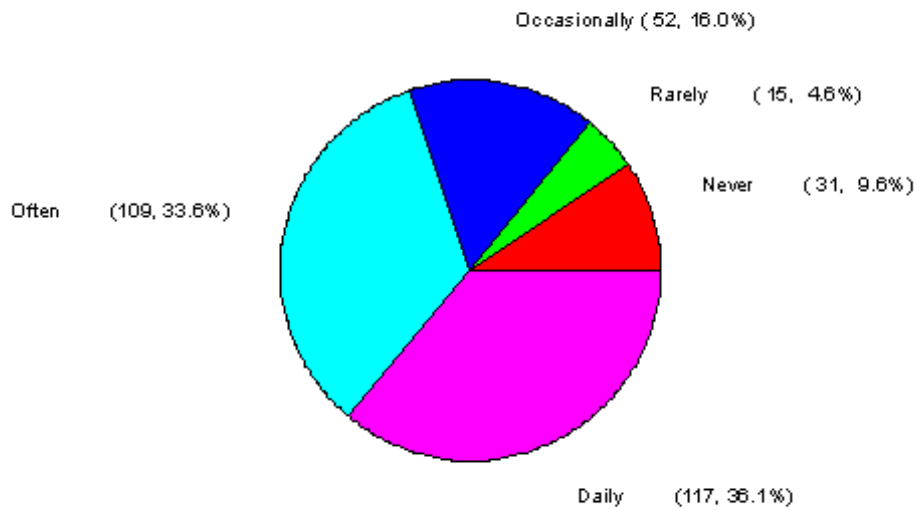
Internet Usage Pattern	Count
Never	31
Rarely (about 3 times per year)	15
Occasionally (about once a month)	52
Often (about once a week)	109
Daily	117

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 patterns as given in the table   above or in the order of a Pareto chart?

Answer: a.

Internet Usage Pattern

Occasionally (52, 16.0%)

Rarely   (15, 4.6%)

Never   (31, 9.6%)

Often   (109, 33.6%)

Daily   (117, 36.1%)

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.
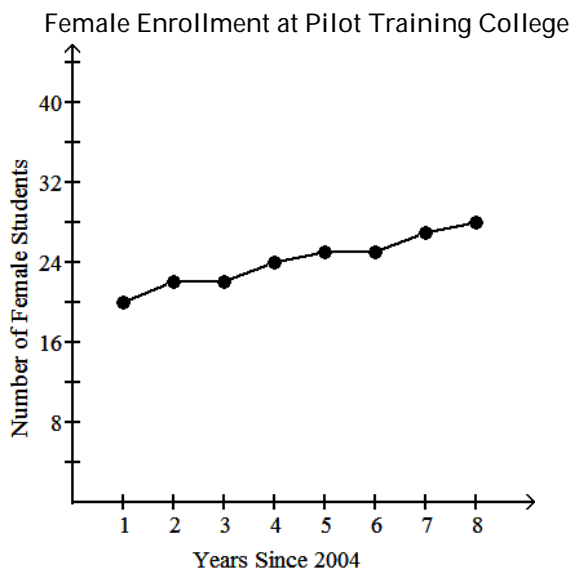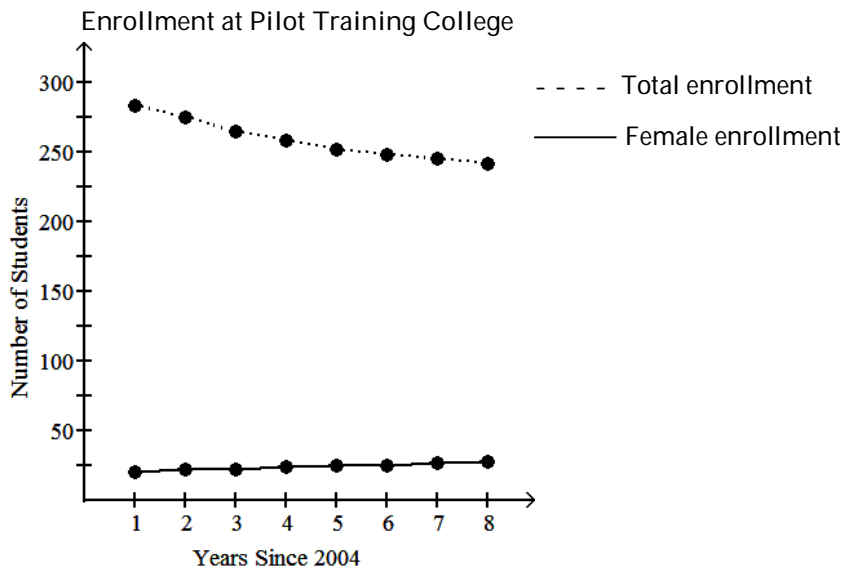
Explanation:

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.

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

Enrollment at Pilot Training College

- - - - Total enrollment

———— Female enrollment

Number of Students

Years Since 2004

Female Enrollment at Pilot Training College

Number of Female Students

Years Since 2004

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.

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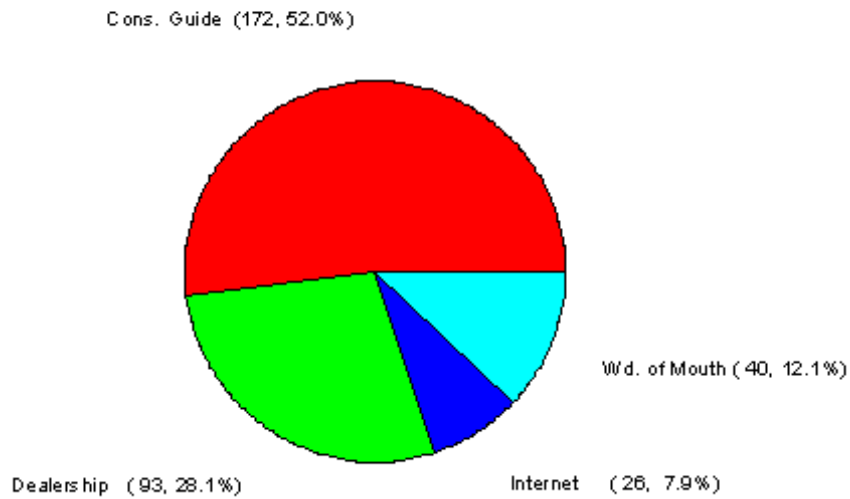
Source	Count
Consumer guide	172
Dealership	93
Word of mouth	40
Internet	26

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

Cons. Guide (172, 52.0%)

Wd. of Mouth (40, 12.1%)

Dealership (93, 28.1%)

Internet   (26, 7.9%)

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.

