CHAPTER 2 FORM A TEST

Name_____

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

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**

1) Which category of heights represents the mode? 1) _____
A) 67.0–68.4
B) 68.5–69.9
C) 71.5–72.9
D) 70.0–71.4
E) 73.0–74.4

2) What proportion of the 30 adult males had heights less than 70 inches? 2) _____
A) 16.7% B) 36.7 C) 0.367 D) 0.167 E) 0.433

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

Provide an appropriate response.

3) 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. 3) _____

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

Find the Five-Number Summary of Positions.

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

4) 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? 4) _____

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

5) Parking at a large university has become a major issue. University administrators would like to determine the average time it takes a student to find a parking spot in a university lot. Students who are willing to participate in the study were asked to record the time between entering campus and pulling into a parking spot. Which of the following would not be appropriate for displaying the parking time data? 5) _____

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

6) 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. 6) _____

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

7) 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. 7) _____

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

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

A)

2	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

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

C)

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

D)

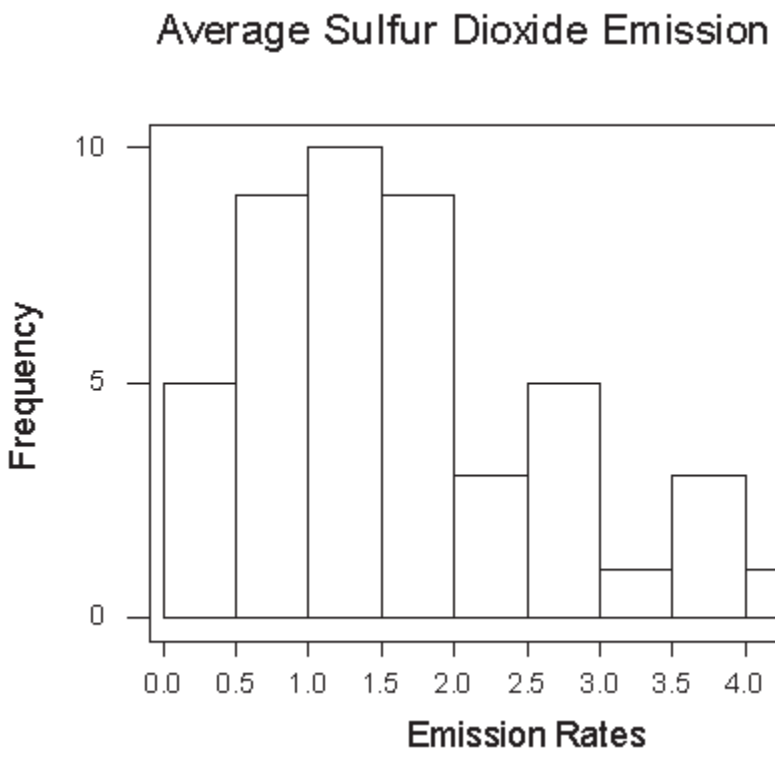
2	0 0 0 0 2 3 4 4 5 7 8
3	0 2 5 7
4	1 2 7 8 9
5	0 2 8
6	0 5

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

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

8) 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). 8) _____



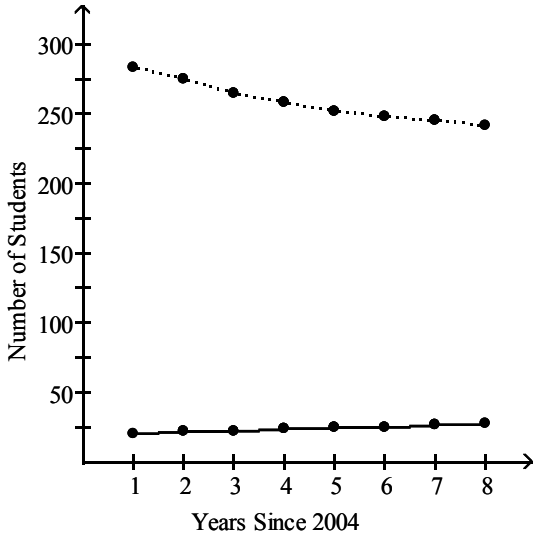
a. Identify the intervals of emission rates used for the plot.
b. Describe the shape of the distribution.
c. What information can you get from the dot plot or stem-and-leaf plot of these data that you
cannot get from this plot?
d. This histogram shows frequencies. If you were to construct a histogram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

