Name: _____ Date: _____

1. As part of a survey of college students a researcher is interested in the variable class level. She records a 1 if the student is a freshman, a 2 if the student is a sophomore, a 3 if the student is a junior, and a 4 if the student is a senior. The variable class standing is:

A) categorical.
B) quantitative.
C) both categorical and quantitative.
D) neither categorical nor quantitative.

2. Responses to a survey are recorded as variables of interest to the researchers. Below are some of the variables from a survey conducted by the U.S. Postal Service. Which of the variables is categorical?

A) state of residence
B) number of people, both adults and children, living in the household
C) total household income, before taxes, in 2007
D) age of respondent

3. A consumer is interested in purchasing an external hard drive and is considering all specifications for the product. Which of these variables associated with external hard drives is categorical?

A) the price of the hard drive
B) the hard drive's storage capacity measured in gigabytes
C) the hard drive's transfer speed time
D) the brand name of the hard drive

4. A description of different houses on the market includes the following three variables. Which of the variables is quantitative?

A) the square footage of the house
B) the monthly gas bill
C) the number of bathrooms in the house
D) All of the answers are correct.

5. A professor records the values of several variables for each student in her class. These include the variables listed below. Which of these variables is categorical?

A) score on the final exam (out of 200 points)
B) final grade for the course (A, B, C, D, or F)
C) the total number of points earned in the class (i.e., the total of the points on all exams and quizzes in the course; the maximum number of points possible is 500)
D) the number of lectures the student missed

6. Which of the following characteristics ensures that a variable is quantitative?

A) General arithmetic calculations can be done with its values.
B) Its values sort cases into categories.
C) Its values are numbers.
D) General arithmetic calculations can be done with its values, and its values are numbers.

7. For which of the following reasons is a variable considered categorical?

A) General arithmetic calculations can be done with its values.
B) Its values sort cases into categories.
C) Its values are labels.
D) Its values sort cases into categories and are also labels.

8. When determining the names to be used for variables in a spreadsheet, why is it best to avoid including spaces in the names?

A) Shorter names are more likely to fit in the column space.
B) Single word names are more descriptive.
C) Some software packages do not allow spaces in variable names.
D) Single word names are easier to remember.

Use the following to answer questions 9-12:

To investigate the valuation of residences in a large metropolitan area, a sample of 504 homes sold within the previous 6 months was extracted from public records and recorded in an Excel worksheet. A portion of that worksheet is displayed below. The selling price (Price) along with size of the home in square feet (SqFt), the Zip Code (Zip) in which the home is located, the number of bedrooms and bathrooms the home has (BedRooms and Baths, respectively), number of garage stalls (Garage), and the style of the home (Style) were recorded. The style of the home is coded as 1 for a ranch layout, 2 for a two-story layout, and 3 for a split-level layout.

	A	B	C	D	E	F	G	H
1	Obs	Zip	Price	SqFt	BedRooms	Baths	Garage	Style
2	1	43203	61500	780	3	1	0	1
3	2	43213	129900	1462	3	2	2	3
4	3	43219	134900	1604	3	1.5	1	3
5	4	43201	139900	1512	3	2	2	1
6	5	43214	179900	1560	3	2	2	2
7	6	43205	134900	2166	4	2	2	1
8	7	43201	122500	2053	4	2.5	2	3
9	8	43229	297900	2655	4	3.5	2	2
10	9	43220	435000	4200	5	4.5	3	2
504	503	43201	75000	1216	3	2	0	1
505	504	43220	289900	2660	3	2.5	2	2

9. How many cases does this data set contain?

A) 5
B) 7
C) 8
D) 504

10. How many variables does this data set contain?

A) 5
B) 7
C) 8
D) 504

11. How many quantitative variables does this data set contain?

A) 5
B) 6
C) 7
D) 504

12. How many categorical variables does this data set contain?

A) 0
B) 1
C) 2
D) 3

Use the following to answer questions 13-15:

An investigation of wages paid to its employees by a large company was undertaken as a result of an allegation of discrimination. Data was collected for 1000 randomly selected employees. The data included employee ID, gender, race, annual wages in dollars (Salary), whether the employee had full-time status or part-time status (Full_Part), number of years of education (Ed), and number of years with the company (Tenure). The first two rows of data in the worksheet are displayed below.

1	Gender	Race	Salary	Full_Part	Ed	Tenure
2	Female	Caucasian	32196	Full	14	2
3	Male	Black	62385	Full	16	10

13. How many cases does this data set contain?

A) 2
B) 3
C) 6
D) 1000

14. How many variables does this data set contain?

A) 2
B) 3
C) 6
D) 1000

15. How many quantitative variables does this data set contain?

A) 2
B) 3
C) 6
D) 1000

16. When drawing a histogram, it is important to:

A) have a separate class interval for each observation to get the most informative plot.
B) make sure the heights of the bars exceed the widths of the class intervals so that the bars are true rectangles.
C) label the vertical axis so the reader can determine the counts or percent in each class interval.
D) make certain the mean and median are contained in the same class interval, so that the correct type of skewness can be identified.

17. In drawing a histogram, which of the following suggestions should be followed?

A) Leave large gaps between bars. This allows room for comments.
B) The heights of bars should equal the class frequency.
C) Generally, bars should be square so that both the height and width equal the class count.
D) The scale of the vertical axis should be that of the variable whose distribution you are displaying.

Use the following to answer questions 18-20:

To investigate the valuation of residences in a large metropolitan area, a sample of 504 homes sold within the previous 6 months was extracted from public records and recorded in an Excel worksheet. A portion of that worksheet is displayed below. The selling price (Price) along with size of the home in square feet (SqFt), the Zip Code (Zip) in which the home is located, the number of bedrooms and bathrooms the home has (BedRooms and Baths, respectively), number of garage stalls (Garage), and the style of the home (Style) were recorded. The style of the home is coded as 1 for a ranch layout, 2 for a two-story layout, and 3 for a split-level layout.

	A	B	C	D	E	F	G	H
1	Obs	Zip	Price	SqFt	BedRooms	Baths	Garage	Style
2	1	43203	61500	780	3	1	0	1
3	2	43213	129900	1462	3	2	2	3
4	3	43219	134900	1604	3	1.5	1	3
5	4	43201	139900	1512	3	2	2	1
6	5	43214	179900	1560	3	2	2	2
7	6	43205	134900	2166	4	2	2	1
8	7	43201	122500	2053	4	2.5	2	3
9	8	43229	297900	2655	4	3.5	2	2
10	9	43220	435000	4200	5	4.5	3	2
504	503	43201	75000	1216	3	2	0	1
505	504	43220	289900	2660	3	2.5	2	2

18. Which of the following would be an appropriate graph to display the Style data?
A) histogram
B) stemplot
C) bar chart
D) both histogram and bar chart

19. Which of the following would be an appropriate graph to display the SqFt data?
A) histogram
B) pie chart
C) bar chart
D) both histogram and bar chart

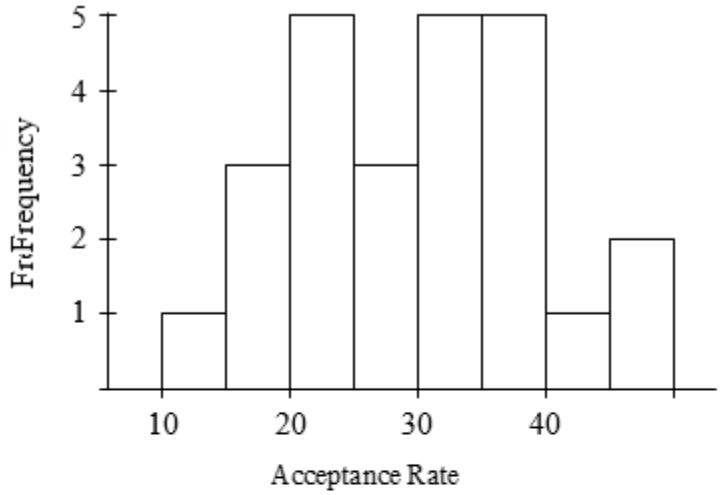
20. Which of the following would be an appropriate graph to display the Zip data?
A) histogram
B) pie chart
C) bar chart
D) both pie chart and bar chart

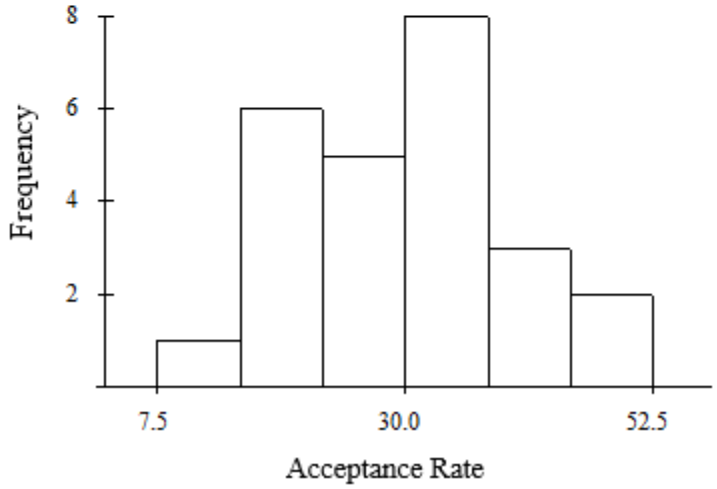
21. What two graphs are typically used to display categorical data?
A) histogram and bar chart
B) pie chart and bar chart
C) bar chart and stemplot
D) histogram and Pareto chart

22. Which of the following graphs could be used to display quantitative data?
I. Histogram
II. Bar chart
III. Pie chart
IV. Stemplot
A) I and II
B) I and IV
C) II and III
D) all of I, II, III, and IV

Use the following to answer questions 23-26:

Each of the following two histograms represents the distribution of acceptance rates (percent accepted) among 25 business schools in 2005. The histograms use different class intervals, but are based on the same data. In each class interval, the left endpoint is included but not the right.