Average cost to rent studio ($)
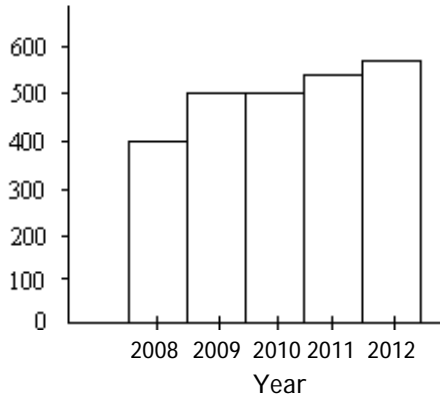
By what percentage does the average price increase from 2008 to 2009? Obtain a truncated version of the graph by sliding a piece of paper over the bottom of the graph so that the bars start at 300. In the truncated graph, by what percentage does the price appear to increase from 2008 to 2009? Why is 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.
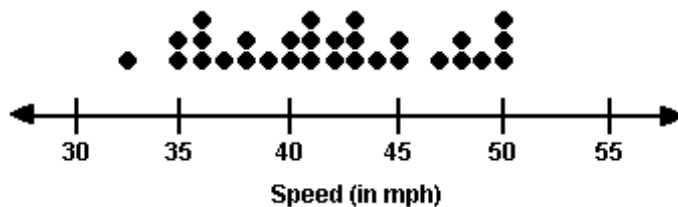
Explanation:

66) _____

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.

```
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:

Speed (in mph)

Explanation:

67) _____

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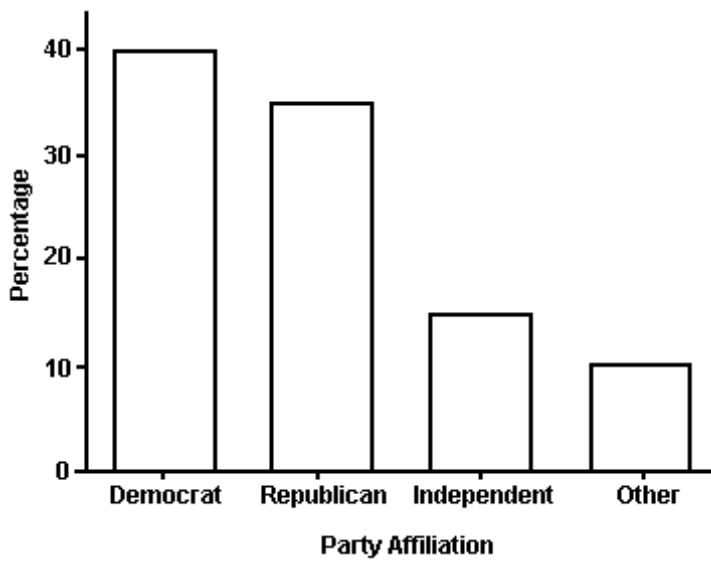
         70 72 71 70 69 73 69 68 70 71
         67 71 70 74 69 68 71 71 71 72

     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   69) _____
(Democratic and Republican)?

     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.   70) _____
     A) 2   B) 32   C) 26   D) 0

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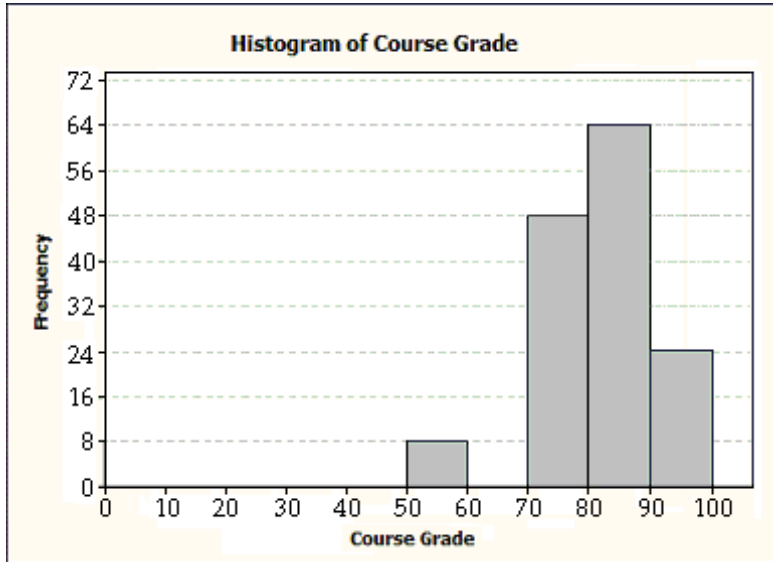   D)

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) _____

       <u>Course Grading Scale</u>
90-99	A
80-89	B
70-79	C
60-69	D
50-59	F

Histogram of Course Grade

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   73) _____
    distribution fall within _____ standard deviations of the mean.
   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.

Relative Frequency vs. Systolic Blood Pressure (mm Hg)
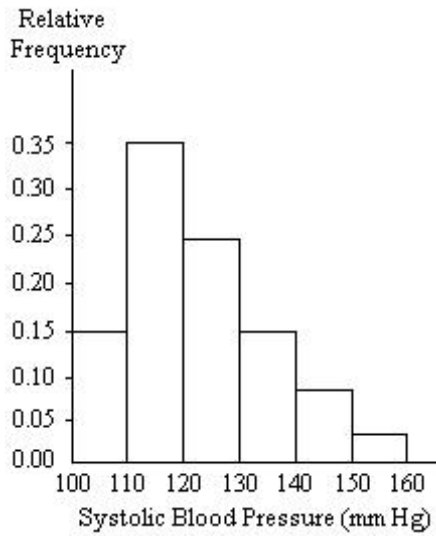
74) Approximately what percentage of the people aged 25-40 had a systolic blood pressure reading of at least 110 but less than 120?   74) _____

   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) The test scores of 15 students are listed below.   76) _____

        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
```

Height (in inches)	Frequency	Relative Frequency
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
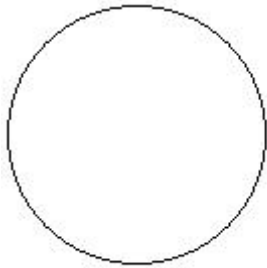Explanation: A)
                 B)
                 C)
                 D)
                 E)

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   79) _____
give the rating distribution.