9) 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. 9) _____

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

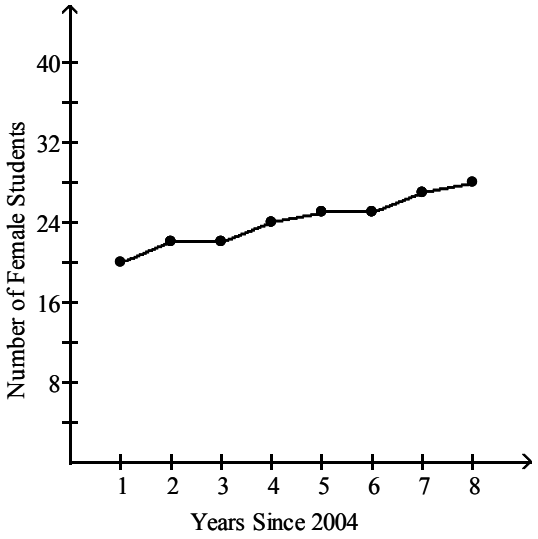
Enrollment at Pilot Training College



- - - - Total enrollment

——— Female enrollment

Female Enrollment at Pilot Training College



10) 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. 10) _____

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?

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

11) 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. 11) _____

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) 7.30 C) 8.25 D) 7.79 E) 7.38

12) 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: 12) _____

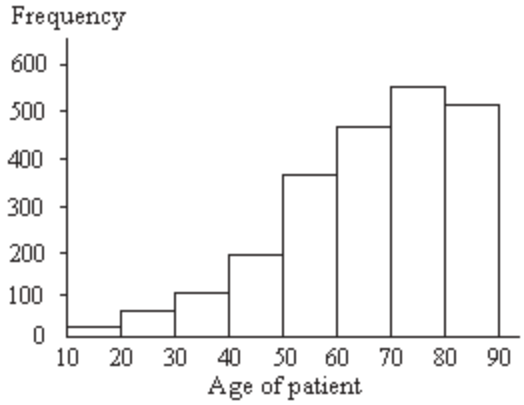
Company A	$72.0	Company F	$26.9
Company B	63.1	Company G	25.0
Company C	54.7	Company H	23.9
Company D	54.3	Company I	23.0
Company E	29.0	Company J	20.0

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

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

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) Skewed to the left
C) Symmetric
D) Multimodal
E) Bimodal

Provide an appropriate response.

14) 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. 14) _____

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

What is the mode of the number of deaths?

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

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

15) The table below shows the unemployment rate in one city from 2003 to 2012. 15) _____

Year	2003	2004	2005	2006	2007	2008	2009	2010	2
Unemployment Rate (Percent)	5.90	5.78	5.45	5.28	5.06	4.88	4.80	4.63	4

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.

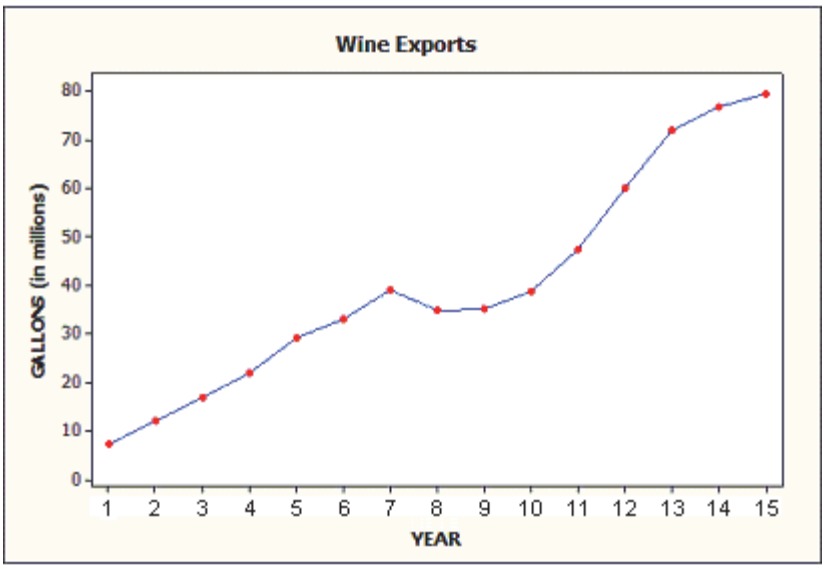
MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