23. What percent of the schools have an acceptance rate of less than 20%?

A) 3%
B) 4%
C) 12%
D) 16%

24. Which interval contains fewer than half of all the observations?

A) 20% ≤ acceptance rate < 35%
B) 22.5% ≤ acceptance rate < 37.5%
C) 25% ≤ acceptance rate < 40%
D) 7.5% ≤ acceptance rate < 30%

25. Which interval contains more than half of all the observations?

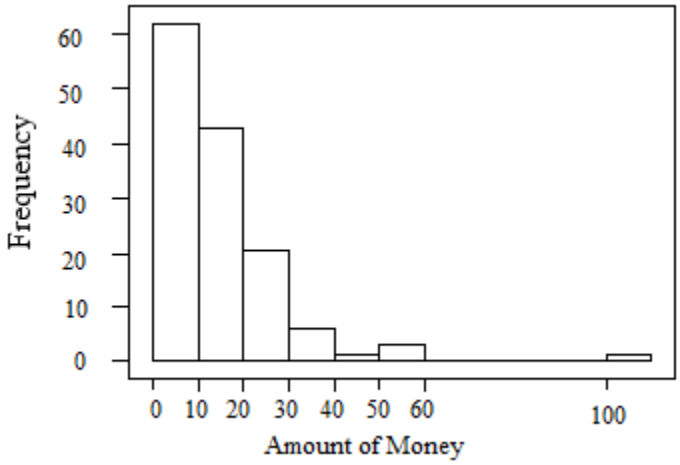
A) 20% ≤ acceptance rate < 35%
B) 7.5% ≤ acceptance rate < 30%
C) 35% ≤ acceptance rate < 50%
D) 30% ≤ acceptance rate < 45%

26. What percent of the schools have an acceptance rate of at least 40%?

A) 4%
B) 8%
C) 12%
D) 20%

Use the following to answer questions 27-31:

In a Business Statistics class with 136 students, the professor records how much money (in dollars) each student has in their possession during the first class of the semester. The histogram below is of the data collected.



27. The percentage of students with less than $10.00 in their possession is closest to:
A) 35%.
B) 50%.
C) 60%.
D) 70%.

28. The histogram:
A) is skewed right.
B) has an outlier.
C) is asymmetric.
D) All of the answers are correct.

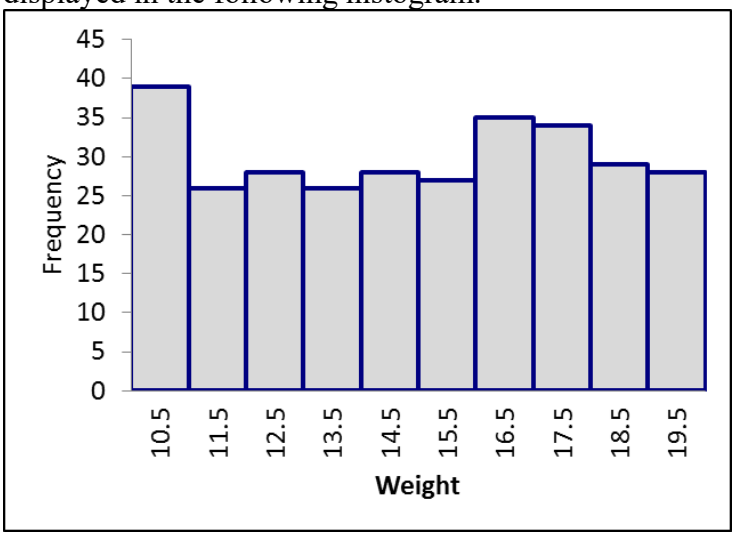
29. The number of students with at least $30.00 in their possession is:
A) fewer than five.
B) about 10.
C) about 30.
D) more than 50.

30. The shape of the histogram is best described as:
A) symmetric.
B) skewed right.
C) skewed left.
D) normal.

31. The midpoint of the dollar amount in the possession of the students is:
A) at least $30,00, but less than $50.00.
B) at least $20.00, but less than $30.00.
C) at least $10.00, but less than $20.00.
D) ≤ $10.00.

Use the following to answer questions 32-33:

Jack O'Lantern sells pumpkins at a roadside stand every autumn. To plan for next season's crop, Jack is interested in size of pumpkins his customers desire. He has selected 300 customers at random and weighed (in pounds) the pumpkins they selected for purchase. The weights are displayed in the following histogram.



32. The histogram is best described as being:

A) skewed right.
B) skewed left.
C) symmetric.
D) Normal.

33. What proportion of the pumpkins sold weigh less than 12 pounds?

A) approximately 0.65
B) approximately 0.10
C) approximately 0.22
D) None of the answers is correct.

34. Which of the following is TRUE regarding a Pareto chart?

A) A Pareto chart is a type of bar chart.
B) Pareto charts are frequently used in quality control settings.
C) Pareto charts display the categories in order from highest frequency to lowest frequency.
D) All of the answers are correct.

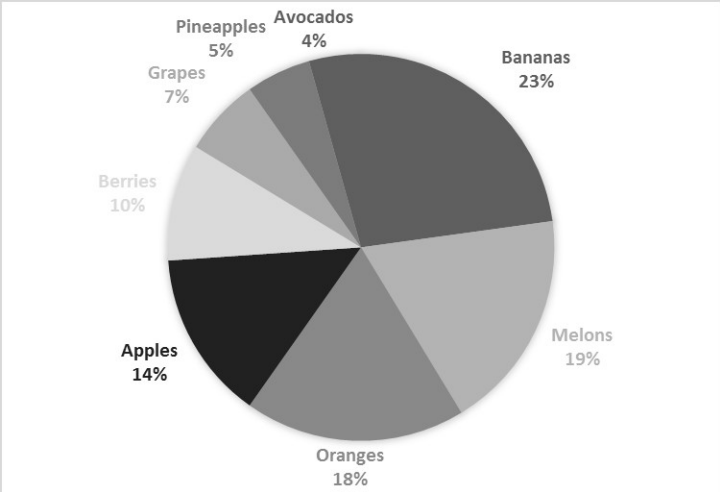
35. A report on retail sales of fresh fruit in the United States in 2012 included the following breakdown of sales:

Apples	13%
Avocados	4%
Bananas	21%
Berries	9%

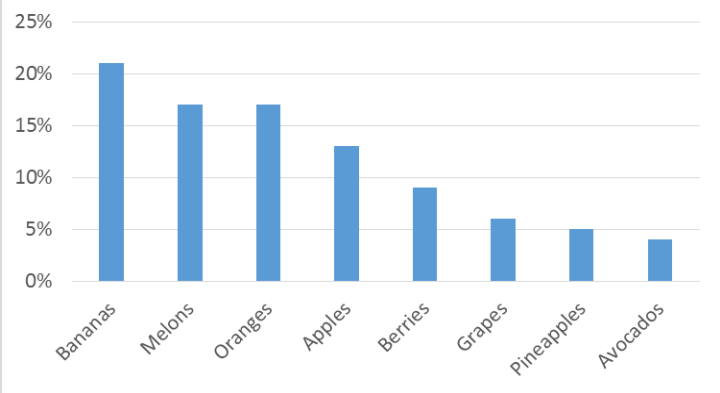
Grapes	6%
Melons	17%
Oranges	17%
Pineapples	5%

Which of the following is the Pareto chart for these data?

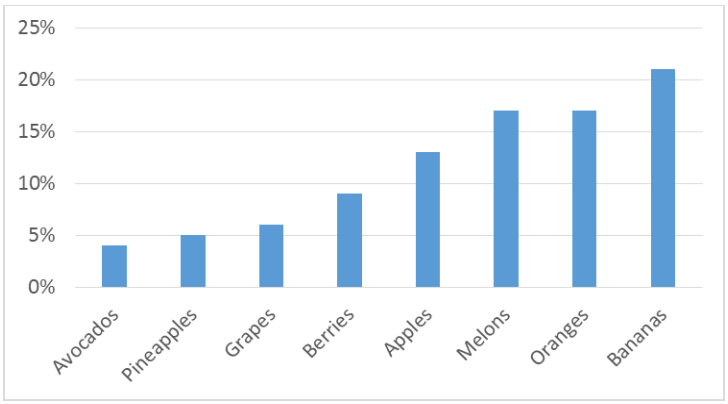
A)



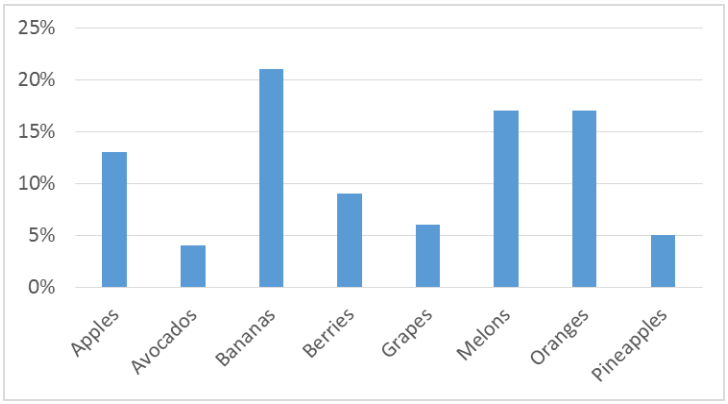
B)



C)

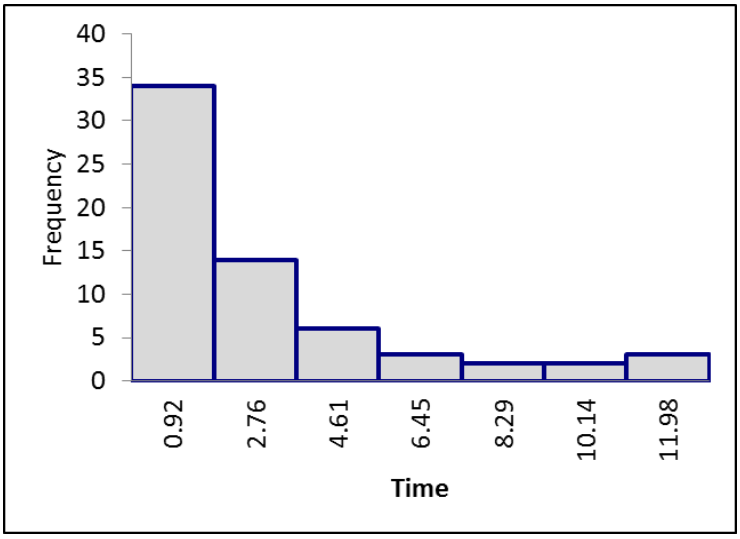


D)



Use the following to answer questions 36-37:

The time (in minutes) required to complete a particular task on an assembly line is being studied. Sixty-four repetitions of the task resulted in the data displayed in the histogram below.



