**MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.**
**Classify as categorical or qualitative data.**

1) 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: 1) _____
A) Categorical B) Quantitative

2) 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? 2) _____
A) Quantitative B) Categorical

3) Your statistics teacher has gathered information on each of the students in your class in order to illustrate the difference between categorical and quantitative variables. For each student, she has recorded their major, gender, age and height. The variable "major" is an example of what type of variable? 3) _____
A) Quantitative B) Categorical

4) 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? 4) _____
A) Quantitative B) Categorical

**Classify the variable as either discrete or continuous.**

5) The time it takes an athlete to run 100 meters. 5) _____
A) Continuous B) Discrete

6) The number of calls received between 8 a.m. and 5 p.m. by a technical support professional. 6) _____
A) Continuous B) Discrete

7) The following table shows the heights of the five tallest mountains in North America. 7) _____

| 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) Discrete B) Continuous

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

| 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 |

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8) _____
A) Continuous B) Discrete

9) Your statistics teacher has gathered information on each of the students in your class in order to illustrate the difference between discrete and continuous variables. For each student, she has recorded their height, number of credit hours completed and the time it took for them to complete their last exam. The variable "height" is 9) _____
A) Discrete B) Continuous

10) 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 10) _____
A) Continuous B) Discrete

**Select the most appropriate answer.**

11) Which of the following is a continuous variable? 11) _____
A) number of homeruns in a professional baseball player's career
B) brand of tennis shoe
C) number of pars in a round of golf
D) type of fish caught
E) daily high temperature in New York City

12) Which of the following is a discrete variable? 12) _____
A) weight of a newborn baby
B) number of phones per household
C) time it takes to drive to work
D) amount of coffee in an 8-ounce cup
E) none of these

13) The characteristics observed to address the questions posed in a study are called 13) _____
A) statistics.
B) variables.
C) categories.
D) parameters.
E) quantities.

**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 |

14) Identify the variable. 14) _____
A) Height

B) Relative frequency
C) Frequency
D) Number of classes
E) Number of adult males

15) Is the variable "height" continuous or discrete? 15) _____
A) Continuous B) Discrete

16) A height of 69 inches belongs to the class having what frequency? 16) _____
A) 0.167 B) 6 C) 11 D) 5 E) 0.20

17) What percentage of the 30 adult males had heights between 73 and 74.4 inches? 17) _____
A) 4
B) 0.04
C) none of these
D) 13.3
E) 0.133

18) What proportion of the 30 adult males had heights less than 70 inches? 18) _____
A) 36.7 B) 0.367 C) 0.433 D) 0.167 E) 16.7%

19) Which category of heights represents the mode? 19) _____
A) 68.5-69.9 B) 70.0-71.4 C) 67.0-68.4 D) 71.5-72.9 E) 73.0-74.4

**Provide an appropriate response.**

20) 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. 20) _____

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

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

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

21) 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 21) _____

| 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.

22) 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 22) _____

| 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.

**Fill in the blank.**

23) A variable is called _____ if each observation belongs to one of a set of categories. 23) _____

24) A variable is called _____ if observations on it take numerical values that represent different magnitudes of the variable. 24) _____

**MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question. Answer true or false.**

25) The frequency for a particular category is the proportion of observations that fall in the category. 25) _____
A) True B) False

26) A frequency table is a listing of possible values for a variable, together with their frequencies and/or relative frequencies. 26) _____
A) True B) False

**SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question. Provide an appropriate response.**

27) Why is it beneficial to label each pie slice of a pie chart with its corresponding percent? 27) _____

28) The enrollment for fall semester at University X is as follows. 28) _____

| 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.

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

29) 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? 29) _____
A) Histogram
B) Stem-and-leaf plot
C) Pie chart

D) None of these should be used.
E) Box plot

30) 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: 30) _____

| | | | |
|---|---|---|---|
| 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) Pie chart
C) Dot plot
D) Histogram
E) None of these should be used.

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

31) 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. 31) _____

| 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?

32) 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. 32) _____

| 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?

33) 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. 33)

| | | | | | | |
|---|---|---|---|---|---|---|
| 44 | 38 | 41 | 50 | 36 | 36 | 43 |
| 35 | 40 | 37 | 41 | 43 | 50 | 45 |
| 50 | 41 | 47 | 36 | 35 | 40 | 42 |

_____ _____

34) The following data represent the number of grams of fat in various breakfast foods. 34) _____

| 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.

35) 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. 35) _____

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 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.

36) 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. 36) _____

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

Construct a dot plot for these data.

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

37) 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. 37) _____

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 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
3 | 0 2 5 7 8
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 5

D)

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

E)

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

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

38) The scores for a statistics test are as follows: 38) _____

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

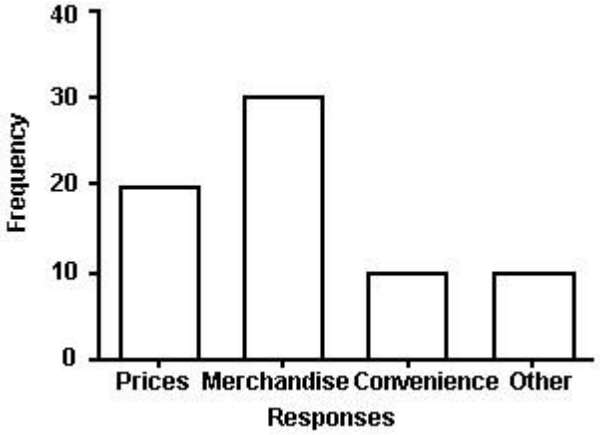
Create a stem-and-leaf display for the data. The stem should consist of the tens digit and range from 1 to 9. The leaves should be drawn aside the appropriate stem based on the data values.

39) The table below shows the unemployment rate in one city from 2003 to 2012. 39) _____

| 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.

**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.**




40) What proportion of the customers responded that the merchandise was the reason they shopped at the store? 40) _____

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

41) What response represents the mode? 41) _____

A) Other B) Merchandise C) Convenience D) Prices

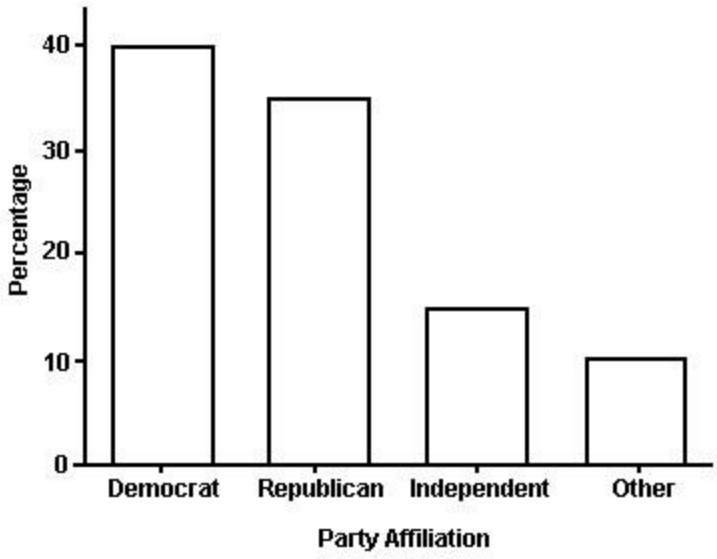
42) Is the variable "reason for shopping at our store" categorical or quantitative? 42) _____

A) Quantitative B) Categorical

43) What percentage of the customers gave "prices" or "merchandise" as their answer? 43) _____

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

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




44) What percentage of the 1000 registered U.S. voters belongs to one of the two traditional parties (Democratic and Republican)? 44) _____

A) 25% B) 75% C) 40% D) 35% E) 50%

45) About how many of the registered U.S. voters stated "Independent" as their political party affiliation? 45) _____

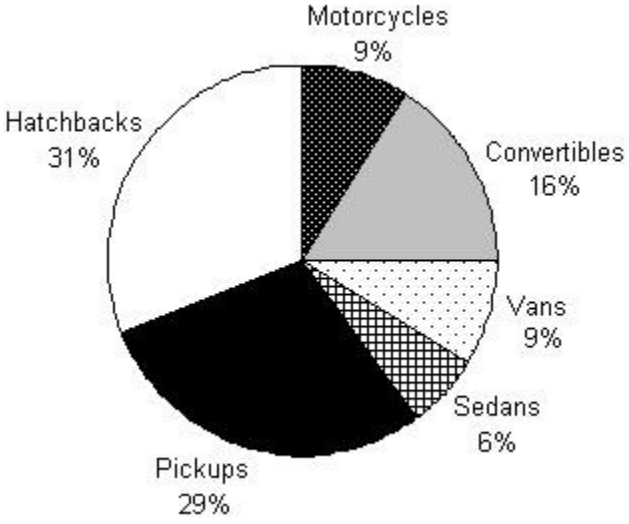
A) cannot be determined from the information given
B) 150
C) 15%
D) 15

46) Which response represents the mode? 46) _____

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

**Provide an appropriate response.**

47) Results from a survey of 7116 vehicle types on the campus of State College are summarized in the following pie chart. 47) _____



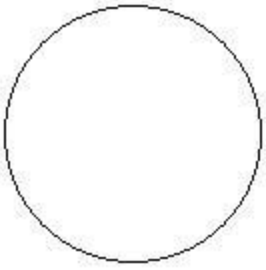

How many of the vehicles were sedans? Give your answer to the nearest whole number.