16) 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. 16) _____

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

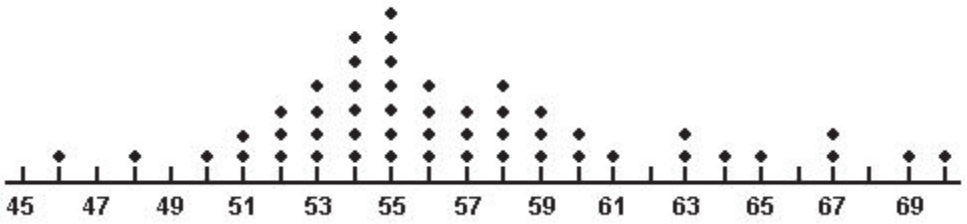
A) skewed to the left
B) bell-shaped
C) skewed to the right
D) unable to determine from the information given

17) 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? 17) _____



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

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.



18) What is the mode for speed? 18) _____
A) 70
B) 60
C) 7
D) 55
E) none of these

19) What proportion of the motorists were speeding? 19) _____
A) 2 B) 0.22 C) 0.72 D) 0.04 E) 0.18

Answer true or false.

20) Bar graphs and pie charts are graphical methods that are often used in summarizing quantitative data. 20) _____
A) True B) False

Select the most appropriate answer.

21) Which of the following is a discrete variable? 21) _____

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

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

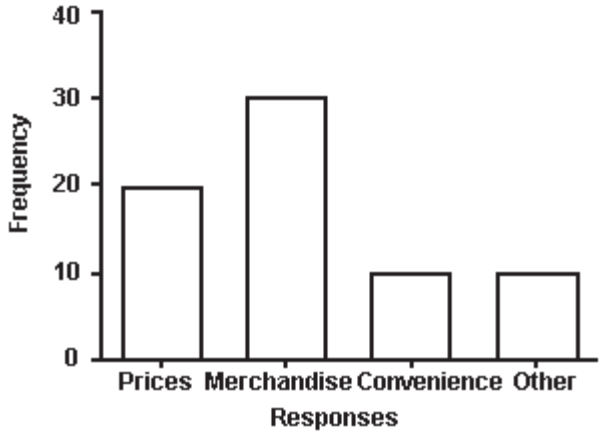
Fill in the blank.

22) A variable is called _____ if each observation belongs to one of a set of categories. 22) _____

23) The _____ is the balance point of the data values; while, the _____ is the midpoint of the ordered data values. 23) _____

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

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.



24) Is the variable "reason for shopping at our store" categorical or quantitative? 24) _____