36. The histogram is best described as being:

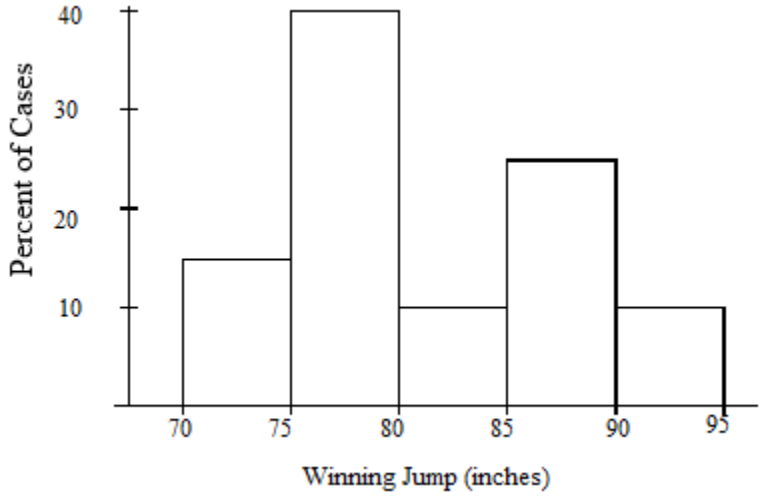
A) skewed right.
B) skewed left.
C) symmetric.
D) Normal.

37. What proportion of the observed tasks required more than 5 minutes for completion?

A) approximately 0.10
B) approximately 0.40
C) approximately 0.15
D) None of the answers is correct.

Use the following to answer questions 38-39:

Here is a histogram of the gold medal–winning high jumps for the Olympic Games.



38. The mean of this histogram is approximately:

A) 75 inches.
B) 77.5 inches.
C) 82 inches.
D) 90 inches.

39. The percentage of these winning jumps that were at least 85 inches is about:

A) 9%.
B) 14%.
C) 23%.
D) 37%.

Use the following to answer questions 40-42:

For a Business Ethics course containing 10 students, the maximum point total for the quarter was 200. The point totals for the 10 students are given in the stemplot below.

```
11 | 6 8
12 | 1 4 8
13 | 3 7
14 | 2 6
15 |
16 |
17 | 9
```

40. This stemplot is most similar to:

A) A histogram with class intervals $110 \leq$ score < 120, $120 \leq$ score < 130, etc.
B) a time plot of the data with the observations taken in increasing order.
C) a boxplot of the data.
D) reporting the 5-point summary for the data, with the mean.

41. To which of the following data sets does this stemplot correspond?

A) All integers between 116 and 179.
B) 1, 2, 3, 4, 6, 6, 7, 8, 8, 9.
C) 16, 18, 21, 24, 28, 33, 37, 42, 46, 79.
D) 116, 118, 121, 124, 128, 133, 137, 142, 146, 179.

42. The median point total for this class is:

A) 130.
B) 130.5.
C) 133.
D) 137.

Use the following to answer questions 43-44:

During the early part of the 1994 baseball season, many sports fans and baseball players noticed that the number of home runs being hit seemed unusually large. Below are the team-by-team statistics on home runs hit through Friday, June 3, 1994 (from the *Columbus Dispatch* Sports Section, Sunday, June 5, 1994). Below are separate stemplots for the number of home runs by American and National League teams.

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

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

43. The median for the number of home runs for the American League teams is:

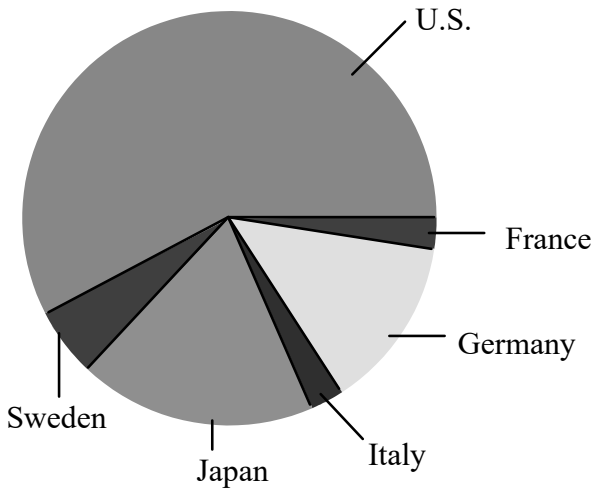
A) lower than for the National League teams.
B) 45.
C) 50.
D) 57.5.

44. Which of the following is a CORRECT statement?

A) The American League plot is reasonably symmetric.
B) The National League plot is slightly skewed to the left.
C) The median number of home runs hit by American League teams was higher than was hit by National League teams.
D) All of the answers are correct.

Use the following to answer questions 45-46:

Consumers' Union measured the gas mileage in miles per gallon of 38 1978–1979 model automobiles on a special test track. The pie chart below provides information about the country of manufacture of the model cars used by Consumers' Union.

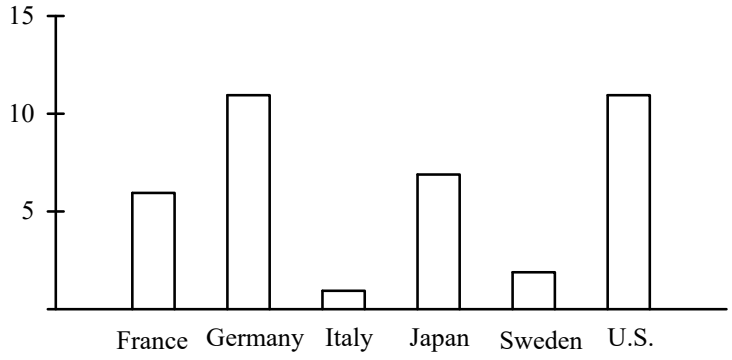


45. Based on this pie chart, we may conclude that:

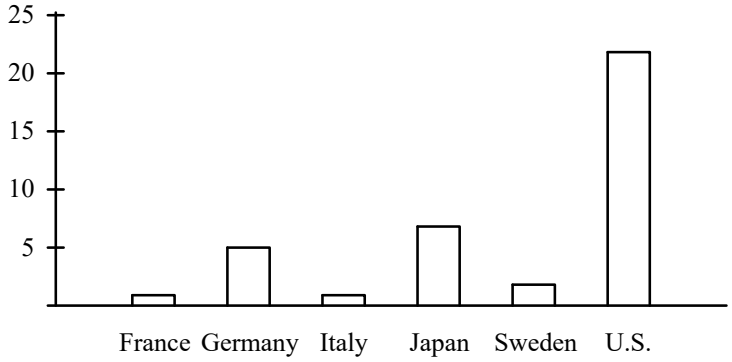
A) Japanese cars get significantly lower gas mileage than cars of other countries. This is because their slice of the pie is at the bottom of the chart.
B) more than half of the cars in the study were from the United States.
C) Swedish cars get gas mileages that are between those of Japanese and U.S. cars.
D) Mercedes Benz, Audi, Porsche, and BMW represent approximately a quarter of the cars tested.

46. Which of the following bar graphs is equivalent to the pie chart?

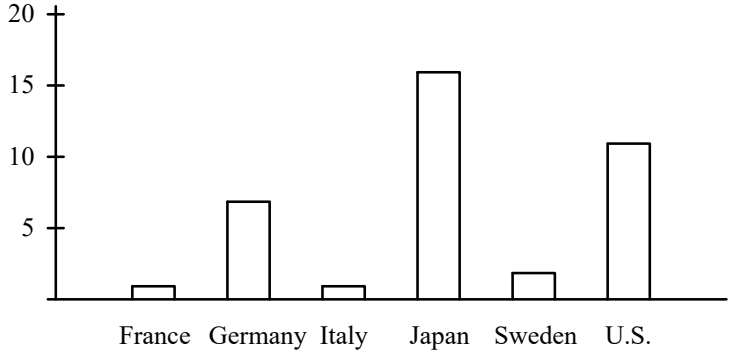
A)



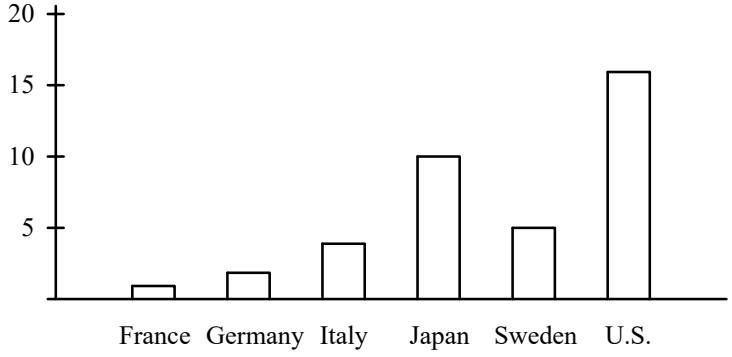
B)



C)

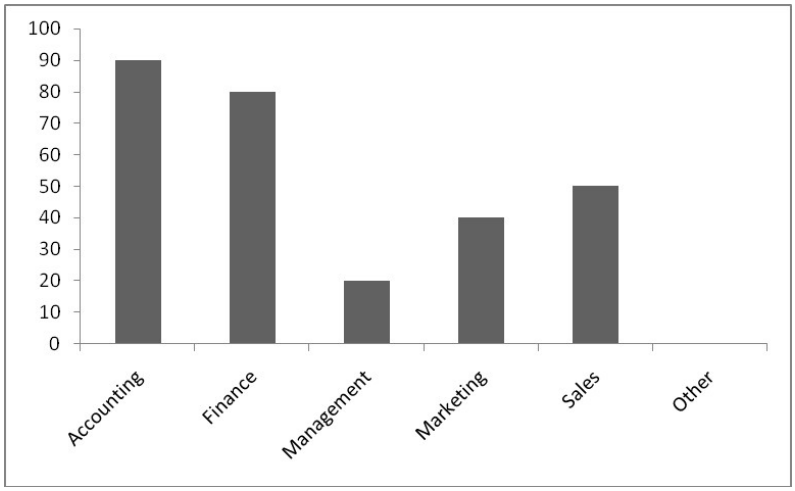


D)



Use the following to answer questions 47-48:

A certain university's career services office took a survey of recent business school graduates to find out the general areas where graduates found jobs. Below is a bar graph of the results of the 300-person survey. In the bar graph, the bar for "Other" has been omitted.



47. The number of graduates who should be displayed in the "Other" class:

A) is about 10.
B) is about 20.
C) is about 30.
D) cannot be determined from the information given.

48. Which of the following statements is TRUE regarding the job placements?

A) About twice as many graduates found jobs in Finance as did in Marketing.
B) More graduates found jobs in Accounting than in all other general areas combined.
C) The fewest number of students chose Management as their general area of study while in college.
D) None of the answers is correct.

Use the following to answer questions 49-51:

The time series plot below gives the share price in dollars of General Electric stock, with the bar chart giving the volume in millions of shares. The plots are for the one-year period September 2001–September 2002.

49. The maximum price per share for this time period was about:

A) $45.
B) $41.
C) $25.
D) $20.

50. Which of the following is a TRUE statement?

A) The price of General Electric stock has been stable for this year.
B) There has been a general downward trend in the stock price over this period.
C) The price should return to $40 within six months because of the cycle.
D) None of the answers is correct.