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

**Construct a pie chart illustrating the given data set.**

48) After reviewing a movie, 900 people rated the movie as excellent, good, or fair. The following data give the rating distribution. 48) _____

| Excellent | Good | Fair |
|---|---|---|
| 180 | 450 | 270 |



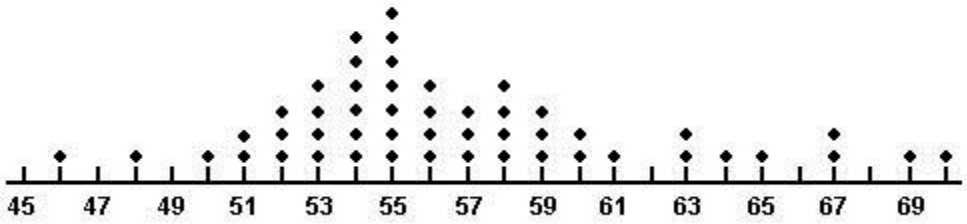
A)


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.**




49) What proportion of the motorists were speeding? 49) _____

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

50) What is the mode for speed? 50) _____

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

51) Would a pie chart be appropriate for displaying this data? 51) _____

A) No B) Yes

52) What is the variable of interest? 52) _____

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

**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 |

53) What percentage of the respondents rated overall television quality as very good (regarded as ratings of 80 and above)? 53) _____

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

54) What is the mode rating? 54) _____

A) 93 B) 9 C) 51 D) 49

55) The variable "quality" is 55) _____

A) Categorical B) Quantitative

56) Identify the minimum quality rating. 56) _____

A) 0 B) 26 C) 32 D) 2

57) Identify the maximum quality rating. 57) _____

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

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

58) 58) _____

| Stem | Leaves |
|---|---|
| 8 | 5 8 |
| 9 | 1 8 |
| 10 | 5 5 |

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

**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**

59) If the stems are 3, 4, 5 and 6, how many leaves are on the "4 stem"? 59) _____

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

60) If the stems are 3, 4, 5 and 6,what are the values of the leaves are on the "4 stem"? 60) _____

A) 0 B) 5 C) 3, 6, 8, 9 D) 3, 3, 6, 8, 9

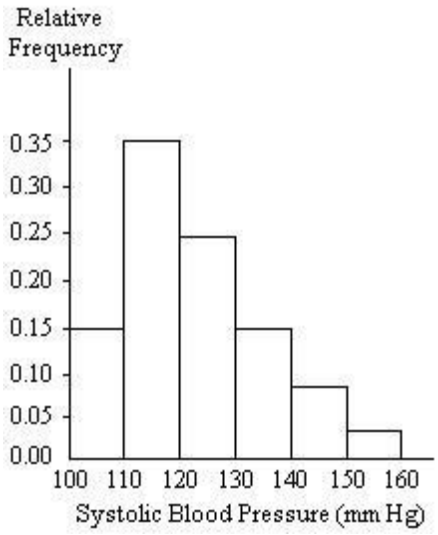
61) Is the variable "number of laps run" discrete or continuous? 61) _____

A) Discrete B) Neither C) Continuous

62) What is the mode for number of laps run? 62) _____

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

**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.**




63) Approximately what percentage of the people aged 25-40 had a systolic blood pressure reading of at least 110 but less than 120? 63) _____

A) 15% B) 0.35% C) 3.5% D) 35% E) 30%

64) Approximately what percentage of the people aged 25-40 had a systolic blood pressure reading less than 120? 64) _____

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

65) Given that 200 people were aged between 25 and 40, approximately how many had a systolic blood pressure reading less than 130? 65) _____

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

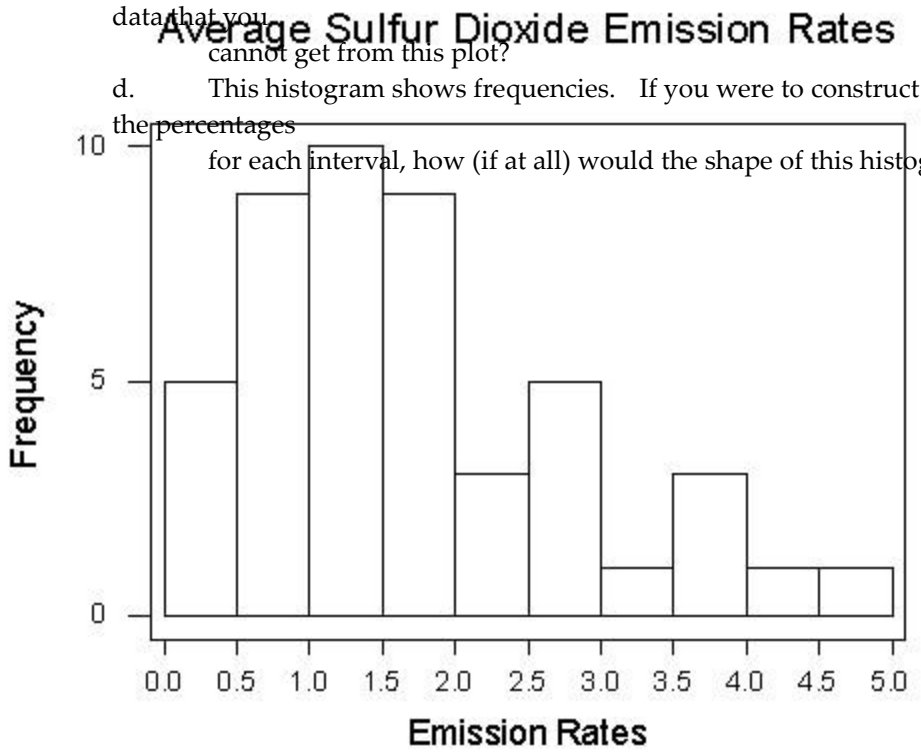
**SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question. Provide an appropriate response.**

66) 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).

66) _____

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?




a. Identify the intervals of emission rates used for the plot.

b. Describe the shape of the distribution.

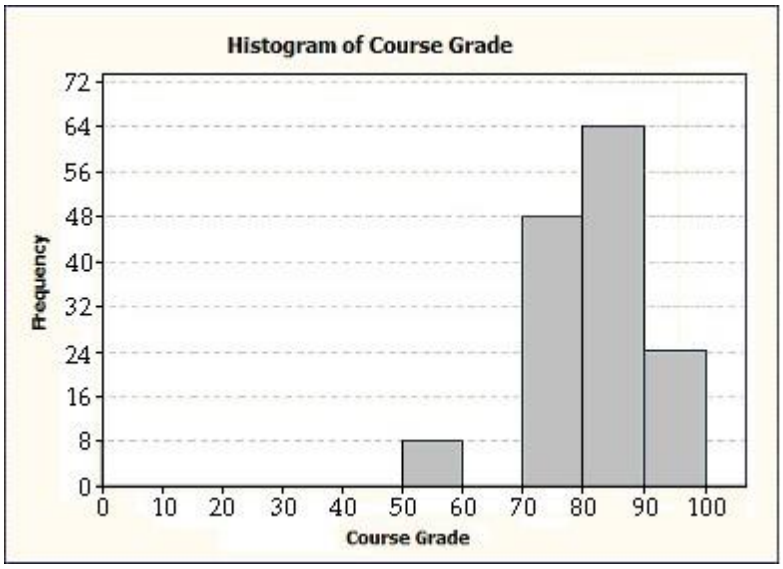
c. What information can you get from the dot plot or stem-and-leaf plot of these

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

67) 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. 67) _____

Course Grading Scale

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



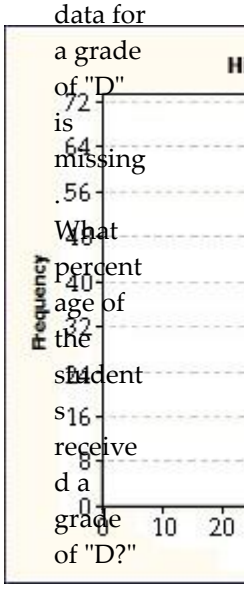

The data for a grade of "D" is missing. What is the correct frequency for the grade of "D?"