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)

37

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

| Height (in inches)	Frequency	Relative Frequency
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.
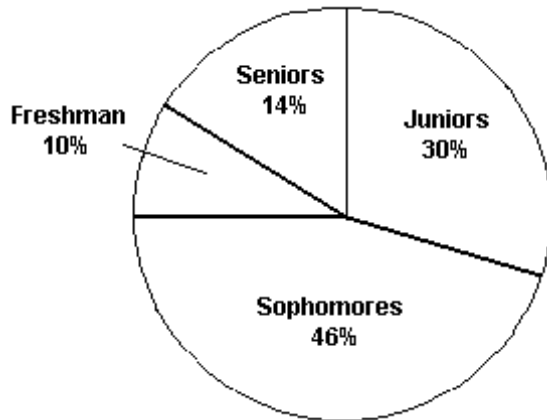
What percentage of the class took the course prior to reaching their senior year?

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.

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

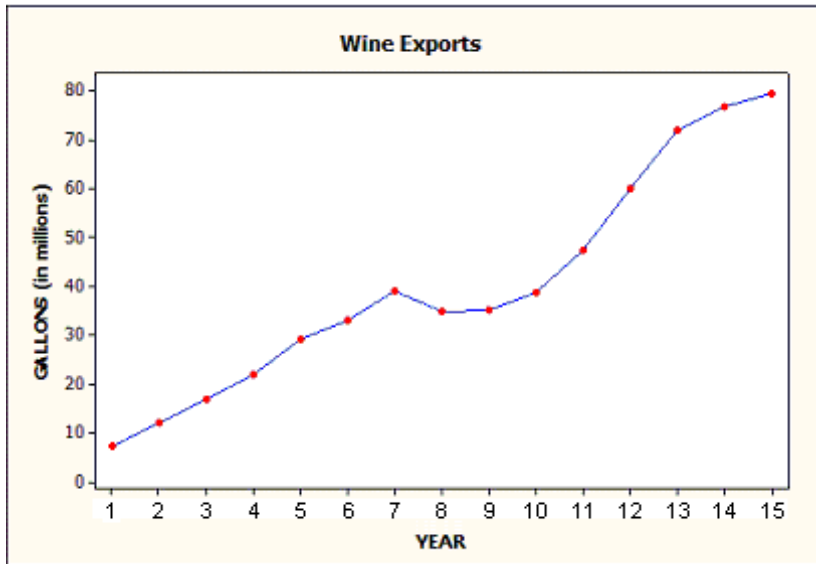A) Discrete   B) Continuous

Answer: A

Explanation: A)
                B)

84) _____

85) _____

86) _____

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?

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.

A) True   B) False

Answer: B
Explanation: A)
                 B)

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

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   90) _____
birth weight has a z-score of 0.81?

  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   91) _____
period. The results are shown below.

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   92) _____
any, influence on its value.

  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   93) _____
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?

  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?   94) _____

      A) 30   B) 65   C) 3   D) 43

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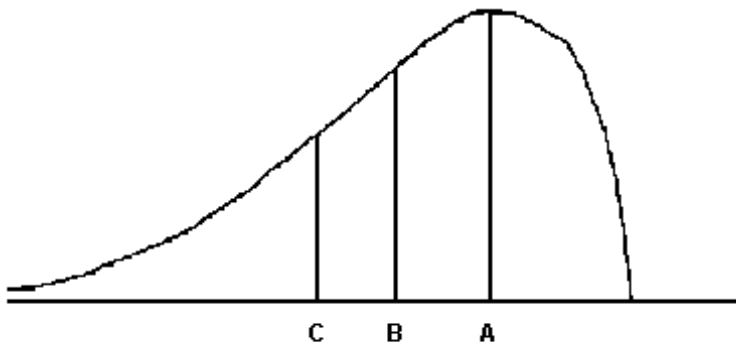
A) A = mode, B = median, C = mean
B) A = median, B = mean, C = mode
C) A = median, B = mode, C = mean
D) A = mean, B = mode, C = median
E) A = mode, B = mean, C = median