51. If you bought a single share of stock at the maximum price and sold it at the minimum price during this one-year period you would have lost about:

A) $15.
B) $25.
C) $35.
D) $40.

52. In an effort to understand the time required by workers to complete a task, 50 workers were observed as they completed the task. The times required ranged from 115 seconds to 161 seconds. Which of the following is the best stemplot for the purpose of summarizing the 50 times?

A)

11	5 9
12	0 1 2 3 4 5 5 6 6 7 7 7 8
13	0 0 2 2 2 2 3 3 3 3 4 4 5 6 6 7 7 7 8 8 9
14	0 0 0 2 3 3 5 9 9 9
15	0 3 5
16	1

B)

11	5 9
12	0 1 2 3 4
12	5 5 6 6 7 7 7 8
13	0 0 2 2 2 2 3 3 3 3 4 4
13	5 6 6 7 7 7 8 8 9
14	0 0 0 2 3 3
14	5 9 9 9
15	0 3
15	5
16	1

C)

16	1
15	0 3 5
14	0 0 0 2 3 3 5 9 9 9
13	0 0 2 2 2 2 3 3 3 3 4 4 5 6 6 7 7 7 8 8 9
13	0 1 2 3 4 5 5 6 6 7 7 7 8
11	5 9

D)

1	15 19
1	20 21 22 23 24
1	25 25 23 26 27 27 27 28
1	30 30 32 32 32 32 33 33 33 33 34 34
1	35 36 36 37 37 37 38 38 39
1	40 40 40 42 43 43
1	45 49 49 49
1	50 53
1	55
1	61

53. A consumer group surveyed the prices for a certain item in five different stores and reported the average price as $15. We visited four of the five stores and found the prices to be $10, $12, $17, and $23. Assuming that the consumer group is correct, what is the price of the item at the store that we did NOT visit?

A) $10
B) $13
C) $15
D) $20

54. The average salary of all female workers is $45,000. The average salary of all male workers is $51,000. What must be TRUE about the average salary of all workers?

A) It must be $48,000.
B) It must be larger than the median salary.
C) It could be any number between $45,000 and $51,000.
D) It must be larger than $48,000.

55. A sample was taken of the salaries of 20 employees of a large company. The following are the salaries (in thousands of dollars) for this year. For convenience, the data are ordered.

28	31	34	35	37	41	42	42	42	47
49	51	52	52	60	61	67	72	75	77

Suppose each employee in the company receives a $3000 raise for next year (each employee's salary is increased by $3000). The mean salary for the employees will:

A) be unchanged.
B) increase by $3000.
C) be multiplied by $3000.
D) increase by $\sqrt{\$3000}$.

56. A researcher reports that, on average, the participants in his study lost 10.4 pounds after two months on his new diet. A friend of yours comments that she tried the diet for two months and lost no weight, so clearly the report must be a fraud. Which of the following statements is CORRECT?

A) Your friend must not have followed the diet correctly because she did not lose weight.
B) Because your friend did not lose weight, the report must not be correct.
C) The report gives only the average. This does not imply that all participants in the study lost 10.4 pounds or even that all lost weight. Your friend's experience does not necessarily contradict the study results.
D) In order for the study to be correct, we must now add your friend's results to those of the study and re-compute the new average.

57. The ages of people in a class (to the nearest year) are as follows:

Age	18	19	20	21	22	23	24	25	32
Number of students	14	120	200	200	90	30	10	2	1

What is true about the median age?

A) It must be 20.
B) It could be any number between 19 and 21.
C) It must be 21.
D) It must be over 21.

58. A list of current major league baseball player David Wright's yearly home run totals from 2004 to 2009 can be seen below.

14 27 26 30 33 10

The mean number of home runs David Wright has hit is:

A) 23.3333.
B) 26.50.
C) 28.0.
D) 31.3333.

59. Suppose the following is a sample of the percentage increase in five growth funds over a one-year period.

8.9% 12.2% 13.7% 14.4% 9.8%

The mean percentage increase in this sample is:

A) 11.8%.
B) 12.2%.
C) 13.7%.
D) 14.1%.

60. The mean age of five people in a room is 30 years. One of the people whose age is 50 years leaves the room. The mean age of the remaining four people in the room is:

A) 40.
B) 30.
C) 25.
D) not able to be determined from the information given.

Use the following to answer questions 61-62:

A sample was taken of the salaries of 20 employees of a large company. The following are the salaries (in thousands of dollars) for this year. For convenience, the data are ordered.

28	31	34	35	37	41	42	42	42	47
49	51	52	52	60	61	67	72	75	77

61. The median salary of the 20 employees is:

A) $49,000.
B) $48,000.
C) $47,000.
D) $42,000.

62. Suppose each employee in the company receives a $3000 raise for next year (each employee's salary is increased by $3000). The median salary for the employees working for the company will:

A) be unchanged.
B) increase by $3000.
C) be multiplied by $3000.
D) increase by $\sqrt{\$3000}$.

63. Suppose the following is a sample of the percentage increase in five growth funds over a one-year period.

    8.9% 12.2% 13.7% 14.4% 9.8%

    The median percentage increase in this sample is:

A) 11.8%.
B) 12.2%.
C) 13.7%.
D) 14.1%.

64. A list of current major league baseball player David Wright's yearly home run totals from 2004 to 2009 can be seen below:

    14 27 26 30 33 10

    The median number of home runs David Wright has hit is:

A) 23.3333.
B) 26.50.
C) 28.0.
D) 31.3333.

65. The median age of five people in a meeting is 30 years. One of the people, whose age is 50 years, leaves the room. The median age of the remaining four people in the room is:

A) 40 years.
B) 30 years.
C) 25 years.
D) not able to be determined from the information given.

66. A set of data has a median that is much larger than the mean. Which of the following statements is MOST consistent with this information?

A) A stemplot of the data is symmetric.
B) A stemplot of the data is skewed left.
C) A stemplot of the data is skewed right.
D) The data set must be so large that it would be better to draw a histogram than a stemplot.

67. In a class of 100 students, the grades on an Accounting test are summarized in the following frequency table.

Grade	Frequency
91–100	11
81–90	31
71–80	42
61–70	16

The median grade is in which of the following intervals?

A) 61–70
B) 71–80
C) 81–90
D) 91–100

68. A reporter wishes to portray basketball players as overpaid. Which measure of center should he report as the average salary of professional basketball players?

A) the mean
B) the median
C) either the mean or median—they will be equal in this case
D) neither the mean nor the median—both will be much lower than the actual average salary

69. Which of the following is likely to have a mean that is smaller than the median?

A) the salaries of all National Football League players
B) the scores of students (out of 100 points) on a very easy exam in which most score perfectly, but a few do very poorly
C) the prices of homes in a large city
D) the scores of students (out of 100 points) on a very difficult exam in which most score poorly, but a few do very well

70. The numbers of new projects started each month at an advertising agency for the last six months are:

2 5 3 3 6 3

The interquartile range (IQR) is defined to be the distance between Q3 and Q1. The IQR for the above data is:

A) 1.0.
B) 4.0.
C) 5.0.
D) 2.0.

Use the following to answer questions 71-73:

A sample was taken of the salaries of 20 employees of a large company. The following are the salaries (in thousands of dollars) for this year. For convenience, the data are ordered.

28	31	34	35	37	41	42	42	42	47
49	51	52	52	60	61	67	72	75	77

71. The first quartile of the 20 salaries is:

A) $35,000.
B) $36,000.
C) $37,000.
D) $39,000.

72. The third quartile of the 20 salaries is:

A) $52,000.
B) $60,000.
C) $60,500.
D) $61,000.

73. The interquartile range (IQR) is defined to be the distance between Q3 and Q1. The IQR of the 20 salaries is:

A) $19,000.
B) $19,500.
C) $21,500.
D) $49,000.

74. Suppose each employee in the company receives a $3000 raise for next year (each employee's salary is increased by $3000). The median of the salaries for the employees will:

A) be unchanged.
B) increase by $3000.
C) be multiplied by $3000.
D) increase by $\sqrt{\$3000}$.

75. The Insurance Institute for Highway Safety publishes data on the total damage suffered by compact automobiles in a series of controlled, low-speed collisions. A sample of the data in dollars, with brand names removed, is:

1000 600 800 1000

The median of the above data is:

A) 600.
B) 700.
C) 800.
D) 900.

76. Suppose the five-number summary for a variable is

Min	Q1	Median	Q3	Max
20	30	35	40	50

The shape of the distribution for this variable is:

A) skewed right.
B) skewed left.
C) symmetric.
D) Normal.

77. Suppose the five-number summary for a variable is

Min	Q1	Median	Q3	Max
0	0	3	7	12

The shape of the distribution for this variable is:

A) skewed right.
B) skewed left.
C) symmetric.
D) Normal.

78. The five-number summary for a variable is reported as

Min	Q1	Median	Q3	Max
20	30	35	40	50

Suppose the maximum value was recorded incorrectly and should actually be 60. Which of the following is then TRUE?

A) The median would increase.
B) The mean would decrease.
C) The standard deviation would increase.
D) The IQR would increase.

79. Which of the following is a resistant numerical measure?
I. Mean
II. Median
III. Standard deviation
IV. Quartile

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

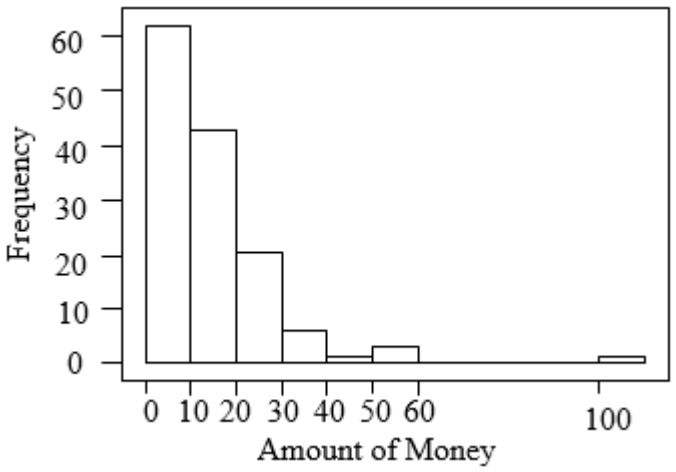
80. A data set lists values ranging from 20 to 50, having mean = 35 and median = 35. Suppose the largest value, currently 50, is changed to 100. Which of the following is TRUE?

A) The median will be larger than 35, but the mean will still equal 35
B) The mean will be larger than 35, but the median will still equal 35.
C) Both the mean and the median will be larger than 35.
D) Both the mean and the median will stay the same.