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

68) 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 |

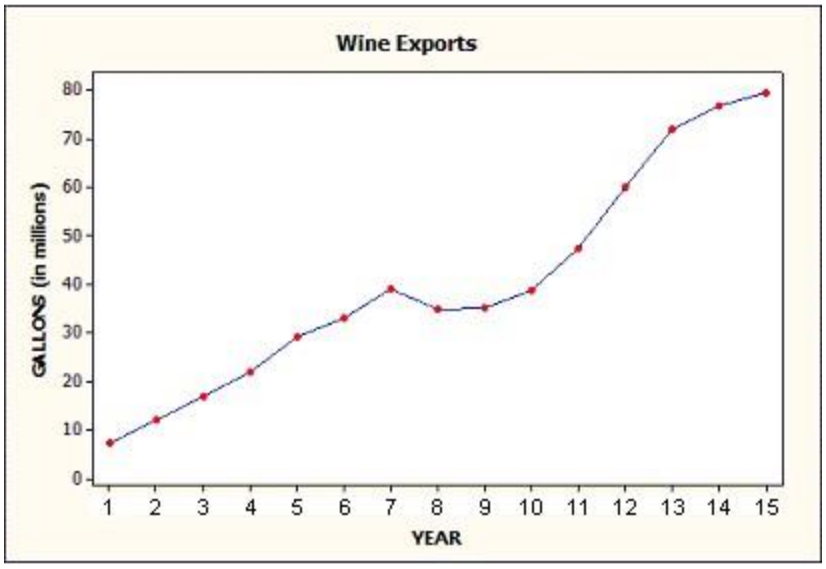



The data for a grade of "D" is missing. What percentage of the students received a grade of "D?"

68) _____

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

69) 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? 69) _____



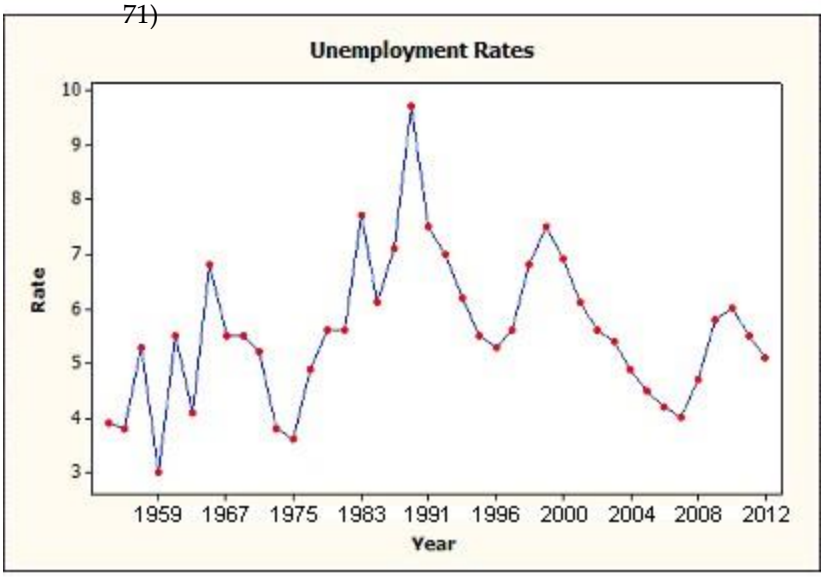

A) yes, decreasing trend B) no trend evident C) yes, increasing trend

70) 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? 70) _____


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

71) 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?

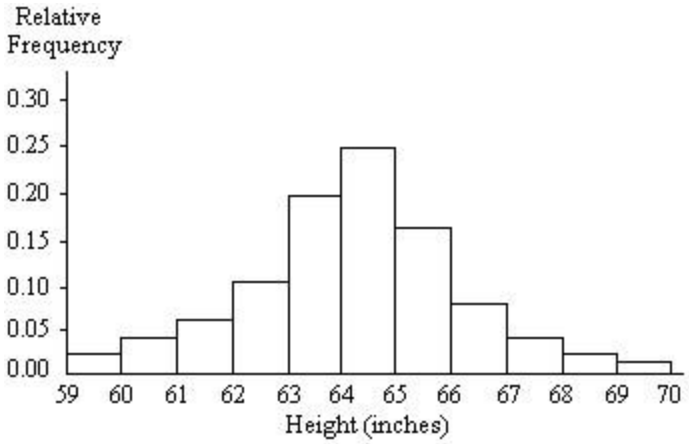
71) ___
___




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

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

72) A relative frequency histogram for the heights of a sample of adult women is shown below. 72) _____

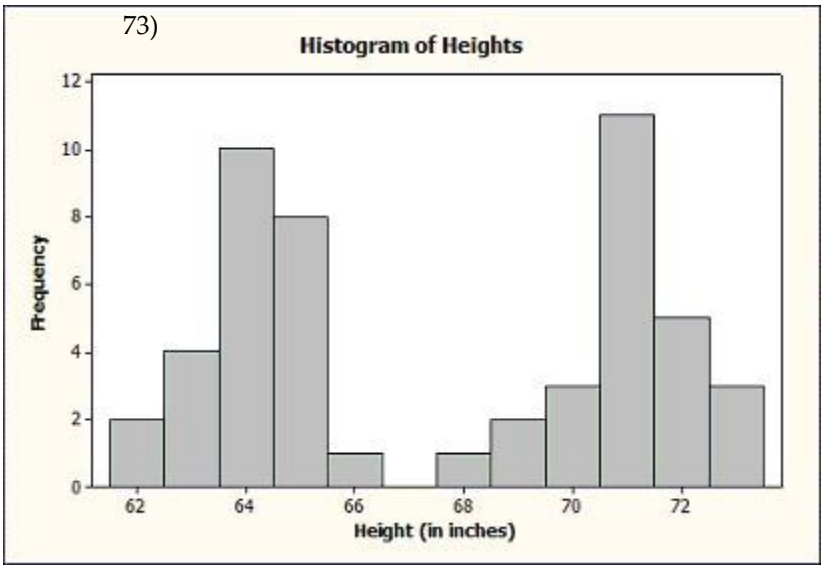



Which of the following best describes the shape of the distribution?

A) Skewed to the right B) Skewed to the left

C) Bimodal D) Symmetric

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

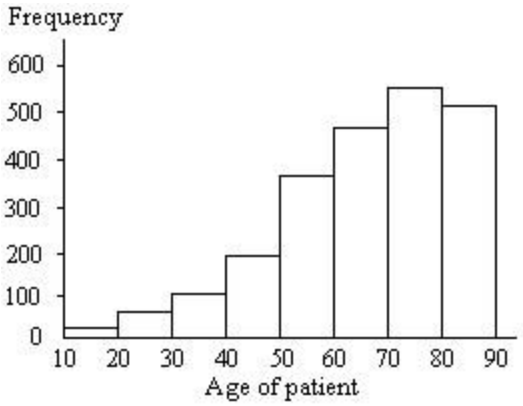
73) 


___
___

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

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

74) The ages of a group of patients being treated at one hospital for osteoporosis are summarized in the frequency histogram below. 74) _____




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

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

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

75) ___

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

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

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

**Select the most appropriate answer.**

76) A distribution that shows an overall pattern with a single mound is called 76) _____
A) multimodal.
B) bimodal.
C) unimodal.
D) nonmodal.
E) symmetric.

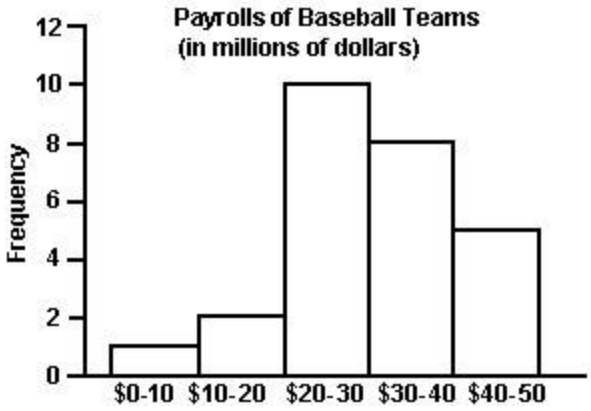
77) A distribution that shows an overall pattern with two mounds is called 77) _____
A) None of the these.
B) multimodal.
C) nonmodal.
D) bimodal.
E) unimodal.