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

Height (in inches)	Frequency	Relative Frequency
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   101) _____
the mean of the data.

```
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   102) _____
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

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 $\sum(x - \bar{x})$,   104) _____
is always equal to zero.

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.
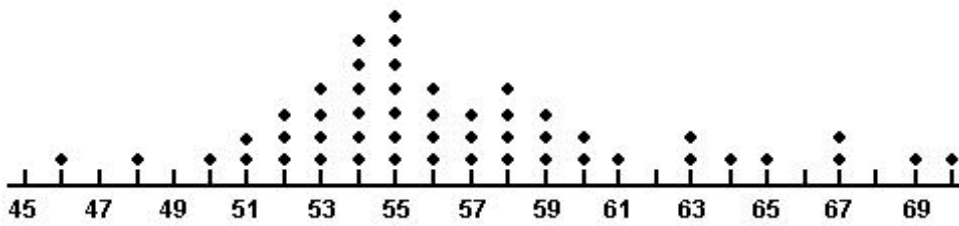
105) Would a pie chart be appropriate for displaying this data?   105) _____

    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   106) _____
data set is likely to be bell-shaped, skewed to the right or skewed to the left.

    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.
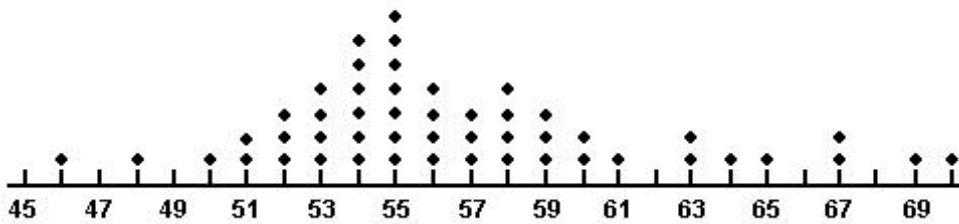
108) What is the variable of interest? 108) _____
    A) number of speeding motorists
    B) motorist's speed
    C) whether or not a motorist was speeding
    D) number of motorists on the Federal highway

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 109) _____
    of central tendency would be the best measure to determine the location of the center of the
    distribution?
    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?
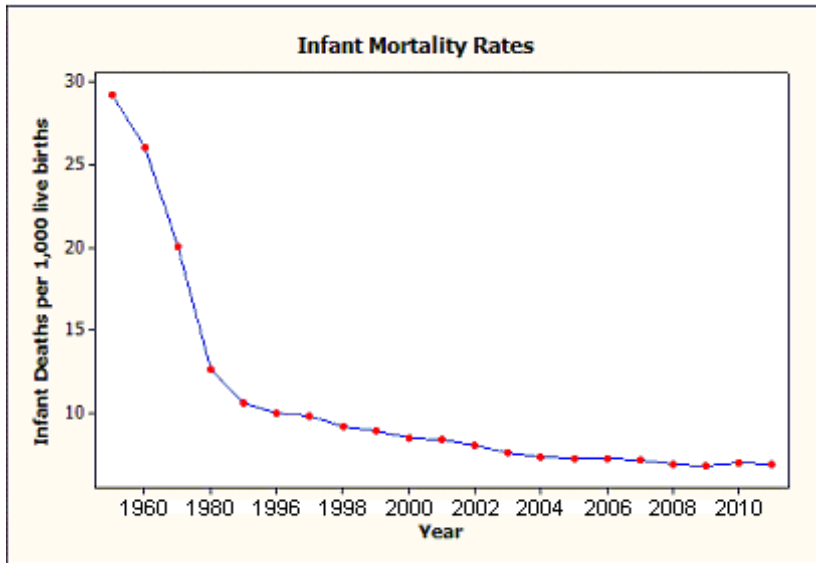
Infant Mortality Rates

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.

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.

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)

110) _____

111) _____

112) _____

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.

    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)

113) _____

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.

    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)

114) _____

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

Payrolls of Baseball Teams (in millions of dollars) — histogram with Frequency on the y-axis (0 to 12) and payroll ranges on the x-axis: $0-10 (1), $10-20 (2), $20-30 (10), $30-40 (8), $40-50 (5).
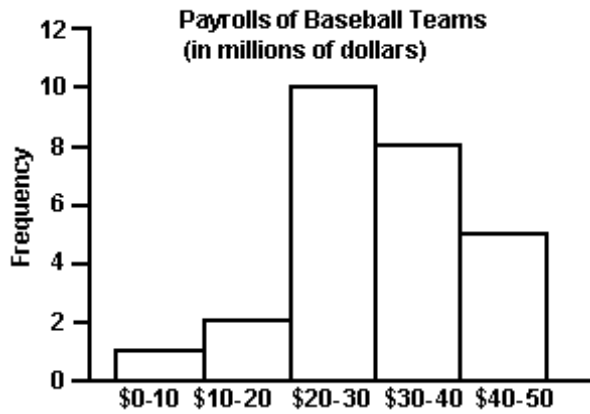
115) What percentage of the payrolls exceed $30 million? (Assume that no payroll is exactly $30 million.)   115) _____

    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.

Relative Frequency vs Systolic Blood Pressure (mm Hg)
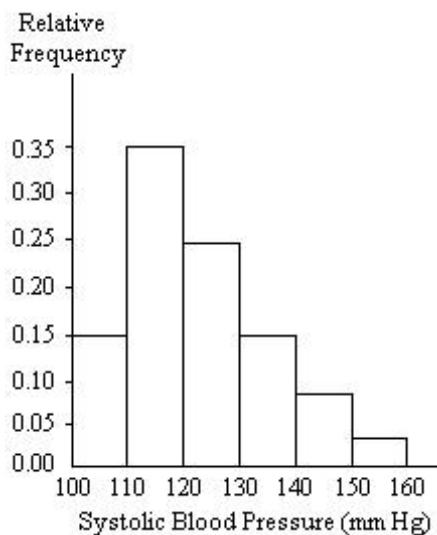
116) Given that 200 people were aged between 25 and 40, approximately how many had a systolic blood pressure reading less than 130?

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

116) _____

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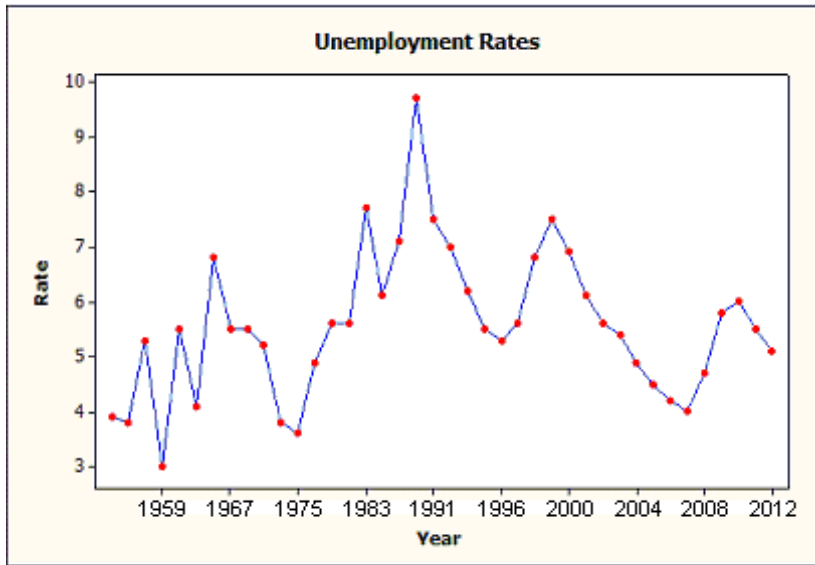
A) yes, increasing trend   B) no trend evident   C) yes, decreasing trend

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. 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)
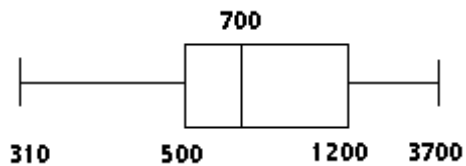
Bell-shaped

B)

Skewed-right

52

C)

510

310 705   1225   3700

Skewed-left

D)

510

310 705   1225   3700

Skewed-right

E)

705

310   510   1225 3700
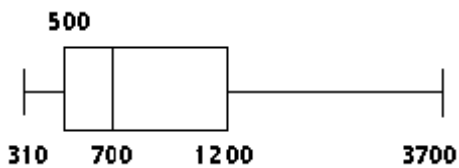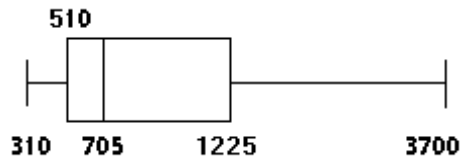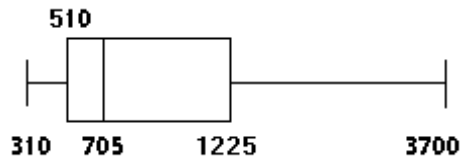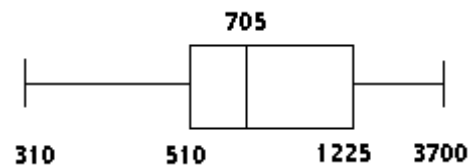
Skewed-left

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   122) _____
and model of the automobiles. The variable "make" is:
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) _____