81. Given the ordered list, from smallest to largest, of the values in a data set, $(n + 1)/2$ is the:

A) value of the median.
B) location of the median from the bottom of the list.
C) value of the mean.
D) interquartile range.

82. In a Business Statistics class with 136 students, the professor records how much money each student has in their possession during the first class of the semester. The histogram below is of the data collected.



From the histogram, which of the following is TRUE?

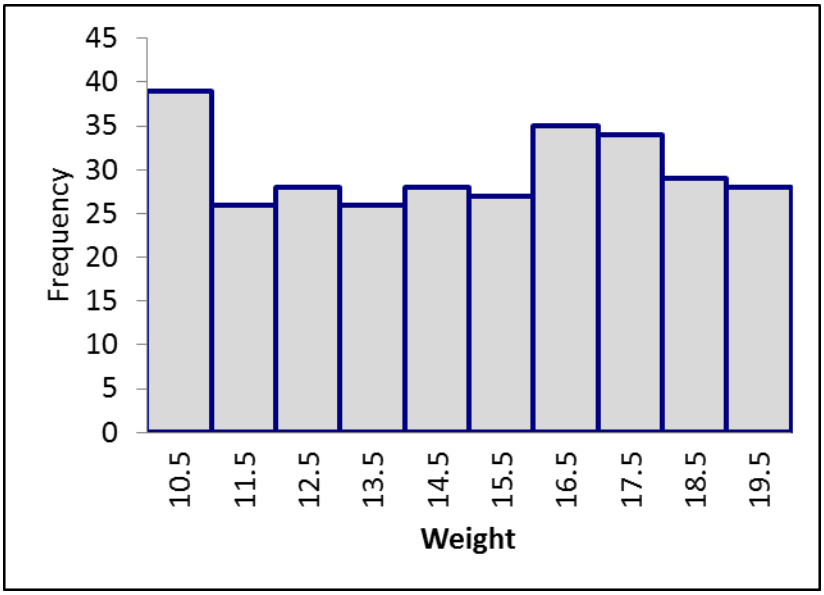
A) The mean is much larger than the median.
B) The mean is much smaller than the median.
C) The mean and median are approximately equal.
D) It is impossible to compare the mean and median for these data.

83. The five-number summary of a set of data is:

A) the minimum, first quartile, median, third quartile, and maximum.
B) the mean, median, mode, variance, and standard deviation.
C) any five-digit number that describes the data.
D) any five single-digit numbers that are measures of center and spread.

Use the following to answer questions 84-85:

Jack O'Lantern sells pumpkins at a roadside stand every autumn. To plan for next season's crop, Jack is interested in size of pumpkins his customers desire. He has selected 300 customers at random and weighed (in pounds) the pumpkins they selected for purchase. The weights are displayed in the following histogram.



84. Which of the following is TRUE regarding the mean and median of the pumpkin weights?

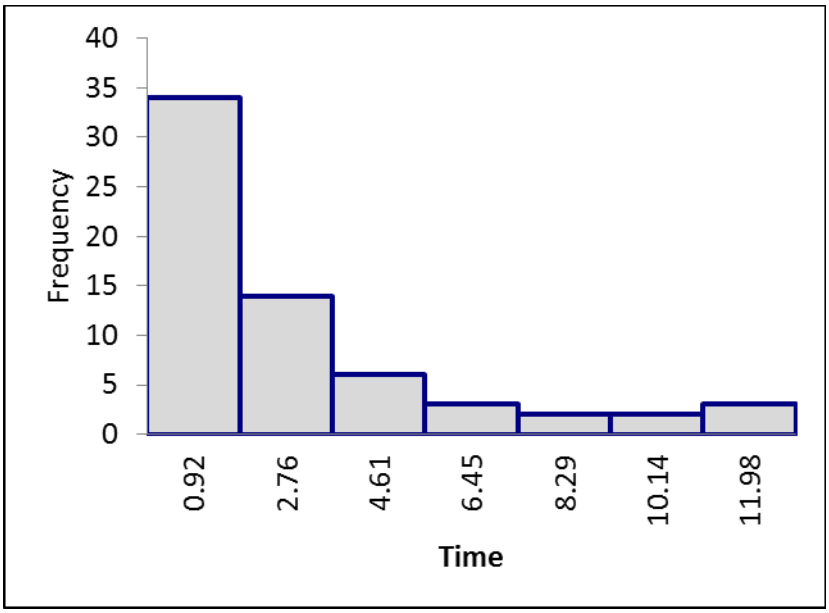
A) The mean and median are approximately equal.
B) The mean is larger than the median.
C) The mean is smaller than the median.
D) Nothing can be said without knowing the 300 individual weights.

85. Which summary would be better to give for this data, the five-number summary or the mean and standard deviation?

A) They are both equally suitable.
B) The five-number summary.
C) The mean and standard deviation.
D) Neither is adequate.

Use the following to answer questions 86-87:

The time (in minutes) required to complete a particular task on an assembly line is being studied. Sixty-four repetitions of the task resulted in the data displayed in the histogram below.



86. Which of the following is TRUE regarding the mean and median of the times?

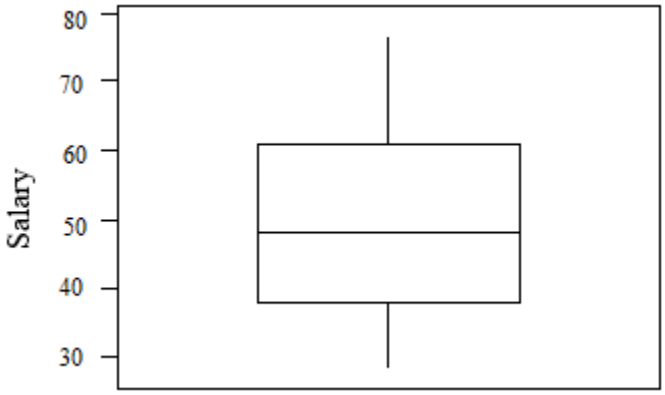
A) The mean and median are approximately equal.
B) The mean is larger than the median.
C) The mean is smaller than the median.
D) Nothing can be said without knowing the 64 individual times.

87. Which summary would be better to give for this data, the five-number summary or the mean and standard deviation?

A) They are both equally suitable.
B) The five-number summary.
C) The mean and standard deviation.
D) Neither is adequate.

Use the following to answer questions 88-90:

A sample was taken of the salaries of 20 employees of a large company. The following is a boxplot of the salaries (in thousands of dollars) for this year.



88. Based on this boxplot, which of the following statements is TRUE?

A) The maximum salary is between $60,000 and $70,000.
B) The minimum salary is $20,000.
C) Approximately 75% of the salaries are $60,000 or less.
D) The median salary is about $40,000.

89. Based on this boxplot, which of the following statements is TRUE?

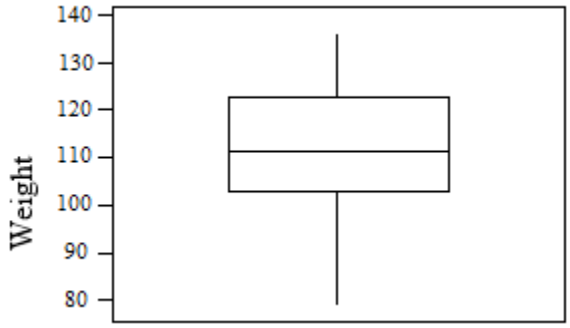
A) The salary distribution is fairly symmetric.
B) About 10 employees make over $50,000.
C) Nobody makes over $80,000.
D) All of the answers are correct.

90. Based on this boxplot, the five-number summary is:

A) 28, 39, 48, 60.5, 77.
B) 28, 41, 48, 58, 77.
C) 28, 39, 51, 58, 77.
D) 28, 41, 51, 60.5, 77.

Use the following to answer questions 91-93:

The following boxplot is of the birthweights (in ounces) of a sample of 160 infants born in a local hospital.



91. The median birthweight is approximately:

A) 90.
B) 100.
C) 110.
D) 120.

92. About 40 of the birthweights were below:

A) 92.
B) 102.
C) 112.
D) 122.

93. The number of children with birthweights between 100 and 120 ounces is approximately:

A) 40.
B) 50.
C) 80.
D) 100.

94. This is a standard deviation contest. Which of the following sets of four numbers has the largest possible standard deviation?

A) 7, 8, 9, 10
B) 5, 5, 5, 5
C) 0, 0, 10, 10
D) 0, 1, 2, 3

95. This is a standard deviation contest. Which of the following sets of six numbers has the largest possible standard deviation?

A) 10, 11, 12, 13, 14, 15
B) 10, 10, 10, 15, 15, 15
C) 12.5, 12.5, 12.5, 12.5, 12.5, 12.5
D) 10, 10, 12.5, 12.5, 15, 15

96. A sample was taken of the salaries of 20 employees of a large company. The following are the salaries (in thousands of dollars) for this year. For convenience, the data are ordered.

28	31	34	35	37	41	42	42	42	47
49	51	52	52	60	61	67	72	75	77

Suppose each employee in the company receives a $3000 raise for next year (each employee's salary is increased by $3000). The standard deviation of the salaries for the employees will:

A) be unchanged.
B) increase by $3000.
C) be multiplied by $3000.
D) increase by $\sqrt{\$3000}$.

97. The standard deviation of 16 measurements of people's weights (in pounds) is computed to be 5.4. The variance of these measurements is:

A) 2.24.
B) 29.16.
C) 52.34.
D) 256.

98. There are three children in a room, ages 3, 4, and 5. If a 4-year-old child enters the room, the:

A) mean will stay the same but the variance will increase.
B) mean age will stay the same but the variance will decrease.
C) mean age and variance will stay the same.
D) mean age and variance will increase.

99. The Insurance Institute for Highway Safety publishes data on the total damage suffered by compact automobiles in a series of controlled, low-speed collisions. A sample of the data in dollars, with brand names removed, is:

    1000 600 800 1000

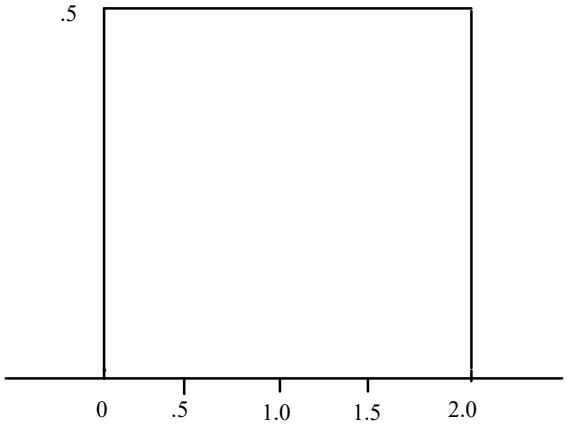
    The variance of the above data is:

A) 191.5.
B) 36,667.
C) 165.8
D) 27,500.