78) A distribution that has a left tail longer than the right tail is considered 78) _____
A) symmetric.
B) not skewed.
C) skewed to the right.
D) None of these.

E) skewed to the left.

79) A distribution that has the right tail longer than the left tail is considered 79) _____
A) skewed to the right.
B) not skewed.
C) skewed to the left.
D) symmetric.
E) None of these.

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

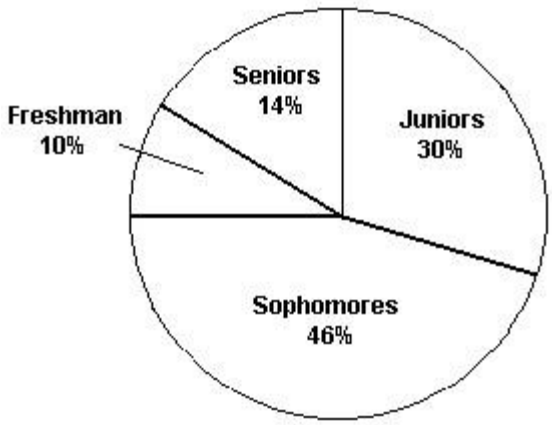



80) How many of the major-league payrolls exceed $20 million? (Assume that no payroll is exactly $20 million.) 80) _____
A) 10 payrolls
B) 3 payrolls
C) 14 payrolls
D) 24 payrolls
E) 23 payrolls

81) What percentage of the payrolls exceed $30 million? (Assume that no payroll is exactly $30 million.) 81) _____
A) 12 B) 13 C) 19% D) 46% E) 50%

**Provide an appropriate response.**

82) 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. 82) _____




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

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

**Answer true or false.**

83) Bar graphs and pie charts are graphical methods that are often used in summarizing quantitative data. 83) _____
A) True B) False

84) Dot plots and stem-and-leaf plots are often used to summarize small quantitative datasets. 84) _____
A) False B) True

**SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.**
**Fill in the blank.**

85) A _____ is a graph that uses bars to portray the frequencies or the relative frequencies of the possible outcomes for a quantitative variable. 85) _____

**MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.**
**Select the most appropriate answer.**

86) Which of the following graphical methods cannot be used to summarize a quantitative dataset? 86) _____
A) a stem-and-leaf plot
B) a frequency table
C) a dot plot
D) a histogram
E) a bar graph

87) A set of data collected over time is called a 87) _____
A) time series.
B) time plot.
C) time bar.
D) None of these.
E) data series.

88) A common pattern observed over time is called a/an 88) _____
A) None of these.
B) trend.
C) time plot.
D) time series.
E) mode

**Provide an appropriate response.**

89) 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. 89) _____

| | | | | | |
|---|---|---|---|---|---|
| 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

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

| | | | |
|---|---|---|---|
| 3.5 | 1.6 | 2.4 | 3. |
| 3.9 | 1.0 | 3.6 | 4. |
| 3.7 | 2.2 | 1.5 | 4. |
| 2.7 | 0.4 | 3.7 | 2. |

90) ___

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

91) The age at inauguration for 15 presidents of various organizations are below. Find the mean age. 91) _____

| | |
|---|---|
| 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 years B) 46.5 years C) 55 years D) 55.5 years

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

92) 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. 92) _____

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

Find the mean.

**MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.**
**Find the median for the given sample data.**

93) 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: 93) _____

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) 72 C) 72.5 D) 69 E) 73

94) A store manager kept track of the number of newspapers sold each week over a seven-week period. The

results are shown below.
95, 38, 221, 122, 258, 237, 233
Find the median number of newspapers sold.

94) ___
___

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

**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) 55 years B) 54.5 years C) 56 years D) 55.5 years

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

96) 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. Find the median. 96) _____

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

_____ _____

97) The following data provide the daily protein intake (in grams of protein per kilogram of body weight) for 20 competitive athletes. 97) _____

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 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.

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

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

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

99) 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. 99) _____

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

**SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.**
**Fill in the blank.**

100) The _____ is the balance point of the data values; while, the _____ is the midpoint of the ordered data values. 100) _____

101) Extreme observations in the dataset are called _____. 101) _____

**MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.**
**Answer true or false.**

102) A numerical summary of the observations is called resistant if extreme observations have little, if any, influence on its value. 102) _____

A) False B) True

103) If a distribution is very highly skewed, the mean is usually preferred over the mean because it better represents what is typical. 103) _____

A) True B) False

104) In skewed distributions, we expect the values of the mean, median, and mode to be approximately equal, since they are all measures of center. 104) _____

A) True B) False

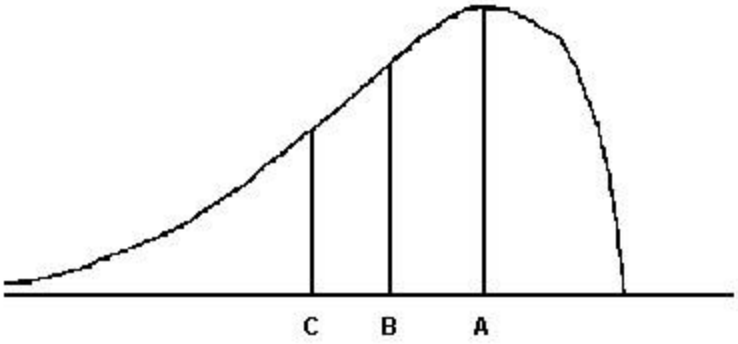
**Provide an appropriate response.**

105) The distribution of salaries of professional basketball players is skewed to the right. Which measure of central tendency would be the best measure to determine the location of the center of the distribution? 105) _____

A) Mode
B) Range

C) Median
D) Standard Deviation
E) Mean

106) For the distribution shown below, identify the mean, median, and mode 106) _____




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

107) The mean is less than the median 107) _____
A) when the data is skewed to the right
B) when the data is skewed to the left
C) never
D) when the data is symmetric

108) 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? 108) _____
A) mode
B) range
C) none of the above
D) variance
E) standard deviation

109) For the stem-and-leaf plot below, find the range of the data set. 109) _____

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

110) The heights (in inches) of 20 adult males are listed below. Find the range of the data. 110) _____

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

A) 5.5 B) 5 C) 7 D) 6.5 E) 6

111) The age at inauguration for 15 presidents of various organizations are below. Find the range of the ages. 111) _____

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

112) The cost for one semester's books (in dollars) are given below for a sample of five college students. Calculate the sample standard deviation, s of the book costs. Round to the nearest hundredth when necessary. 112) _____

340, 170, 145, 420, 120

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

113) The heights (in inches) of 10 adult males are listed below. Find the standard deviation, s. Round to the nearest hundredth. 113) _____

70 72 71 70 69 73 69 68 70 71

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

114) The mean score on the SAT writing section was 497 for the a given graduating class. Noting that this test is scored on a scale of 200 to 800, which of the following is the most plausible value for the standard deviation of the scores? 114) _____

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

115) The proportion of adults aged 15-49 who are living with HIV/AIDS is 0.5% in Latin America, 1.0% in the Caribbean, 0.9% in Eastern Europe and Central Asia and 0.6% in North America. Suppose we include the proportion for Sub-Saharan Africa (5.0%) to this data set and calculate the standard deviation. Would you expect it to be significantly larger, smaller or remain about the same as the standard deviation of the proportions WITHOUT the observation from Sub-Saharan Africa? 115) _____

A) remain about the same
B) unable to determine from the information given
C) significantly larger
D) significantly smaller