A) Categorical B) Quantitative

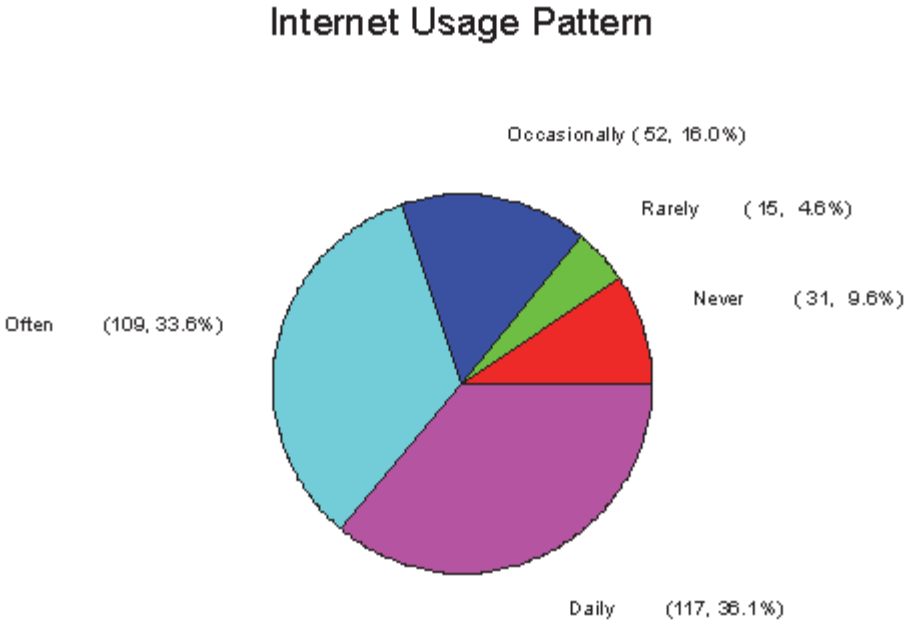
The following data show the number of laps run by each participant in a timed running race:

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

25) If the stems are 3, 4, 5 and 6, how many leaves are on the "4 stem"? 25) _____

A) 4 B) 5 C) 1 D) 0

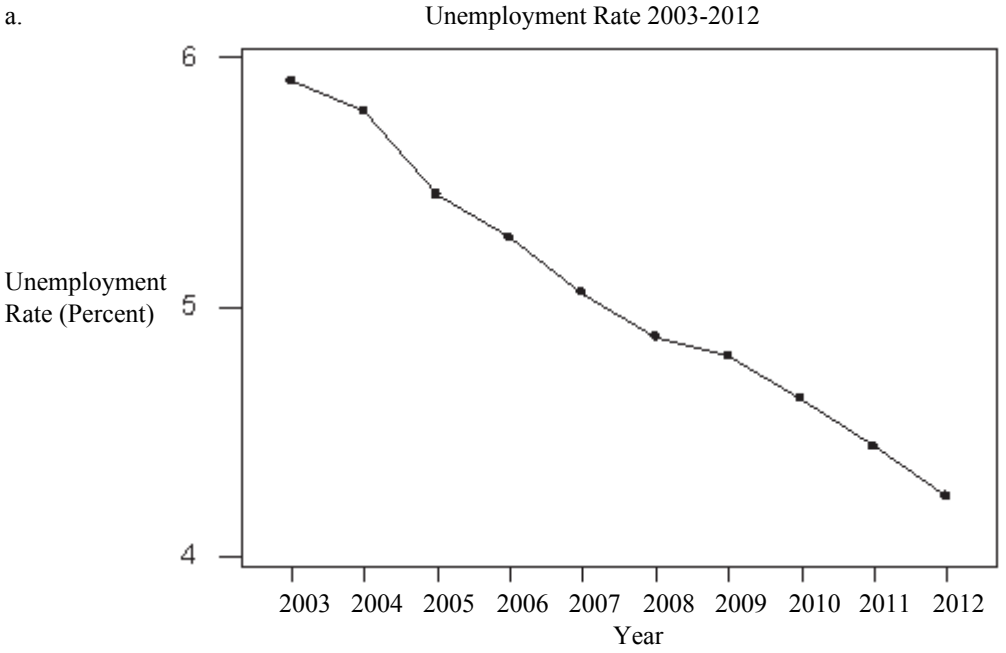
1) D
2) C
3) minimum = 2 seconds, Q1 = 10 seconds, median = 51 seconds, Q3 = 191 seconds, and maximum = 548 seconds
4) C
5) A
6) D
7) A
8) a. 0 to 0.49, 0.5 to 0.99, 1.0 to 1.49, 1.5 to 1.99, 2.0 to 2.49, 2.5 to 2.99, 3.0 to 3.49, 3.5 to 3.99, 4.0 to 4.49, 4.5 to 4.99; b. The distribution is skewed to 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.
9) 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.
10) a.