100. A sample of 12 measurements has a mean of 38 and a standard deviation of 4.25. Suppose that the sample is enlarged to 14 measurements, by including two additional measurements having a common value of 38 each. The standard deviation of the 14 measurements is:

A) 18.063.
B) 4.250.
C) 3.909.
D) 15.284.

Use the following to answer questions 101-103:



101. For this density curve, which of the following is TRUE?

A) It is symmetric.
B) The total area under the curve is 1.
C) The median is 1.
D) All of the answers are correct.

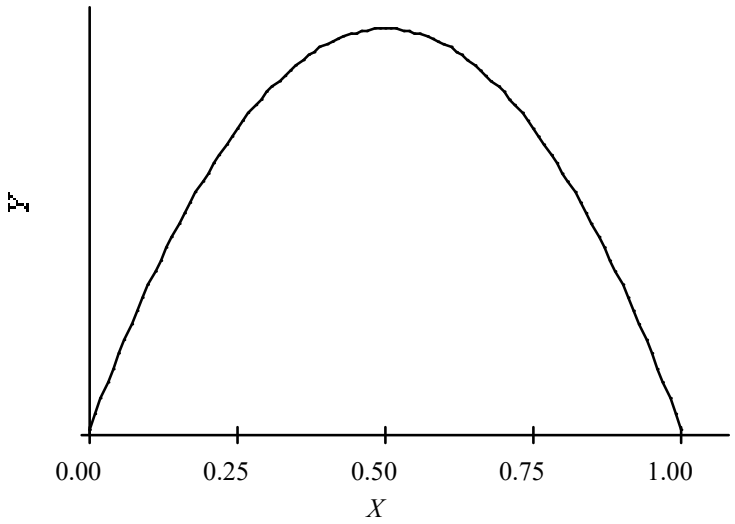
102. For this density curve, what percent of the observations lie above 1.8?

A) 10%
B) 20%
C) 80%
D) 90%

103. For this density curve, what percent of the observations lie between 0.4 and 1.1?

A) 25%
B) 35%
C) 50%
D) 70%

Use the following to answer questions 104-105:



104. For this density curve, which of the following is TRUE?

A) It is symmetric.
B) It is Normal.
C) Q1 = 0.25.
D) All of the answers are correct.

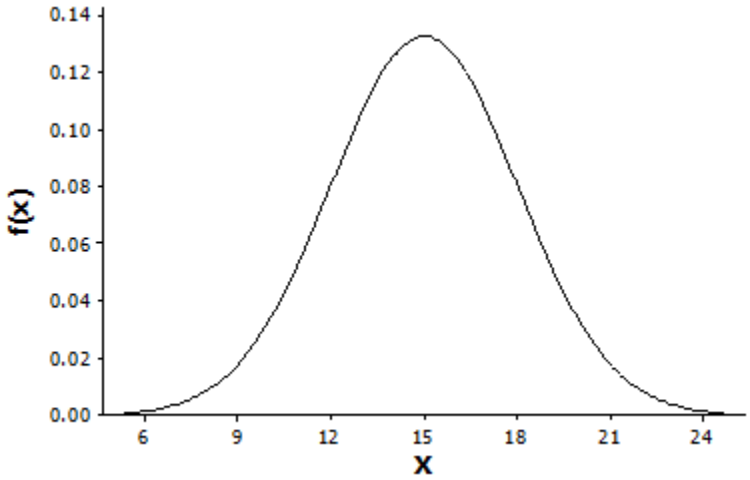
105. For this density curve, the mean is:

A) 0.25.
B) 0.50.
C) 0.71.
D) 0.75.

106. A Normal density curve has which of the following properties?

A) It is symmetric.
B) It has a peak centered above its mean.
C) The spread of the curve is proportional to the standard deviation.
D) All of the answers are correct.

Use the following to answer questions 107-108:



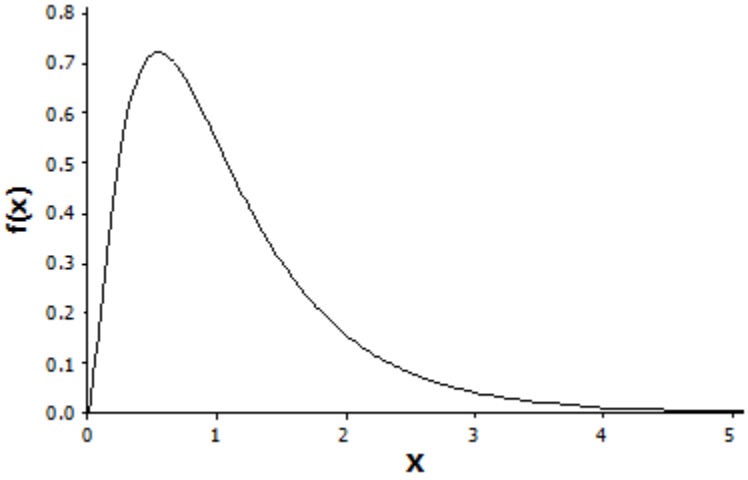
107. For this density curve, which of the following is TRUE?

A) It is symmetric.
B) It is Normal.
C) The mean is 15.
D) All of the answers are correct.

108. For this density curve, what percentage of the observations falls between 12 and 18?

A) approximately 32%
B) approximately 50%
C) approximately 68%
D) It cannot be determined.

Use the following to answer questions 109-110:



109. For this density curve, which of the following is TRUE?

A) It is symmetric.
B) The mean is about 0.7.
C) It is skewed left.
D) The total area under the curve is 1.

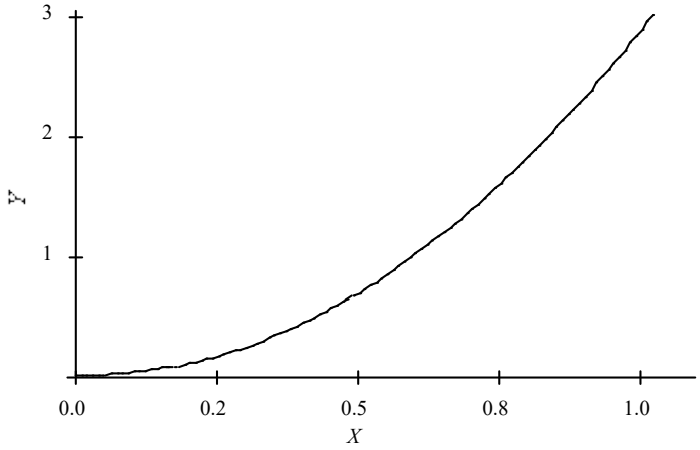
110. For this density curve, which of the following is TRUE?

A) The mean and median are equal.
B) The mean is greater than the median.
C) The mean is less than the median.
D) The peak is centered above the mean.

111. Items produced by a manufacturing process are supposed to weigh 90 grams. The manufacturing process is such, however, that there is variability in the items produced and they do not all weigh exactly 90 grams. The distribution of weights can be approximated by a Normal distribution with mean 90 grams and a standard deviation of 1 gram. What percentage of the items will weigh less than 87 grams?

A) 2.5%
B) 95%
C) 99.7%
D) 0.13%

112. For the density curve below, which of the following is TRUE?



A) The mean and median are equal.
B) The mean is greater than the median.
C) The mean is less than the median.
D) The mean could be either greater than or less than the median.

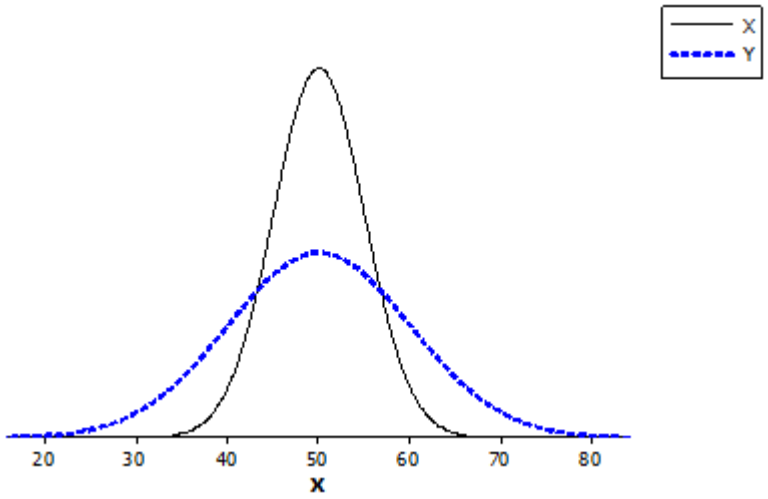
113. The time to complete a standardized exam is approximately Normal with a mean of 70 minutes and a standard deviation of 10 minutes. Using the 68-95-99.7 rule, what percent of students will complete the exam in under an hour?

A) 68%
B) 32%
C) 16%
D) 5%

114. The time to complete a standardized exam is approximately Normal with a mean of 70 minutes and a standard deviation of 10 minutes. Using the 68-95-99.7 rule, what percent of students will complete the exam in between 60 and 90 minutes?

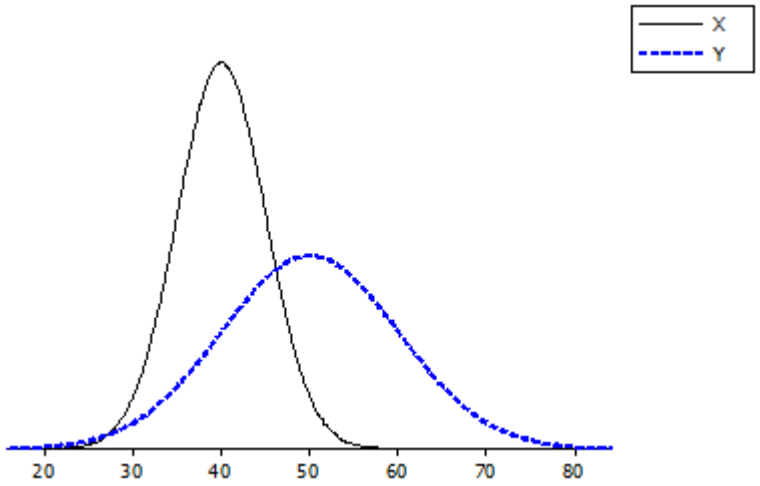
A) 34%
B) 68%
C) 81.5%
D) 95%

115. In comparing the two Normal distributions shown below, we can conclude that:



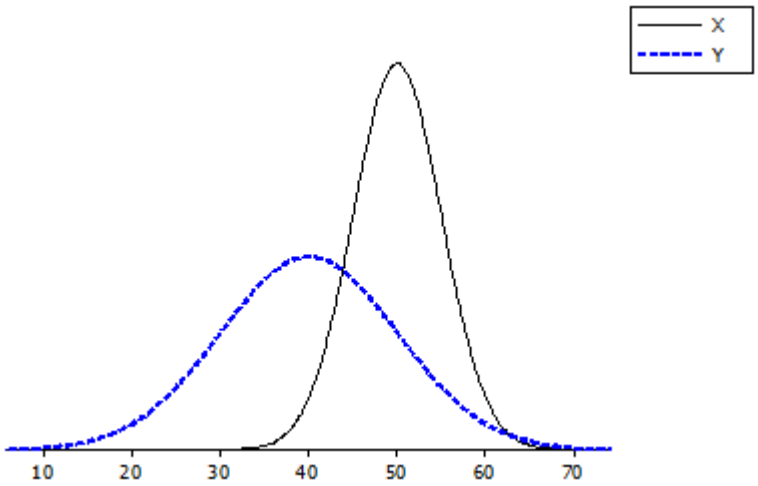
A) $\sigma$for X = $\sigma$for Y, but $\mu$for X > $\mu$for Y.
B) $\sigma$for X = $\sigma$for Y, but $\mu$for X < $\mu$for Y.
C) $\sigma$for X < $\sigma$for Y, but $\mu$for X = $\mu$for Y.
D) $\sigma$for X > $\sigma$for Y, but $\mu$for X = $\mu$for Y.