116) 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. 116) _____

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

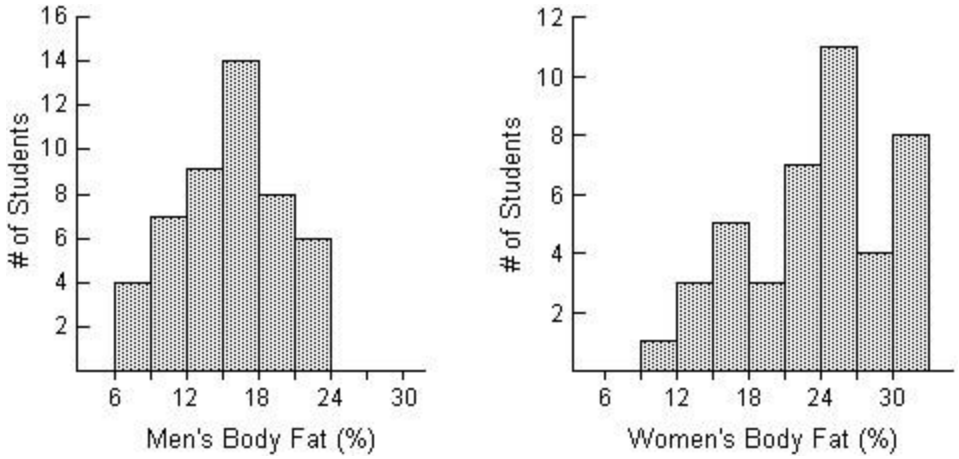
A) skewed to the left
B) bell-shaped
C) skewed to the right
D) unable to determine from the information given

117) 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. 117) _____

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

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

118) The histograms below display the body fat percentages of 42 female students and 48 male students taking a college health course. 118) _____

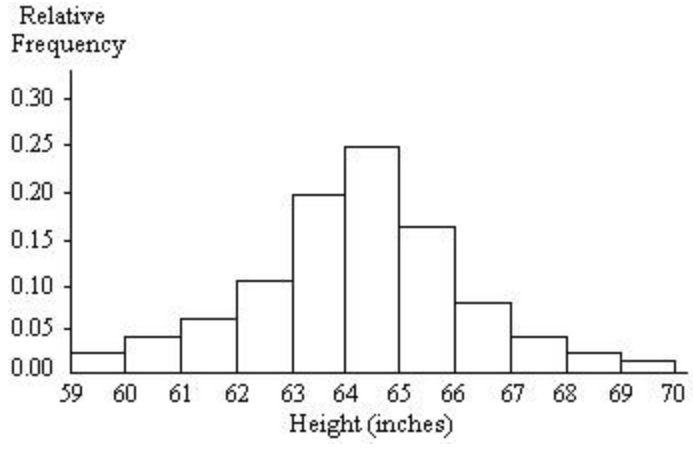



Do the female or male students have a larger standard deviation?

A) female students B) male students

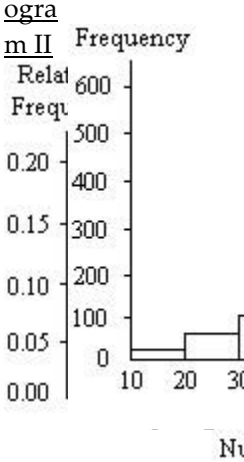
119) Histograms are presented below for three different samples. To which of the samples does the empirical rule apply?

Histogram I




Hist ogram III

Hist ogra m II

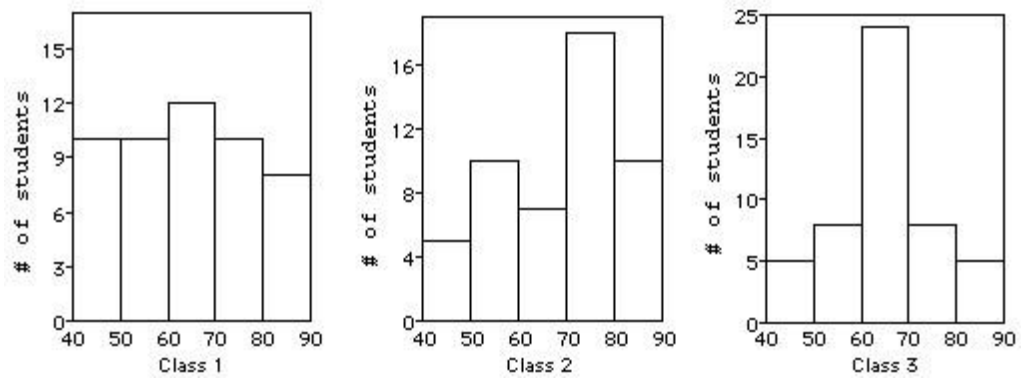



Hist

119) _____

A) I and II B) I and III C) II only D) I only

120) 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? 120) _____




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

121) 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. 121) _____

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

122) 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. 122) _____

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

123) According to the Empirical Rule, approximately 95% of the data values from a bell-shaped distribution fall within _____ standard deviations of the mean. 123) _____

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

**SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.**
**Fill in the blank.**

124) The _____ is the difference between the largest and the smallest data values. 124) _____

**MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.**
**Answer true or false.**

125) The sum of the deviations, the differences between the observations and the sample mean $\sum(x - \bar{x})$, is always equal to zero. 125) _____

A) True B) False

**Select the most appropriate answer.**

126) Which of the following numerical summary measures cannot be negative? 126) _____

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

**Determine the quartile, percentile or interquartile range as specified.**

127) The test scores of 15 students are listed below. Find the first quartile, $Q_1$. 127) _____

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

A) 57.0 B) 58.5 C) 55.5 D) 53.4 E) 54.0

128) The test scores of 19 students are listed below. Find the interquartile range. 128) _____

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

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

129) When Scholastic Achievement Scores (SAT's) are sent to test-takers, the percentiles associated with their scores are also given. Suppose a test-taker scored at the 75th percentile for their verbal grade and at the 37th percentile for their quantitative grade. Interpret these results. 129) _____

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

130) The cholesterol levels (in milligrams per deciliter) of 30 adults are listed below. Find the interquartile range for the cholesterol level of the 30 adults. 130) _____

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) 31 B) 30 C) 111 D) 211 E) 180

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

131) The test scores of 15 students are listed below. 131) _____

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

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

132) The normal annual precipitation (in inches) is given below for 21 different U.S. cities. 132) _____

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) 59.4, 65.3
B) 9.2, 12.3

C) 9.2, 59.4, 65.3
D) 65.3
E) None

**Find the five-number summary for the given data.**

133) The salaries (in millions of dollars) of the top 10 highest paid CEOs in the U.S. 133) _____

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

134) The normal annual precipitation (in inches) is given below for 21 different U.S. cities. 134) _____

| | | | | | | |
|---|---|---|---|---|---|---|
| 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, 14.3, 22.6, 33.8, 51.7 inches
B) 5.1, 14.1, 22.6, 31.625, 51.7 inches
C) 5.1, 14.7, 22.6, 35.6, 51.7 inches
D) 5.1, 14.7, 21.3, 33.8, 51.7 inches
E) 5.1, 14.1, 21.3, 31.625, 51.7 inches

**SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question. Provide an appropriate response.**

135) 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. 135) _____

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

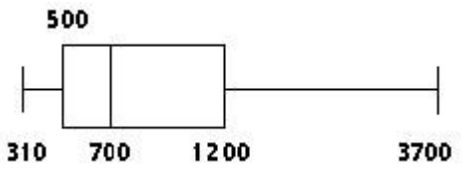
Find the Five-Number Summary of Positions.

**MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question. Construct a boxplot as specified.**

136) 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? 136) _____

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

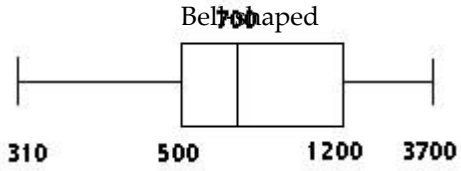
A)



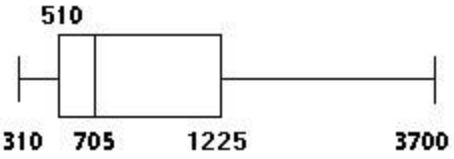

Skewed-right

B)

Bell-shaped

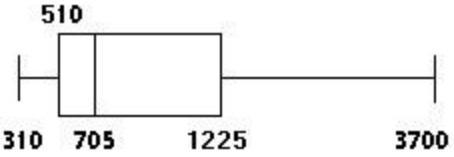



C)



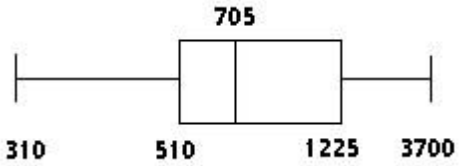

Skewed-left

D)




Skewed-right

E)




Skewed-left

**SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question. Provide an appropriate response.**

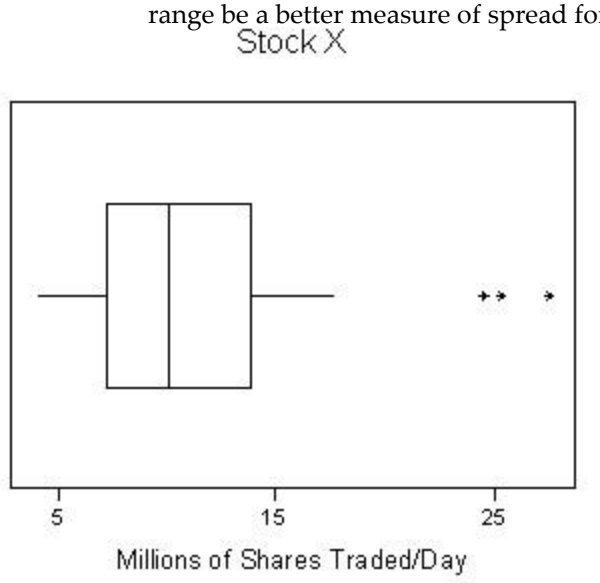
137) 1.The data below represent the number of inches of rain in Chicago, Illinois, during the month of April for 20 randomly selected years. 137) _____

| | | | | |
|---|---|---|---|---|
| 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.