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.

11) D
12) C
13) B
14) B

15) a.



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

16) C
17) A
18) D
19) E
20) B
21) D
22) categorical
23) mean; median
24) A
25) B

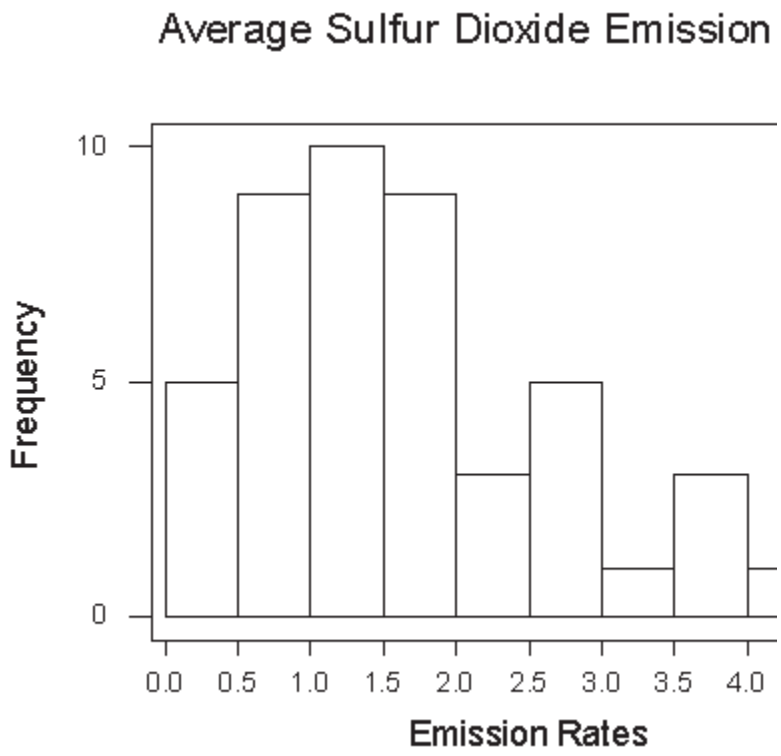
CHAPTER 2 FORM B TEST

Name_____

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

Provide an appropriate response.

1) 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). 1) _____



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?

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

2) Parking at a large university has become a major issue. University administrators would like to determine the average time it takes a student to find a parking spot in a university lot. Students who are willing to participate in the study were asked to record the time between entering campus and pulling into a parking spot. Which of the following would not be appropriate for displaying the parking time data? 2) _____

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

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

3) 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. 3) _____

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?

4) The table below shows the unemployment rate in one city from 2003 to 2012. 4) _____

Year	2003	2004	2005	2006	2007	2008	2009	2010	2
Unemployment Rate (Percent)	5.90	5.78	5.45	5.28	5.06	4.88	4.80	4.63	4

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.

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

5) 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 t right or skewed to the left. 5) _____

Mean = 120, s=22, Minimum=37, Maximum=136

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

6) 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. 6) _____

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

7) 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. 7) _____

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

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

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

8) The following data represent the number of grams of fat in various breakfast foods. 8) _____

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.