```
1 | 4 5
2 | 6 6 6 7 8 9
2 | 7 7 7 8 8 9 9 9
3 | 0 1 1 2 3 4 4 5
3 | 6 6 6 7 8 8 9
4 | 0 0
```
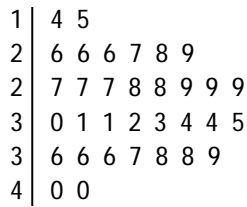
   A) 26   B) 40   C) 36   D) 34   E) 14

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.   124) _____
Calculate the sample standard deviation, s of the book costs. Round to the nearest hundredth when necessary.

   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.
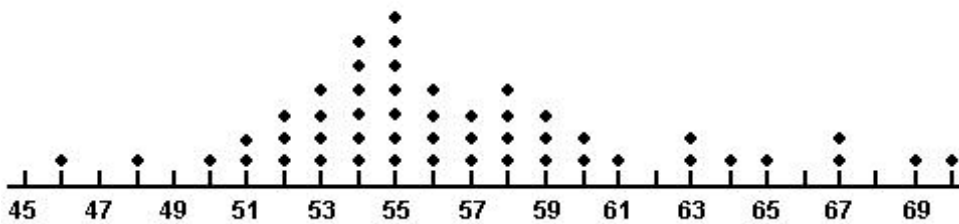
125) What proportion of the motorists were speeding?   125) _____
   A) 0.22   B) 2   C) 0.04   D) 0.72   E) 0.18

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 126) _____
interquartile range for the cholesterol level of the 30 adults.
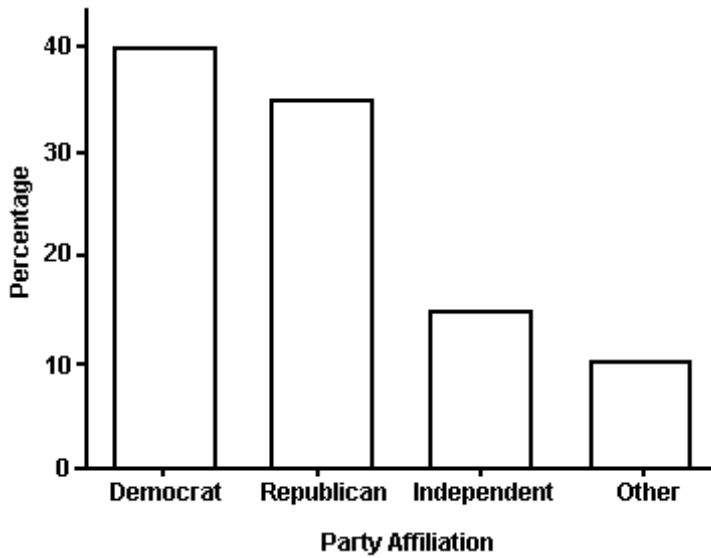
154 156 165 165 170 171 172 180 184 185
189 189 190 192 195 198 198 200 200 200
205 205 211 215 220 220 225 238 255 265

  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)?

     A) 4%   B) 3%   C) 12%   D) 1%   E) 32%

128) _____

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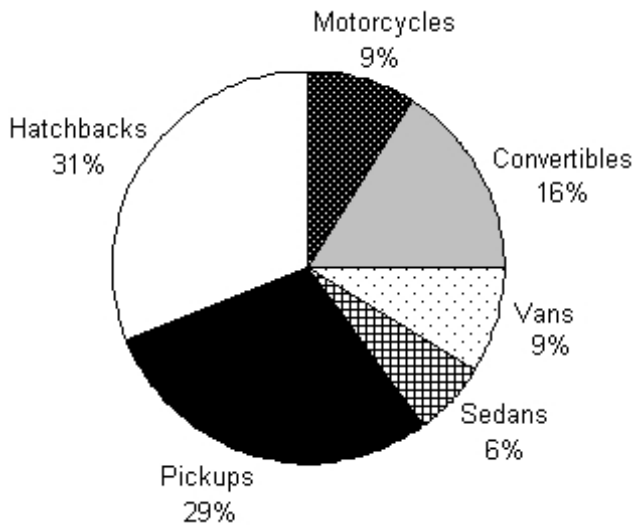
How many of the vehicles were sedans? Give your answer to the nearest whole number.

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

Height (in inches)	Frequency	Relative Frequency
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.
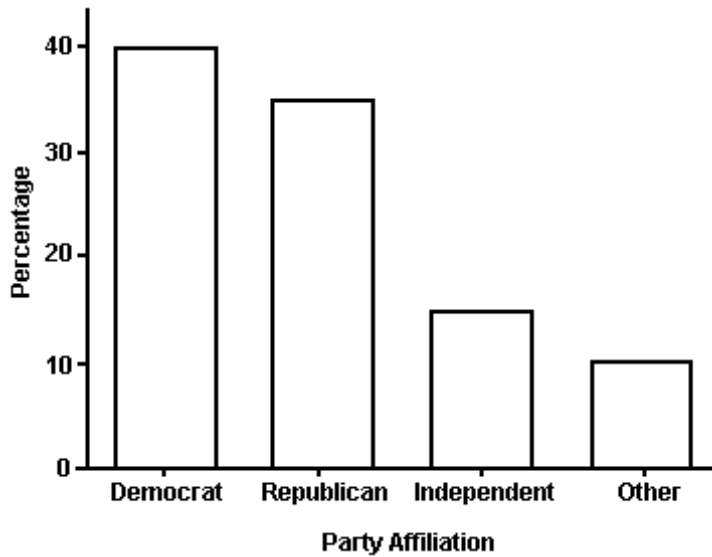
134) About how many of the registered U.S. voters stated "Independent" as their political party affiliation?

134) _____

   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.

135) _____

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   136) _____
male child weighing 2.75 kg at birth, what is the corresponding z-score?

  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.