138) 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.

range be a better measure of spread for this dataset? Explain. 138) _____




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

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

139) 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? 139) _____

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

140) The weight at birth of males has a mean value of 3.53 kg with a standard deviation of 0.58. For a male child weighing 2.75 kg at birth, what is the corresponding z-score? 140) _____

A) 0.78 B) 1.34 C) -0.78 D) -1.34

141) The weight at birth of males has a mean value of 3.53 kg with a standard deviation of 0.58. What birth weight has a z-score of 0.81? 141) _____

A) 2.52 kg B) 4 kg C) -4 kg D) -3.06 kg

**Select the most appropriate answer.**

142) 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? 142) _____

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

143) 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? 143) _____

Weights: 110 pounds, 157 pounds, 281 pounds

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

144) In human engineering and product design, it is important to consider the weights of people so that airplanes or elevators are not overloaded. The distribution of weights for adult males in the U.S. has a mean weight of 173 pounds and a standard deviation of 30 pounds. Suppose the distribution of weights was skewed to the left. Which of the following values is most likely the value of the median weight? 144) _____

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

145) The area of New Jersey Counties, in square miles, ranges from 47 to 819 with Q1=228, median=329 and Q3=476. The full data set follows.

130
47 192
103

221 228 145) ____
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) -43, 701 D) -144, 848

146) The area of New Jersey Counties, in square miles, ranges from 47 to 819 with Q1=228, median=329 and Q3=476. The full data set follows. 146) _____

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

147) The salaries of the top 10 highest paid CEOs in the U.S. ranged from 249.42 to 68.95 million dollars. These data had Q1=71.84, median=101.7 and Q3=139.96. The full data set is given below. 147) _____

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

148) The salaries of the top 10 highest paid CEOs in the U.S. ranged from 249.42 to 68.95 million dollars. These data had Q1=71.84, median=101.7 and Q3=139.96. The full data set is given below. 148) _____

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

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

**Fill in the blank.**

149) The five-number summary of a dataset consists of the _____, _____, _____, _____, and _____. 149) _____

150) The _____ for a data value is the number of standard deviations that it falls from the mean. 150) _____

**MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.**
**Answer true or false.**

151) The median is always the midpoint of Q1 and Q3. 151) _____
A) False B) True

**Select the most appropriate answer.**

152) One-fourth of the dataset lies 152) _____
A) above Q1.
B) above Q3.
C) below Q3.
D) between Q1 and Q3.
E) above Q2.

153) The median is equivalent to which quartile? 153) _____
A) Q4
B) Q2
C) Q3
D) None of these.
E) Q1

154) What percent of the data falls below Q1? 154) _____
A) 50% B) 25% C) 33% D) 75% E) 10%

155) What percent of the data falls above Q2? 155) _____
A) 90% B) 10% C) 25% D) 75% E) 50%

156) Which of the following numerical summary measures is not sensitive to outliers in a dataset? 156) _____
A) standard deviation
B) range
C) none of these
D) mean
E) interquartile range

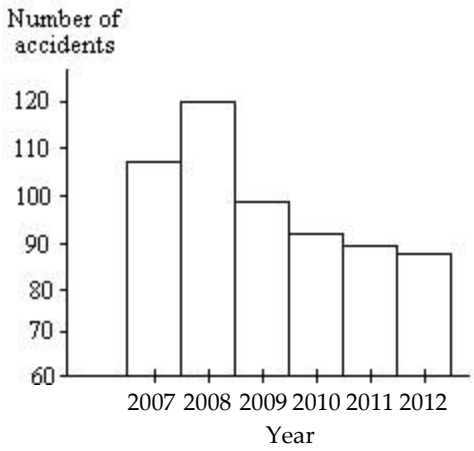
157) Which of the following numerical summary measures cannot be easily approximated from a box plot? 157) _____
A) median
B) Q1
C) variance
D) range
E) interquartile range

**SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.**
**Provide an appropriate response.**

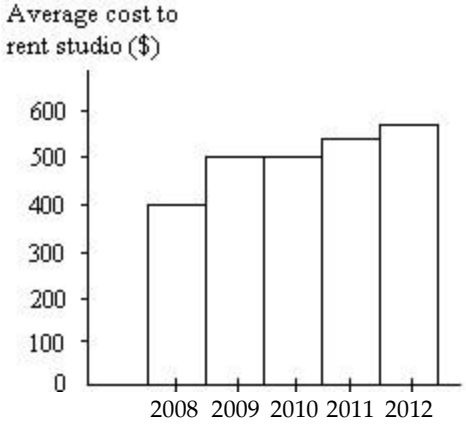
158) The histogram below shows the number of car accidents occurring in one city in each of the years 2007

through 2012. The number of accidents dropped in 2009 after a new speed limit was imposed. Why is the graph misleading? How would you redesign the graph to be less misleading?

158) ____
____
____




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



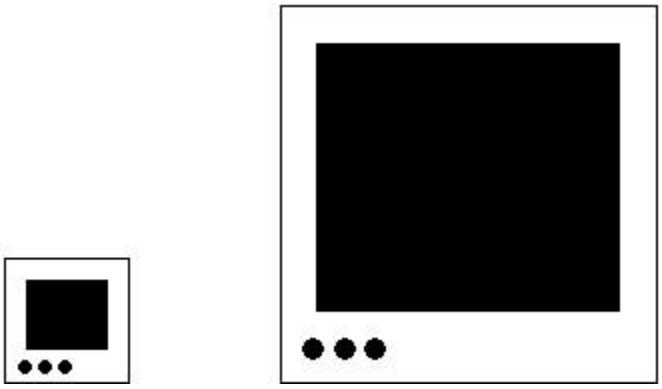

By what percentage does the average price increase from 2008 to 2009? Obtain a truncated version of the graph by sliding a piece of paper over the bottom of the graph so that the bars start at 300 In the truncated graph, by what

percentage does the price appear to increase from 2008 to 2009? Why is the truncated graph misleading?

159) ____
____
____

160) 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.

160) _____



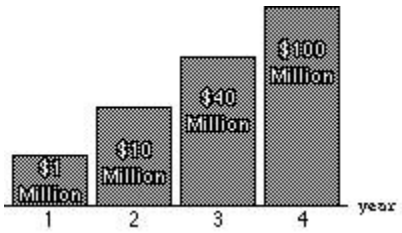
2002 2012

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

**Identify the abuse of statistics.**

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

161) _____




**Provide an appropriate response.**

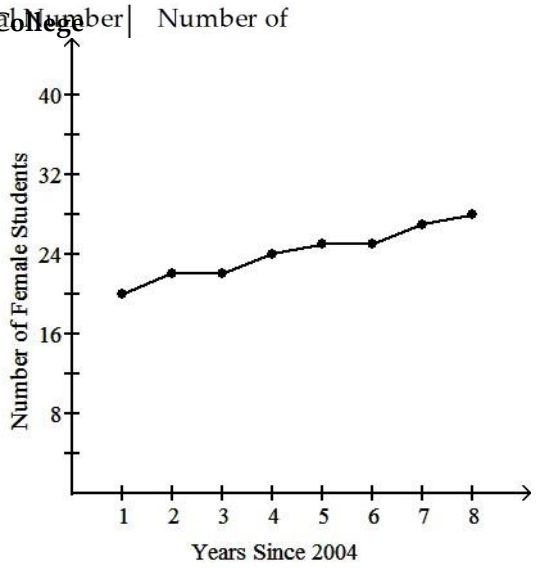
162) The table below summarizes total enrollment and female enrollment at a pilot training college for the years 2005 through 2012. The table has been used to construct two different graphs displayed below the table. Summarize the information that is available from each of the graphs and discuss the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