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

9) 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. 9) _____

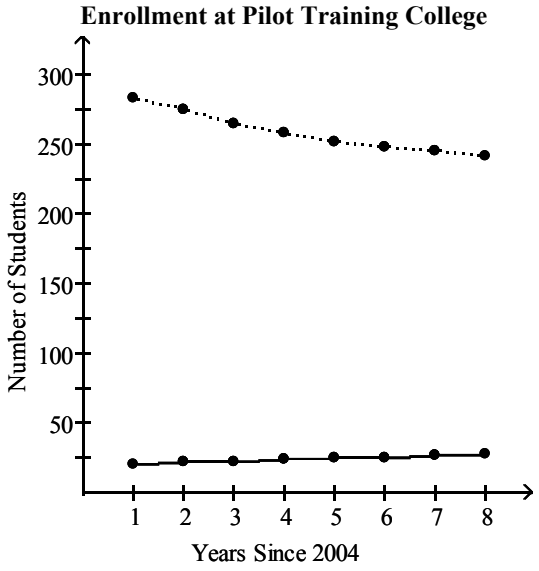
A) 47.5% B) 68% C) 51% D) 49.9% E) 34%

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

10) 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. 10) _____

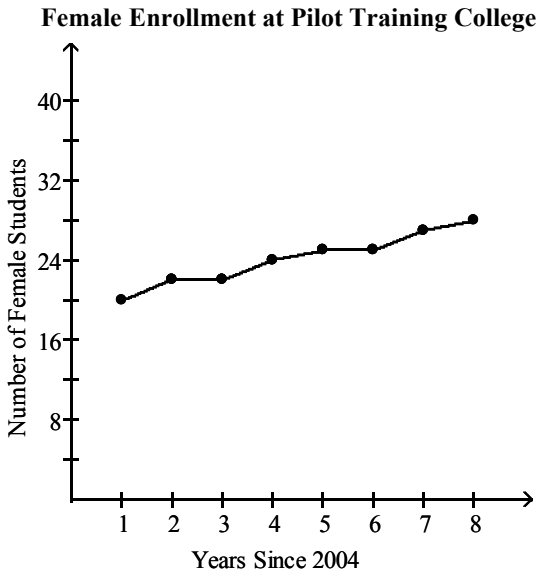
Enrollment at Pilot Training College

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



- - - - Total enrollment

——— Female enrollment



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

11) 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: 11) _____

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

12) 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. 12) _____

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

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

A)

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

B)

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

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 5

E)

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

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

13) 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. 13) _____

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

Find the Five-Number Summary of Positions.

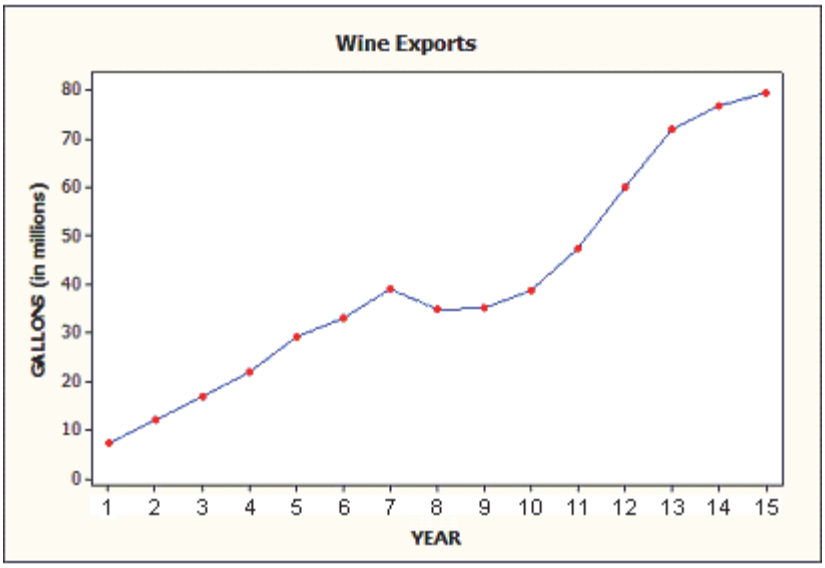
MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

14) 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. 14) _____

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

What is the mode of the number of deaths?
A) 13 B) 22 C) 16 D) 15.5 E) 12

15) 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? 15) _____



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

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

16) If the stems are 3, 4, 5 and 6, how many leaves are on the "4 stem"? 16) _____
A) 0 B) 5 C) 1 D) 4

Select the most appropriate answer.