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

142) _____

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.

A) Continuous   B) Discrete

143) _____

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?

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

144) _____

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%   145) _____
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?
  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.
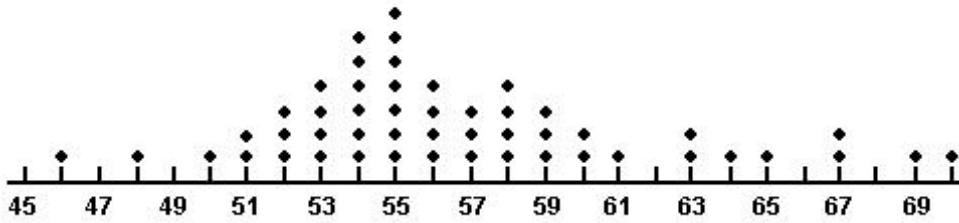
147) What is the mode for speed?   147) _____
    A) 70
    B) 55
    C) 7
    D) none of these
    E) 60

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   148) _____
and/or relative frequencies.
    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.

Course Grading Scale
90-99   A
80-89   B
70-79   C
60-69   D
50-59   F
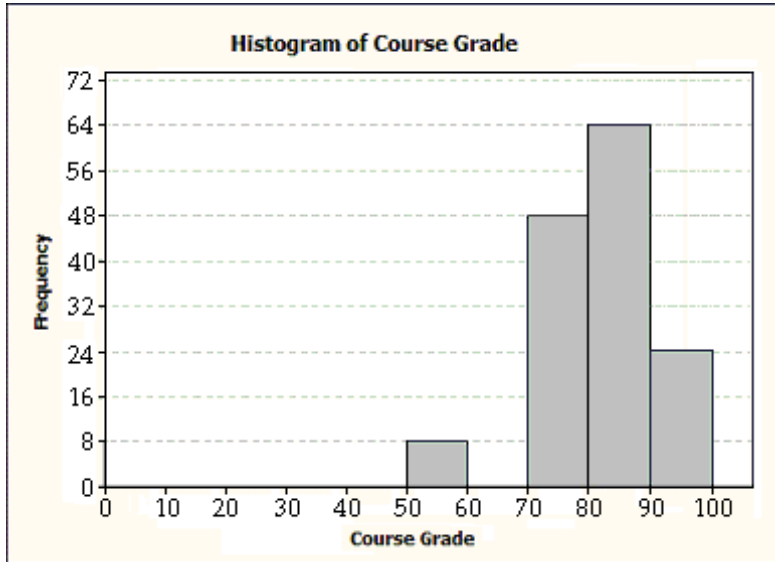
The data for a grade of "D" is missing. What is the correct frequency for the grade of "D?"
A) 0
B) 10
C) 16
D) cannot be determined from the information given

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.

Payrolls of Baseball Teams (in millions of dollars)
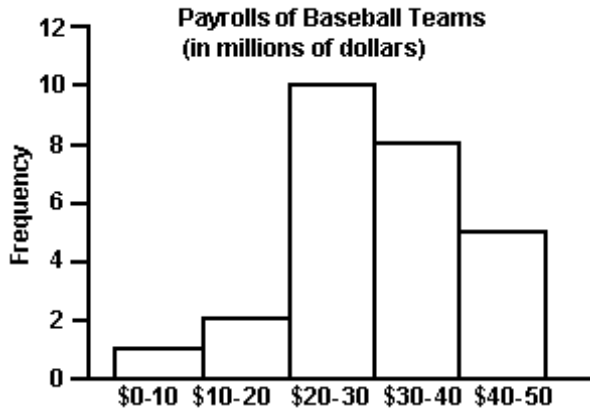
150) How many of the major-league payrolls exceed $20 million? (Assume that no payroll is exactly $20 million.)

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

Height (in inches)	Frequency	Relative Frequency
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.

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

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

Height (in inches)	Frequency	Relative Frequency
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

154) What proportion of the 30 adult males had heights less than 70 inches?   154) _____