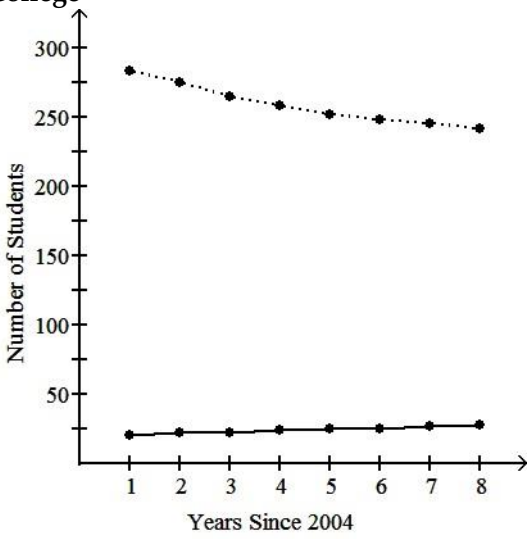
**Enroning College llme nt at Pilot Trai**

162) _____

| Year | Total Number of | Number of |
|---|---|---|
| 2005 | | |
| 2006 | | |
| 2007 | | |
| 2008 | | |
| 2009 | | |
| 2010 | | |
| 2011 | | |
| 2012 | | |

**College Enrollment at Pilot Training College**




- - - - Total enrollment

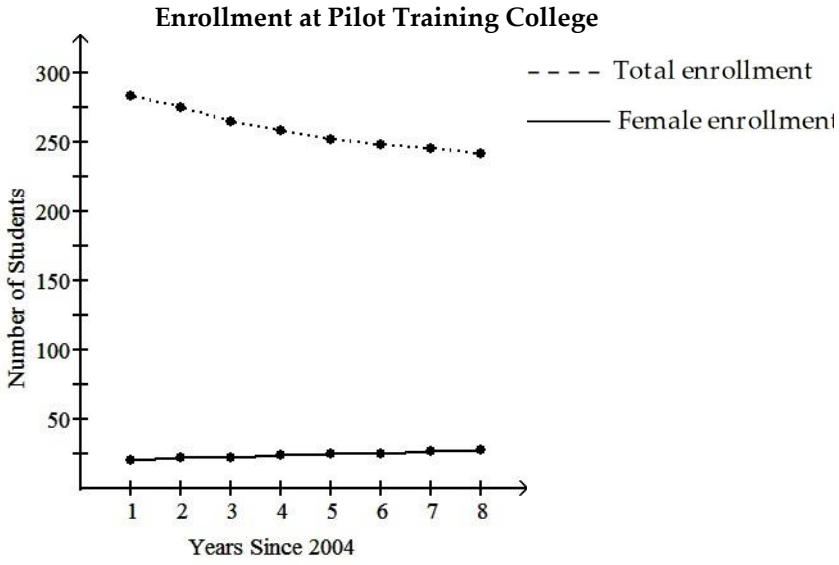
——— Female enrollment

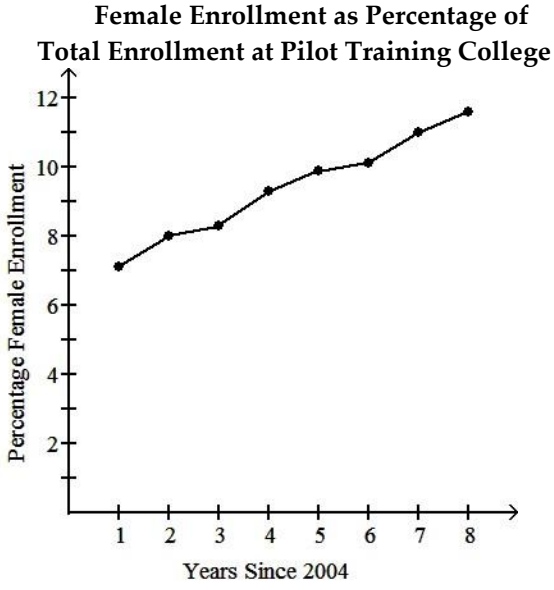
**Female Enrollment at Pilot Training**

163) 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. 163) _____

**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 |



1) A
2) A
3) B
4) A
5) A
6) B
7) A
8) A
9) B
10) B
11) E
12) B
13) B
14) A
15) A
16) D
17) D
18) B
19) B
20) E
21) a. stock performance
b. categorical
c. up
d.

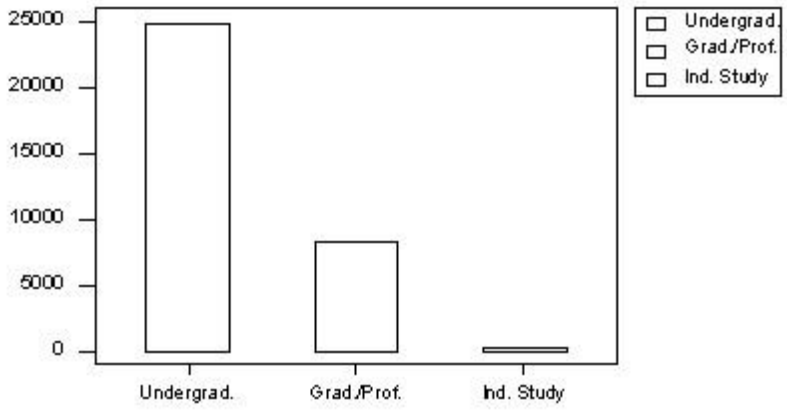
| Stock performance | up | same | down |
|---|---|---|---|
| Count | 0.525 | 0.175 | 0.300 |

22) 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 |

23) categorical
24) quantitative
25) B
26) A
27) This clarifies what percent a slice represents and which of two slices is larger.
28) a.

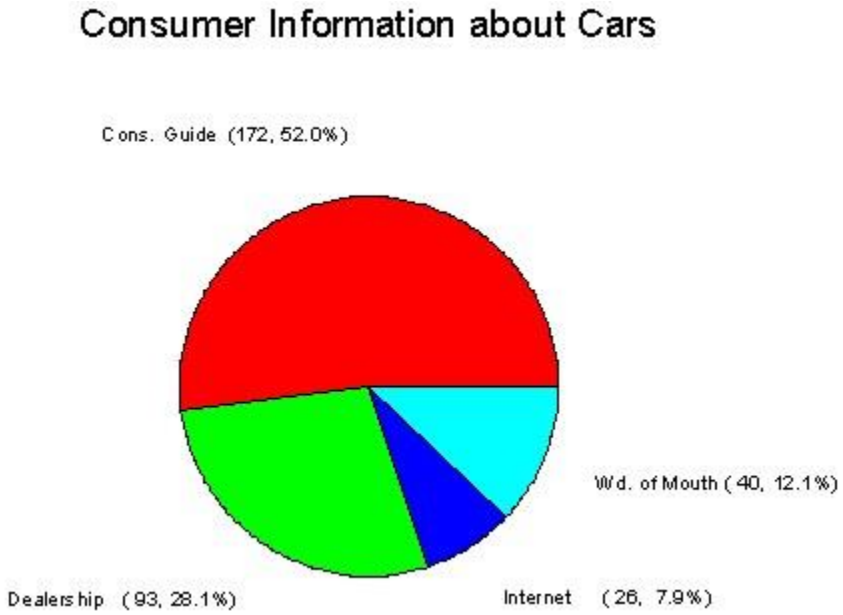
b. No, both a dot plot and a stem-and-leaf plot are used on small quantitative datasets.