17) Which of the following is a discrete variable? 17) _____

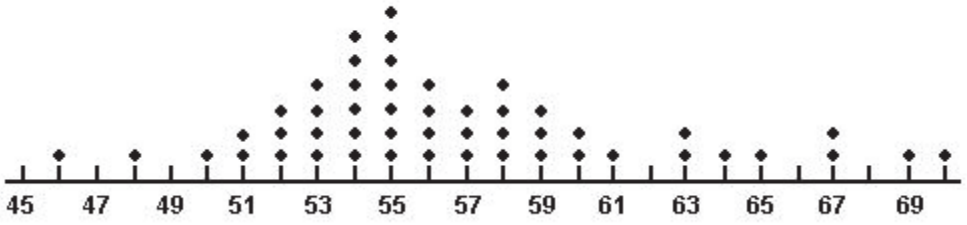
A) weight of a newborn baby
B) none of these
C) number of phones per household
D) amount of coffee in an 8–ounce cup
E) time it takes to drive to work

Classify as categorical or qualitative data.

18) A survey of automobiles parked in the student and staff lots at a large college recorded the make and model of the automobiles. The variable "make" is: 18) _____

A) Quantitative B) Categorical

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.



19) What is the mode for speed? 19) _____

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

Answer true or false.

20) Bar graphs and pie charts are graphical methods that are often used in summarizing quantitative data. 20) _____

A) True B) False

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

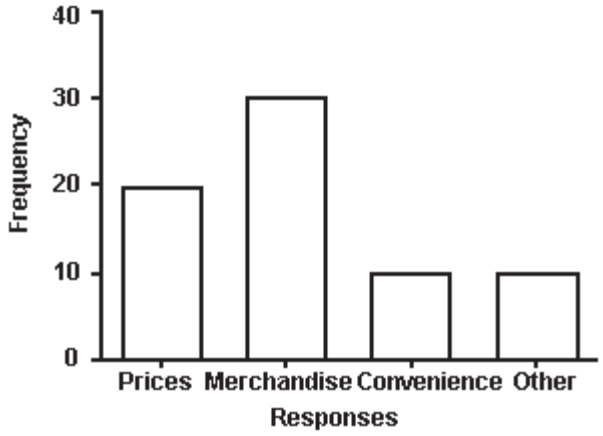
Fill in the blank.

21) A variable is called _____ if each observation belongs to one of a set of categories. 21) _____

22) The _____ is the balance point of the data values; while, the _____ is the midpoint of the ordered data values. 22) _____

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

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.



23) Is the variable "reason for shopping at our store" categorical or quantitative? 23) _____
A) Quantitative B) Categorical

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

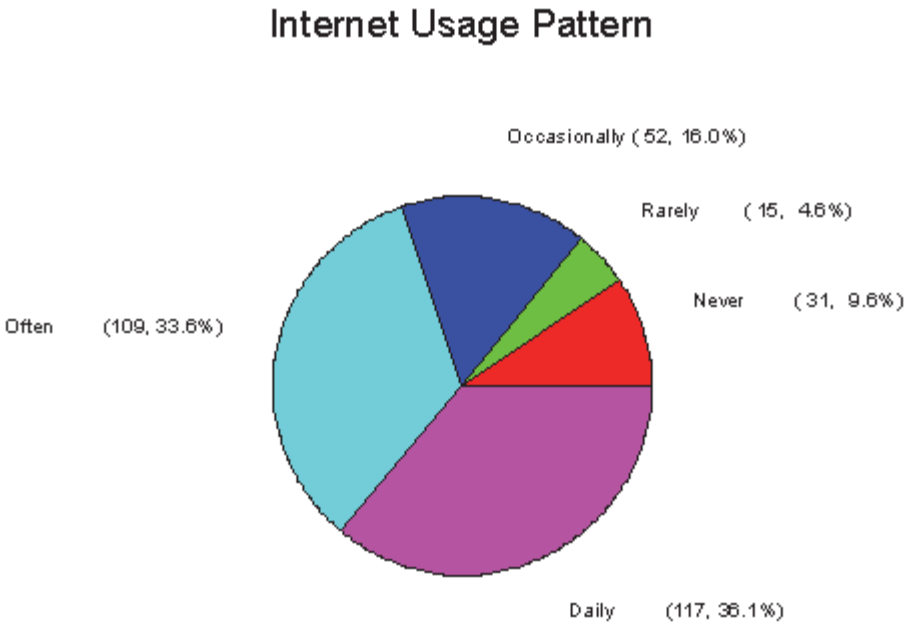
70	**72**	**71**	**70**	**69**	**73**	**69**	**68**	**70**	**71**
67	**71**	**70**	**74**	**69**	**68**	**71**	**71**	**71**	**72**
69	**71**	**68**	**67**	**73**	**74**	**70**	**71**	**69**	**68**