116. In comparing the two Normal distributions shown below, we can conclude that:



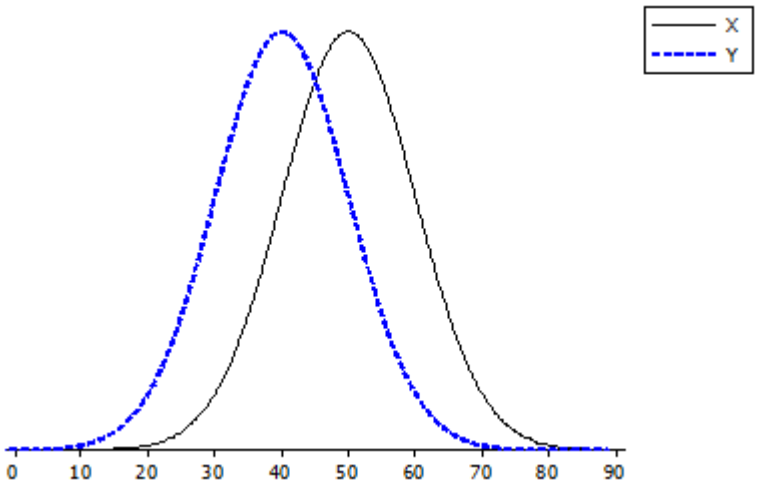
A) $\sigma$for X = $\sigma$for Y, and $\mu$for X = $\mu$for Y.
B) $\sigma$for X > $\sigma$for Y, but $\mu$for X < $\mu$for Y.
C) $\sigma$for X > $\sigma$for Y, and $\mu$for X > $\mu$for Y.
D) $\sigma$for X < $\sigma$for Y, and $\mu$for X < $\mu$for Y.

117. In comparing the two Normal distributions shown below, we can conclude that:



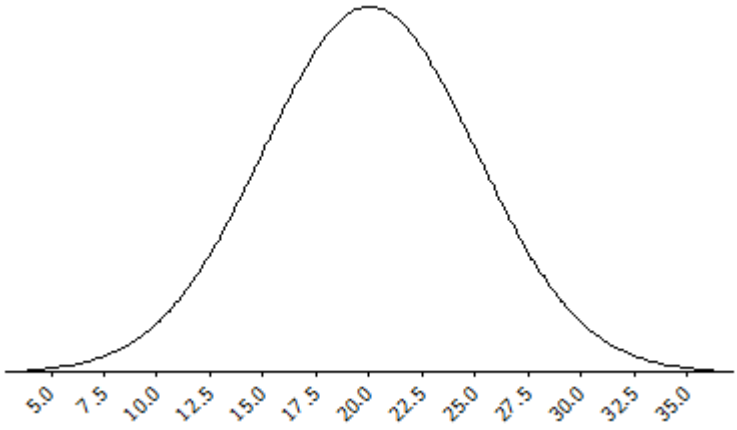
A) σ for X = σ for Y, and μ for X = μ for Y.
B) σ for X < σ for Y, but μ for X > μ for Y.
C) σ for X > σ for Y, and μ for X > μ for Y.
D) σ for X < σ for Y, and μ for X < μ for Y.

118. In comparing the two Normal distributions shown below, we can conclude that:



A) σ for X = σ for Y, but μ for X > μ for Y.
B) σ for X = σ for Y, but μ for X < μ for Y.
C) σ for X > σ for Y, and μ for X > μ for Y.
D) σ for X < σ for Y, but μ for X = μ for Y.

119. What are the mean and standard deviation of the Normal distribution below?



A) The mean is 20 and the standard deviation is 2.5.
B) The mean is 20 and the standard deviation is 5.
C) The mean is 5 and the standard deviation is 20.
D) The mean is 2.5 and the standard deviation is 20.

120. For which of the following is the Normal distribution important in statistics?
A) Normal distributions are good descriptions for many distributions of real data.
B) Normal distributions provide good approximations to the distributions of many kinds of "chance" outcomes.
C) An extensive set of statistical inference procedures is based on the Normal distribution.
D) All of the answers are correct.

121. Using the standard Normal distribution tables, what is the area under the standard Normal curve corresponding to $Z > -1.23$?
A) 0.1151
B) 0.1093
C) 0.8888
D) 0.8907

122. Using the standard Normal distribution tables, what is the area under the standard Normal curve corresponding to $-0.5 < Z < 1.21$?
A) 0.3085
B) 0.8869
C) 0.5784
D) 0.2815

123. Using the standard Normal distribution tables, what is the area under the standard Normal curve corresponding to $0.50 < Z < 1.00$?

A) 0.5328
B) 0.3413
C) 0.1915
D) 0.1498

124. Which of the following is TRUE regarding the standard Normal distribution?

A) It has a mean of 1 and a standard deviation of 0.
B) It has a mean of 0 and a standard deviation of 1.
C) The mean can be any value and the standard deviation can be any positive value.
D) The mean is always larger than the standard deviation.

125. Changing the units of an observation from a distribution by applying the formula $(x - \mu)/\sigma$ is termed:

A) commonizing.
B) adjusting.
C) deviating.
D) standardizing.

126. A *z*-score tells us:

A) the percentage of the time that a value in a distribution occurs.
B) the number of standard deviations from the mean that a value in a distribution is.
C) whether a value in a distribution is above the mean or below the mean.
D) both the number of standard deviations from the mean that a value in a distribution is and whether a value in a distribution is above the mean or below the mean.

127. What percentage of the time will an observation from a Normal distribution have a value that is within 1 standard deviation of the mean?

A) approximately 34%
B) approximately 68%
C) approximately 16%
D) approximately 95%

128. What percentage of the time will an observation from a Normal distribution has a value that is more than 2 standard deviations away from the mean?

A) approximately 5%
B) approximately 95%
C) approximately 2.5%
D) approximately 47.5%

129. Suppose the volume of juice being poured into containers in a filling operation is Normally distributed with a mean of 16 ounces and a standard deviation of 0.05 ounces. About 95% of all containers should contain what volume of juice?

A) 16.10 ounces
B) 18 ounces
C) between 15.9 ounces and 16.1 ounces
D) between 14 ounces and 18 ounces

130. A distribution is described as $N(50, 4)$. Which of the following is TRUE?

A) The distribution is Normal.
B) The mean of the distribution is 4.
C) The standard deviation of the distribution is 50.
D) All of the answers are correct.

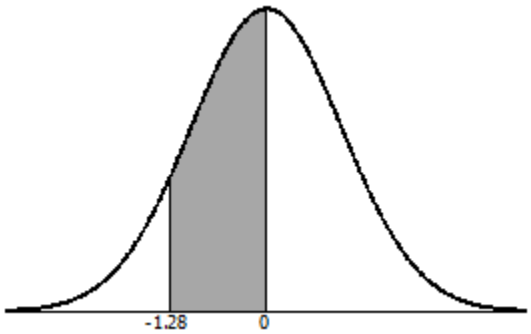
131. A distribution is Normal with $\mu = 25$ and $\sigma = 4$. If 47.72% of all observations from this distribution are between 25 and "a," what value must "a" have?

A) 2
B) 8
C) 27
D) 33

132. Which of the following CORRECTLY depicts the area corresponding to $-1.28 < Z < 0$?

A)

B)

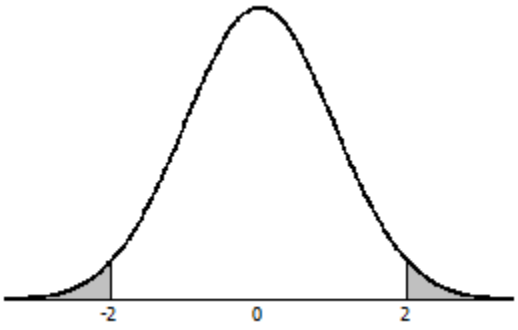


C)

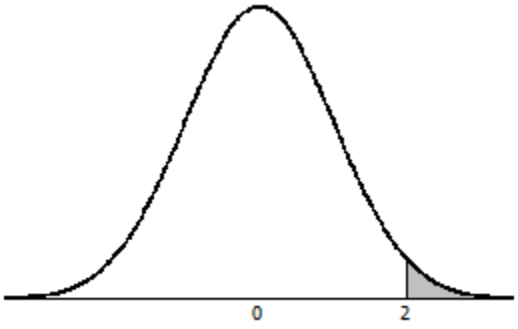
D)

133. Which of the following CORRECTLY depicts the area corresponding to $|Z| > 2$?

A)



B)



C)

D)

Use the following to answer questions 134-135:

A new brand of hybrid car claims to get an average of 51 miles per gallon of regular unleaded gasoline during stop-and-go driving. The distance the car travels on one gallon of fuel has a Normal distribution with a standard deviation of 5.8 miles.

134. Approximately what percentage of these hybrid cars get more than 60 miles per gallon?

A) 43.94%
B) 1.55%
C) 93.94%
D) 6.06%

135. What is the approximate maximum number of miles per gallon that puts a driver in the bottom 5% of all drivers?

A) 51 miles per gallon
B) 41.46 miles per gallon
C) 60.54 miles per gallon
D) 43.58 miles per gallon

136. Birthweights at a local hospital have a normal distribution with a mean of 110 ounces and a standard deviation of 15 ounces. The proportion of infants with birthweights under 95 ounces is:

A) 0.500.
B) 0.159.
C) 0.341.
D) 0.841.