29) C

30) B

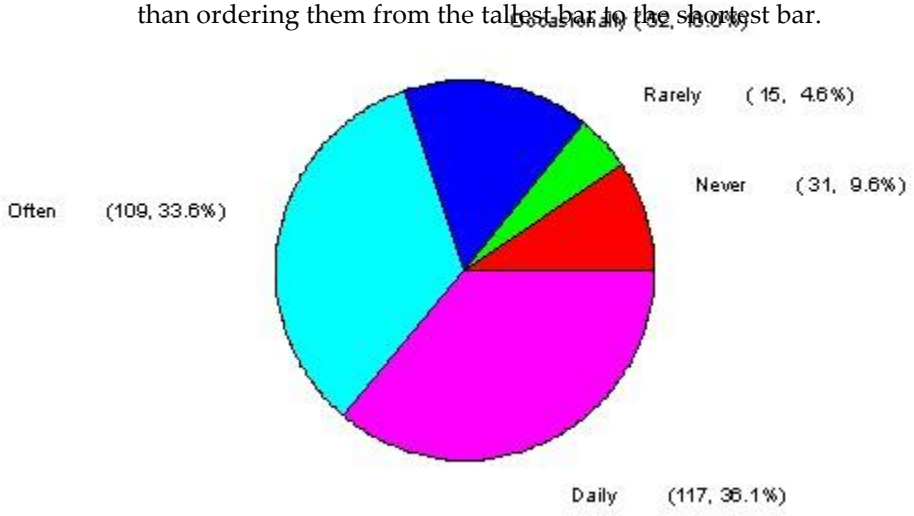
31) a.



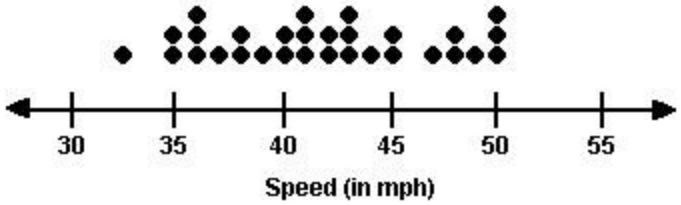

b. Since it is of interest to know which categories were more useful to consumers, ordering the categories as in a Pareto chart would be more appropriate than listing them alphabetically.

32) a.

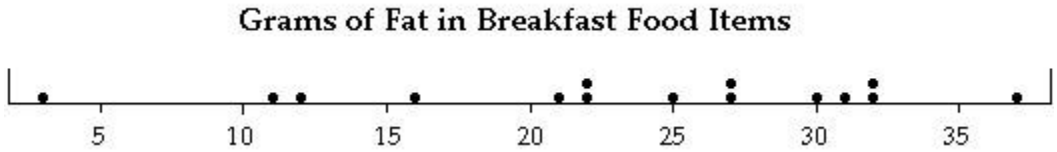
b. Since the categories of Internet usage pattern have a natural order from never to daily, it makes more sense to leave the categories in this natural order rather than ordering them from the tallest bar to the shortest bar.



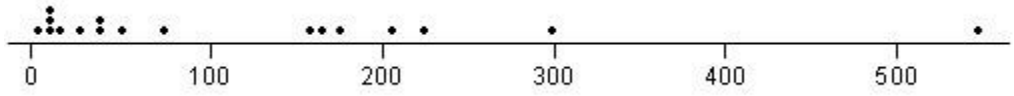

33)




34)

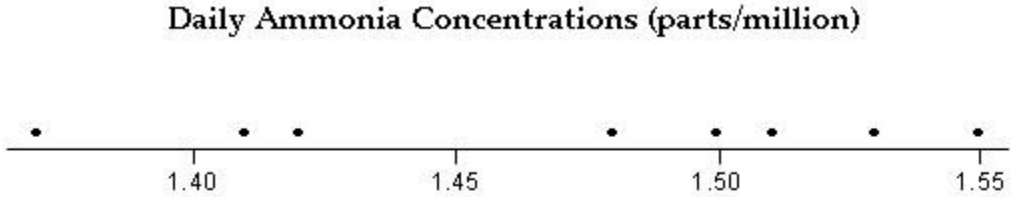



35)




This distribution appears to be skewed to the right.

36)

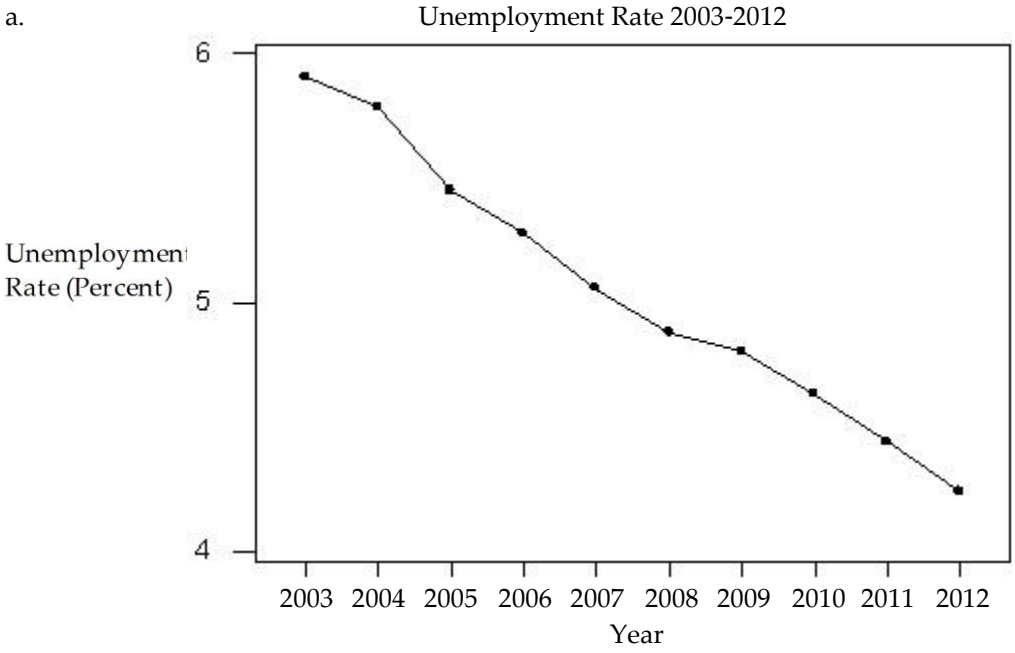



37) C

38)

| | |
|---|---|
| 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 |

39) a.

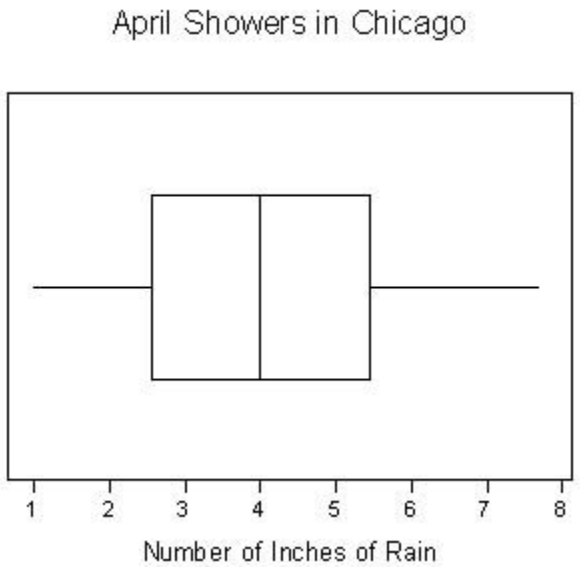



b. There is a clear decreasing trend over time; c. No, a histogram would not depict the trend in this dataset.

40) B
41) B
42) B
43) E
44) B
45) B
46) B
47) E
48) A
49) D
50) B
51) A
52) C
53) A
54) D
55) B
56) C
57) B
58) E
59) B
60) D
61) A
62) A
63) D

64) B
65) D
66) 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.
67) D
68) C
69) C
70) B
71) C
72) D
73) C
74) C
75) B
76) C
77) D
78) E
79) A
80) E
81) E
82) B
83) B
84) B
85) histogram
86) E
87) A
88) B
89) E
90) E
91) D
92) mean = 1.471
93) B
94) D
95) A
96) median = 1.49
97) mean = 1.985, median = 1.85; The median seems more appropriate for this dataset, because this dataset is highly skewed to the right.
98) A
99) E
100) mean; median
101) outliers
102) B
103) B
104) B
105) C
106) B
107) B
108) B
109) C
110) C
111) C
112) B

113) C
114) A
115) C
116) A
117) A
118) A
119) D
120) B
121) B
122) A
123) B
124) range
125) A
126) B
127) A
128) D
129) E
130) A
131) A
132) A
133) A
134) A
135) minimum = 2 seconds, Q1 = 10 seconds, median = 51 seconds, Q3 = 191 seconds, and maximum = 548 seconds
136) D
137) a.




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.

138) 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.
139) A
140) D
141) B
142) E
143) B
144) C

145) B
146) A
147) C
148) D
149) minimum value; Q1; median; Q3; maximum value
150) z-score
151) A
152) B
153) B
154) B
155) E
156) E
157) C
158) 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.
159) 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.
160) 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.
161) The bars are not drawn in the correct proportions.
162) 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.
163) 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.