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**

24) What proportion of the 30 adult males had heights less than 70 inches? 24) _____
A) 0.367 B) 36.7 C) 16.7% D) 0.433 E) 0.167

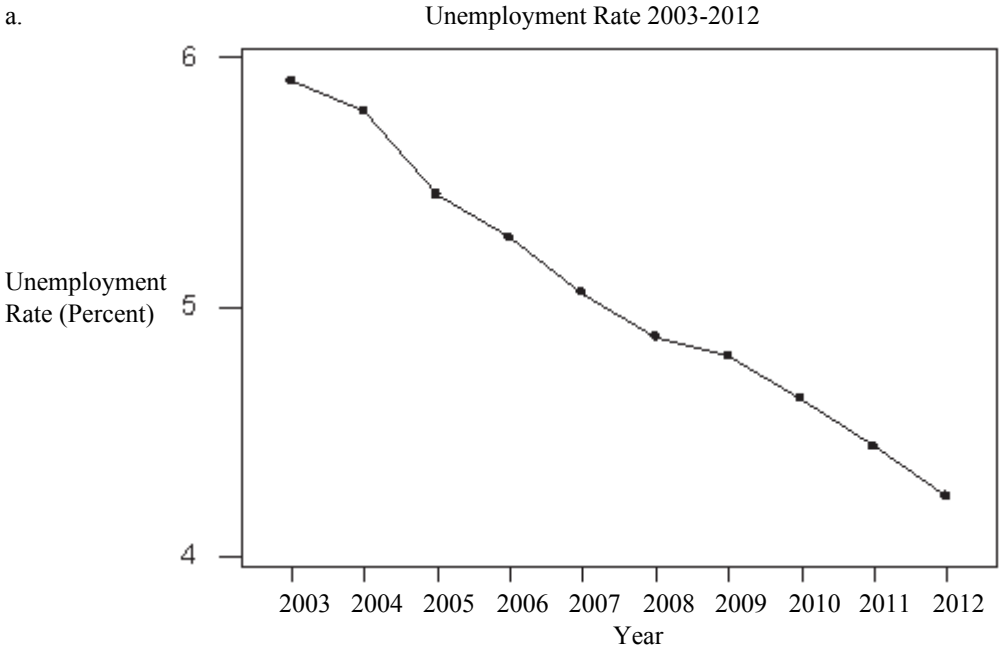
25) Which category of heights represents the mode? 25) _____
A) 70.0-71.4
B) 67.0-68.4
C) 68.5-69.9
D) 73.0-74.4
E) 71.5-72.9

1) 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.
2) E
3) a.



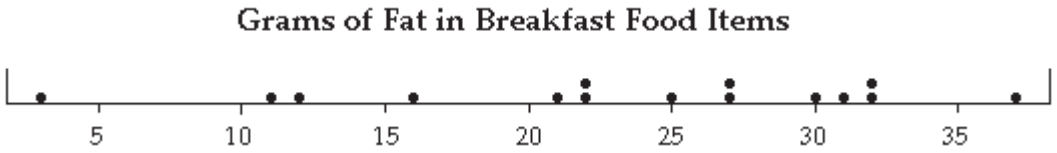
b. Since the categories of Internet usage pattern have a natural order from never to daily, it makes more sense to leave the categories in this natural order rather than ordering them from the tallest bar to the shortest bar.

4) a.



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

5) B
6) D
7) A
8)



9) E
10) 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.
11) B
12) D
13) minimum = 2 seconds, Q1 = 10 seconds, median = 51 seconds, Q3 = 191 seconds, and maximum = 548 seconds
14) E
15) C
16) B
17) C
18) B
19) B

20) B
21) categorical
22) mean; median
23) B
24) A
25) A