137. A computer company produces an extremely light laptop and they claim it is the lightest on the market, weighing only 32 ounces. The actual weight of the laptop in the box has a Normal distribution, with a mean of 33 ounces and a standard deviation of 0.7 ounces. What proportion of laptops is overweight (i.e., weigh more than 32 ounces)?

A) 0.0764
B) 0.2400
C) 0.7580
D) 0.9236

138. A market research company employs a large number of typists to enter data into a computer. The time taken for new typists to learn the computer system is known to have a Normal distribution with a mean of 90 minutes and a standard deviation of 18 minutes. The proportion of new typists that take more than two hours to learn the computer system is:

A) 0.952.
B) 0.548.
C) 0.048.
D) 0.452.

Use the following to answer questions 139-140:

The distribution of actual weights of 8.0 ounces chocolate bars produced by a certain machine is normal with a mean of 8.1 ounces and a standard deviation of 0.1 ounces.

139. The proportion of chocolate bars weighing under 8.0 ounces is:

A) 0.500.
B) 0.159.
C) 0.341.
D) 0.841.

140. The proportion of chocolate bars with weights between 8.2 and 8.3 ounces is:

A) 0.819.
B) 0.636.
C) 0.477.
D) 0.136.

141. Tickets to minor league baseball games cost on average $7.02. Including food, drinks, parking, and other expenses, the average cost for a family of four to attend the game is $57.70. Assume the distribution of cost has a Normal distribution with standard deviation $5.57. The approximate proportion (using the standard Normal table) of families that will pay between $60 and $70 is:

A) 0.9864.
B) 0.6591.
C) 0.0136.
D) 0.3273.

142. The mean amount spent by a family of four on food per month is $700 with a standard deviation of $85. Assuming that the food expenditures are normally distributed, what is the proportion of families of four that spend more than $900 per month?

A) 0.9906
B) 0.0094
C) 0.0235
D) 0.4906

143. The time to complete a standardized exam is approximately normal with a mean of 70 minutes and a standard deviation of 10 minutes. How much time should be given to complete the exam so that 80% of the students will complete the exam in the time given?

A) 84 minutes
B) 78.4 minutes
C) 92.8 minutes
D) 79.8 minutes

144. The time taken to prepare the envelopes to mail a weekly report to all executives in a company has a Normal distribution, with a mean of 35 minutes and a standard deviation of 2 minutes. On 95% of occasions the mailing preparation takes less than:

A) 38.29 minutes.
B) 31.71 minutes.
C) 35.25 minutes.
D) 34.75 minutes.

145. A soft-drink machine can be regulated so that it discharges an average of μ ounces per cup. If the ounces of fill are Normally distributed, with a standard deviation of 0.4 ounces, what value should μ be set at so that 6-ounce cups will overflow only 2% of the time?

A) 6.82 ounces
B) 6.00 ounces
C) 5.18 ounces
D) 5.60 ounces

146. The weights of packets of cookies produced by a certain manufacturer have a Normal distribution with a mean of 202 g and a standard deviation of 3 g. The weight that should be stamped on the packet so that only 1% of packets are underweight is:

A) 209 g.
B) 195 g.
C) 202 g.
D) not able to be determined with the available information.

147. Tickets to minor league baseball games cost on average $7.02. Including food, drinks, parking, and other expenses, the average cost for a family of four to attend the game is $57.70. Assume the distribution of cost has a Normal distribution with standard deviation $5.57. Only 2.5% of families pay more than this:

A) $68.62.
B) $66.86.
C) $64.83.
D) $46.78.

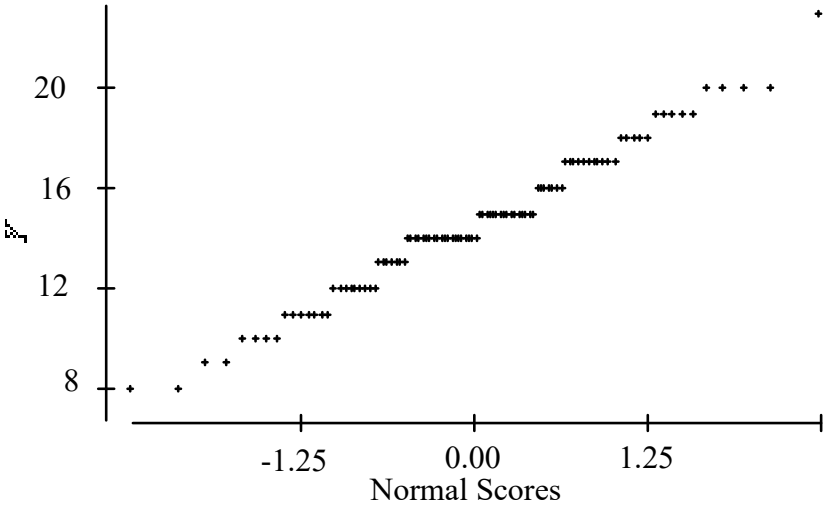
148. A computer company produces an extremely light laptop, and they claim it is the lightest on the market, weighing only 32 ounces. The actual weight of the laptop in the box has a Normal distribution, with a mean of 33 ounces and a standard deviation of 0.7 ounces. Ninety-five percent of laptops actually weigh more than x ounces. What is the value of x?

A) 34.40
B) 34.15
C) 31.85
D) 31.60

149. The distribution of actual weights of 8-ounce chocolate bars produced by a certain machine is Normal, with a mean of 8.1 ounces and a standard deviation of 0.1 ounces. What weight should be put on the chocolate bar wrappers so that only 1% of bars are underweight?

A) 7.77 ounces
B) 8.33 ounces
C) 7.87 ounces
D) 8.23 ounces

150. Consider the following normal quantile plot.



The MOST striking feature of the plot is the:

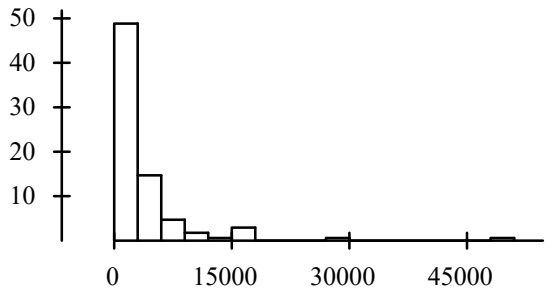
A) granularity; that is, the appearance of steps.
B) strong skewness indicated by the plot.
C) many outliers evident in the plot.
D) fact that Y is categorical.

151. A stemplot of a set of data is roughly symmetric, but the data do not even approximately follow the 68-95-99.7 rule. We conclude that the data are:

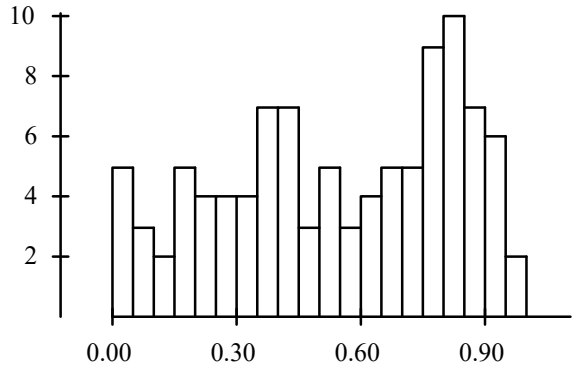
A) Normal, but they are not standard Normal.
B) standard Normal.
C) not Normal.
D) Normal.

152. Which of the following histograms would BEST be approximated by a Normal distribution?

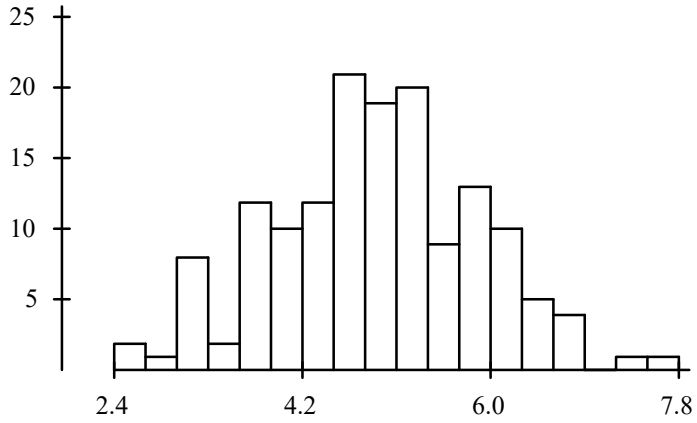
A)



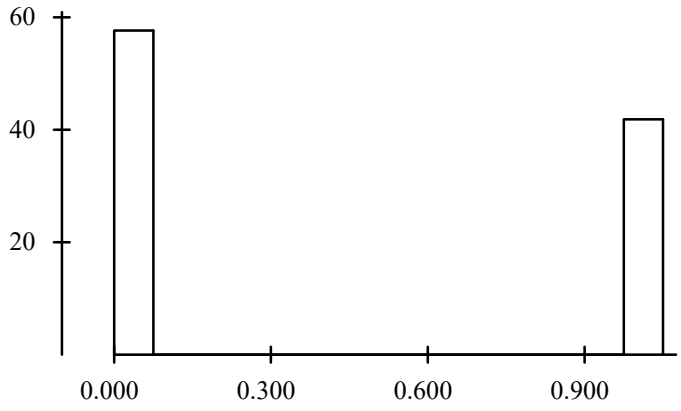
B)



C)



D)


60
40
20
0.000
0.300
0.600
0.900

Answer Key

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

45. B
46. B
47. B
48. A
49. B
50. B
51. A
52. B
53. B
54. C
55. B
56. C
57. A
58. A
59. A
60. C
61. B
62. B
63. B
64. B
65. D
66. B
67. B
68. A
69. B
70. D
71. D
72. C
73. C
74. B
75. D
76. C
77. A
78. C
79. D
80. B
81. B
82. A
83. A
84. A
85. C
86. B
87. B
88. C
89. D
90. A

91. C
92. B
93. C
94. C
95. B
96. A
97. B
98. B
99. B
100. C
101. D
102. A
103. B
104. A
105. B
106. D
107. D
108. C
109. D
110. B
111. D
112. C
113. C
114. C
115. C
116. D
117. B
118. A
119. B
120. D
121. D
122. C
123. D
124. B
125. D
126. D
127. B
128. A
129. C
130. A
131. D
132. B
133. A
134. D
135. B
136. B

137. D
138. C
139. B
140. D
141. D
142. B
143. B
144. A
145. C
146. B
147. A
148. C
149. C
150. A
151. C
152. C