    A) 0.167   B) 36.7   C) 16.7%   D) 0.433   E) 0.367

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?

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

155) _____

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.

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

156) _____

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) _____
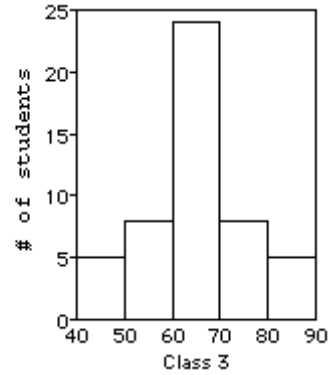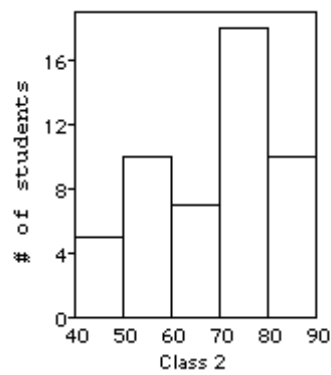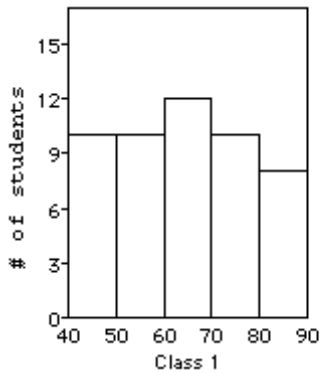
A) 1, 3   B) 3, 2   C) 2, 1   D) 3, 1

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) _____
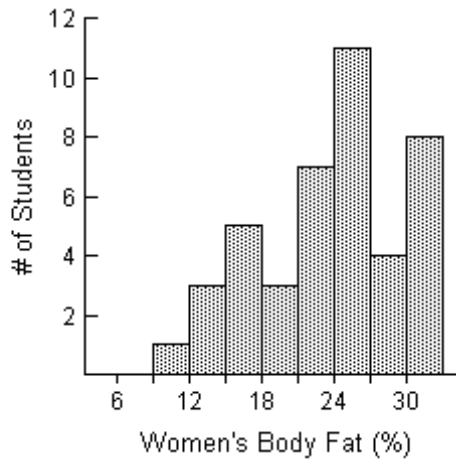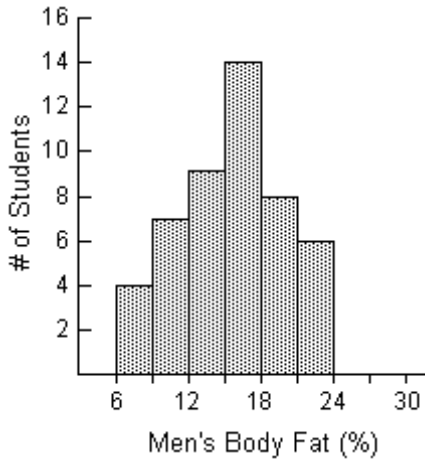
Do the female or male students have a larger standard deviation?
    A) male students   B) female students

Answer: B
Explanation: A)
              B)

71

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   160) _____
    empirical rule apply?
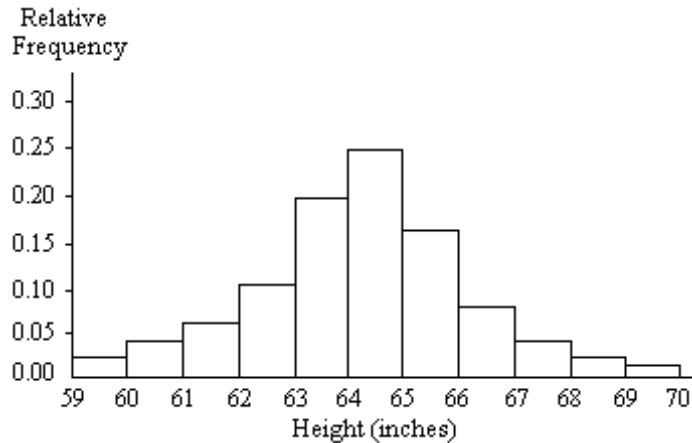
    Histogram I

    Histogram II

    Histogram III

Frequency

Age of patient
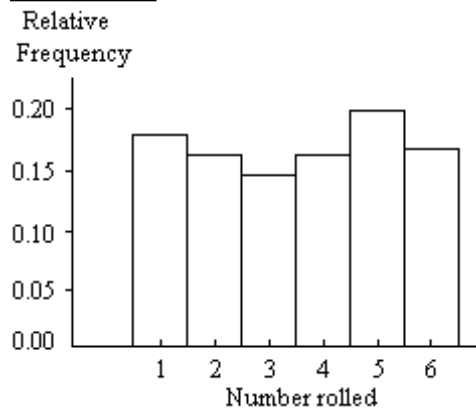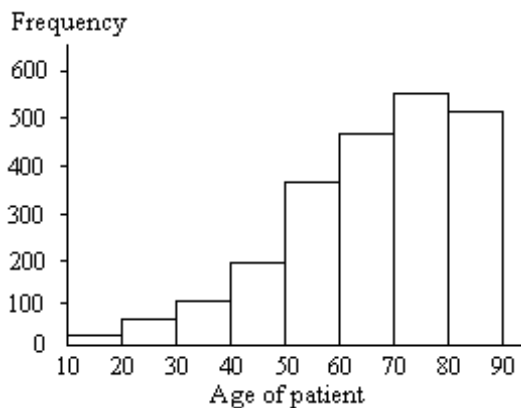
A) I and II   B) II only   C) I only   D) I and III

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   161) _____
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.
   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)

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.
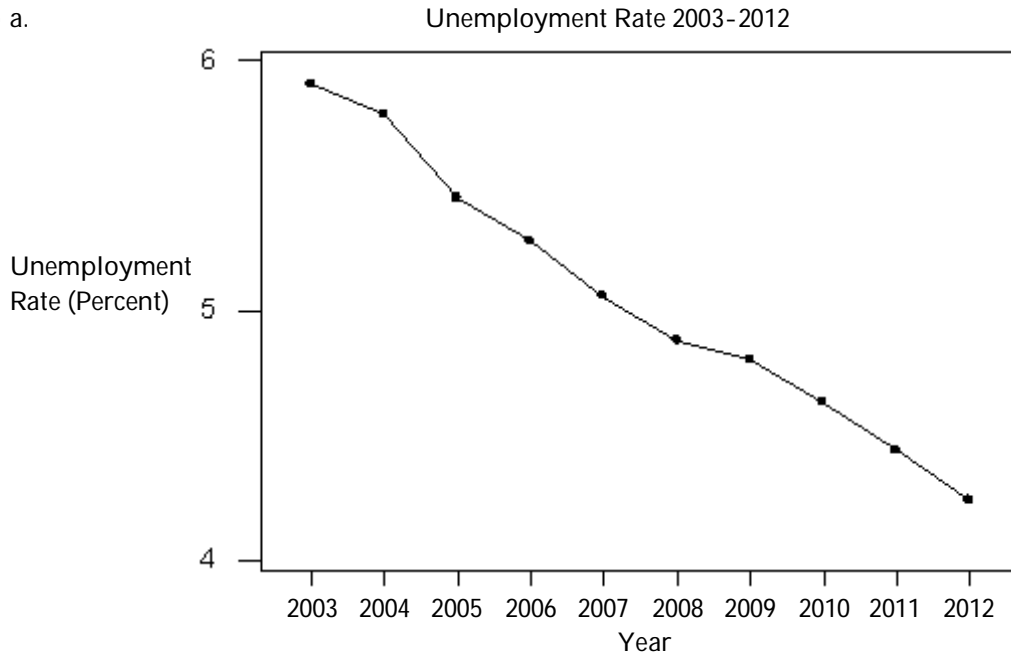
Unemployment Rate 2003-2012

   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

Number of Inches of Rain

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.
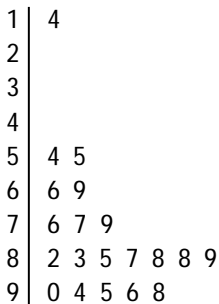
45) mean; median

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)

```
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
```

52)   Total Tobacco Exposure Time

Exposure Time (seconds)
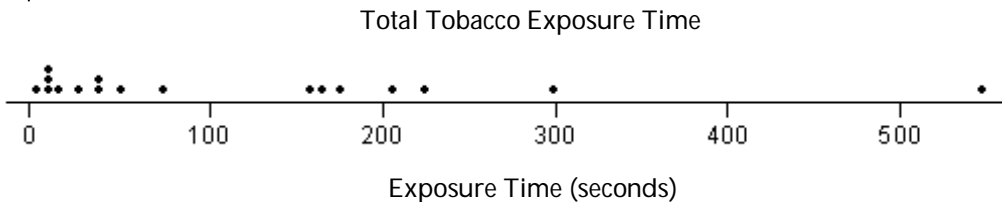
This distribution appears to be skewed to the right.

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

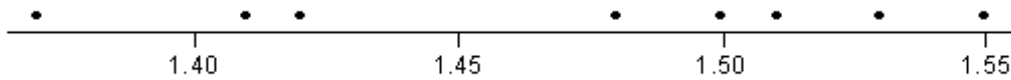56) mean = 1.471
57)

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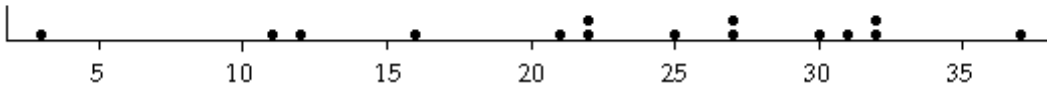
58) z-score
59) Possible answer: The graph is misleading because it is truncated. The scale on the vertical axis should start at zero so that the bars will be in the correct proportions. A part of the vertical axis could be omitted but the symbol // should then be used to warn the reader of the modified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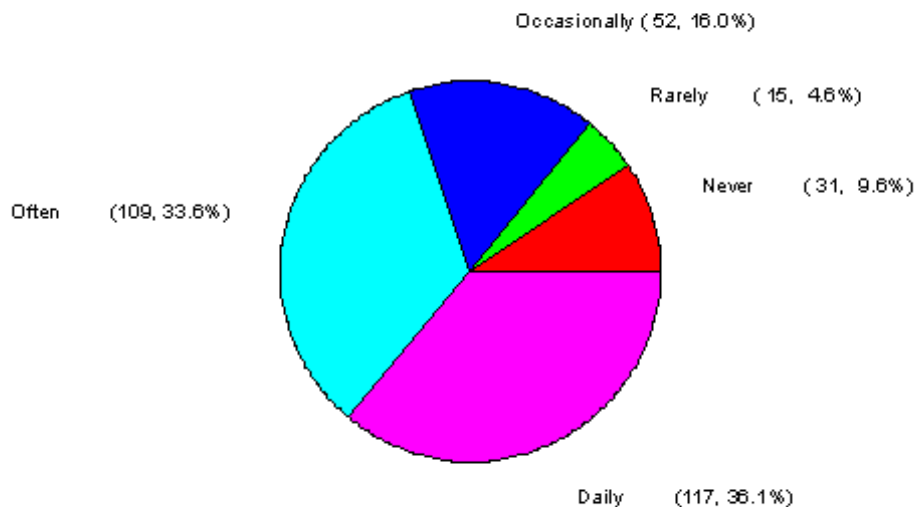60) a.

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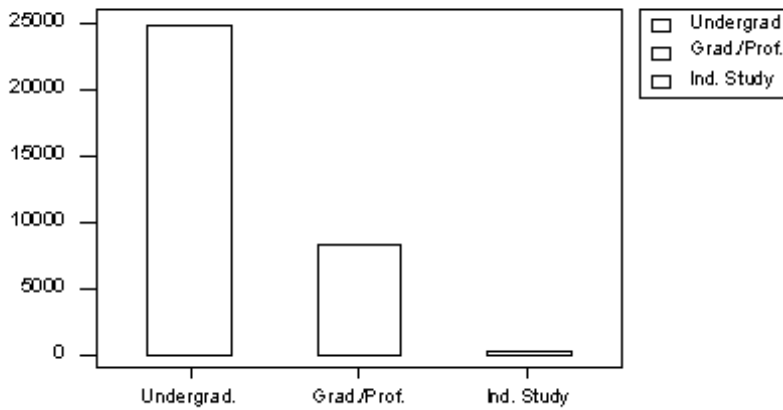
    b.   No, both a dot plot and a stem-and-leaf plot are used on small quantitative datasets.

61)

Daily Ammonia Concentrations (parts/million)

62) a.

Internet Usage Pattern

Occasionally (52, 16.0%)

Rarely   (15, 4.6%)

Never   (31, 9.6%)

Often   (109, 33.6%)

Daily   (117, 36.1%)

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
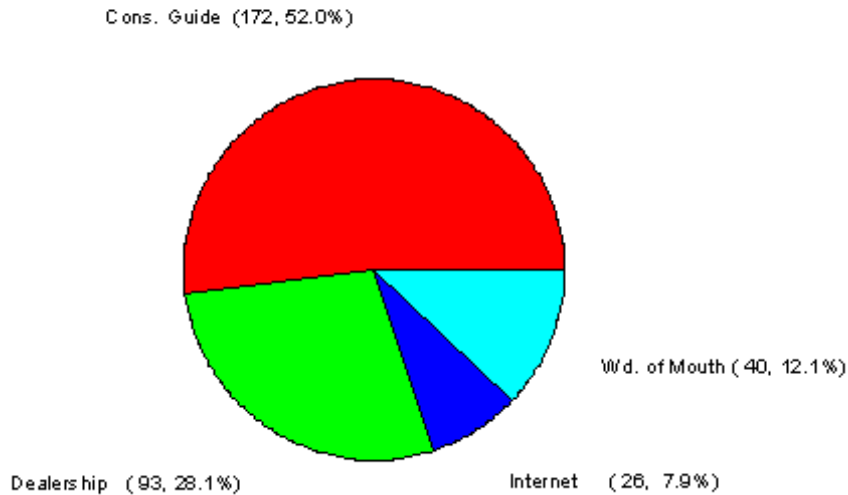
Cons. Guide (172, 52.0%)

Wd. of Mouth (40, 12.1%)

Dealership (93, 28.1%)   Internet   (26, 7.9%)

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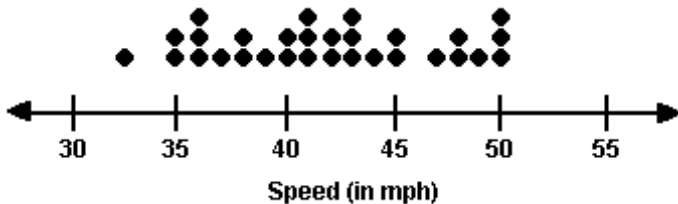
68) A
69) B
70) B
71) D
72) B
73) E
74) A
75) C
76) C
77) A
78) B
79) C
80) A
81) B
82) A
83) D

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