practice set chapter 1 – 3

Disclaimer: The actual exam is not necessarily like these questions, nor is it strictly multiple choice. This is only an aid to help you practice.

Provide an appropriate response.

1) Distinguish between categorical and quantitative data. Give an example for each.

2) Define observational study and experiment. Define the terms "treatment group" and "placebo group" as part of your answer.

3) Define the terms "stratified sampling", "systematic sampling", "cluster sampling", and "convenience sampling". Give examples for each.

4) A hip hop radio show broadcast in the city of Puddelton asked people to call in and express their opinions on the new mayor. Are the results likely to be representative of all adults in Puddelton? Of all listeners to the hip hop show? Why or why not?

5) Would an observational study or an experiment be more appropriate to investigate the effects on humans of a substance known to be toxic? Explain.

6) A teacher was interested in knowing how much tax people pay in the United States. She selected a simple random sample of her friends and asked them about their taxes. Is this sample likely to be representative of all adults in the United States?

Use common sense to determine whether the given event is impossible; possible, but very unlikely; or possible and likely.

7) Andrew rolled a die five times and got a six every time.
   A) Possible, but very unlikely   B) Possible and likely   C) Impossible

8) Luis and his sister both won more than a million dollars in lotteries last year
   A) Possible, but very unlikely   B) Possible and likely   C) Impossible

Determine which of the four levels of measurement (nominal, ordinal, interval, ratio) is most appropriate.

9) Salaries of college professors.
   A) Ratio   B) Interval   C) Ordinal   D) Nominal

Use common sense to determine whether the given event is impossible; possible, but very unlikely; or possible and likely.

10) When Amina took a four–day Thanksgiving vacation in Seattle, it rained every day.
   A) Possible and likely   B) Possible, but very unlikely   C) Impossible

Determine whether the given value is a statistic or a parameter.

11) A sample of 120 employees of a company is selected, and the average age is found to be 37 years.
   A) Statistic   B) Parameter

12) After inspecting all of 55,000 kg of meat stored at the Wurst Sausage Company, it was found that 45,000 kg of the meat was spoiled.
   A) Parameter   B) Statistic

Determine whether the given value is from a discrete or continuous data set.

13) The number of freshmen entering college in a certain year is 621.
    A) Discrete   B) Continuous

14) The temperature of a cup of coffee is 67.3°F.
    A) Continuous   B) Discrete

15) The height of 2–year–old maple tree is 28.3 ft.
    A) Continuous   B) Discrete

16) The total number of phone calls a sales representative makes in a month is 425.
    A) Discrete   B) Continuous

Determine which of the four levels of measurement (nominal, ordinal, interval, ratio) is most appropriate.

17) Survey responses of "good, better, best".
    A) Ordinal   B) Interval   C) Ratio   D) Nominal

18) The temperatures of eight different plastic spheres.
    A) Interval   B) Ordinal   C) Ratio   D) Nominal

19) The sample of spheres categorized from softest to hardest.
    A) Ordinal   B) Interval   C) Ratio   D) Nominal

20) The subjects in which college students major.
    A) Nominal   B) Interval   C) Ordinal   D) Ratio

Identify the sample and population. Also, determine whether the sample is likely to be representative of the population.

21) An employee at the local ice cream parlor asks three customers if they like chocolate ice cream.

22) In a poll of 50,000 randomly selected college students, 74% answered "yes" when asked "Do you have a television in your dorm room?".

Use critical thinking to develop an alternative conclusion.

23) A study shows that adults who work at their desk all day weigh more than those who do not. Conclusion: Desk jobs cause people to gain weight.

Perform the requested conversions. Round decimals to the nearest thousandth and percents to the nearest tenth of a percent, if necessary.

24) Convert the fraction $\frac{7}{11}$ to an equivalent decimal and percentage.

    A) 0.636, 63.6%   B) 0.636, 6.36%   C) 0.756, 75.6%   D) 0.756, 756%

25) Convert 25% to an equivalent fraction and decimal.

    A) $\frac{1}{4}$, 0.25   B) $\frac{1}{4}$, 2.5   C) $\frac{1}{8}$, 0.25   D) $\frac{1}{8}$, 2.5

26) Convert $\frac{1}{12}$ to an equivalent decimal and percent.

    A) 0.083, 8.3%   B) 0.083, 0.83%   C) 0.203, 20.3%   D) 0.203, 203%

27) Convert 0.368 to an equivalent fraction and percent.

    A) $\frac{46}{125}$, 36.8%   B) $\frac{46}{125}$, 3.68%   C) $\frac{9}{25}$, 36.8%   D) $\frac{9}{25}$, 3.68%

28) Convert 1.5 to an equivalent fraction and percent.

    A) $1\frac{1}{2}$, 150%   B) $1\frac{1}{2}$, 15%   C) $1\frac{1}{3}$, 150%   D) $1\frac{1}{3}$, 15%

Solve the problem.

29) A lawyer has 40 clients, 10% of whom are businesses. Find the number of business clients.

    A) 4 clients   B) 6 clients   C) 36 clients   D) 38 clients

30) Alex and Juana went on a 100–mile canoe trip with their class. On the first day they traveled 26 miles. What percent of the total distance did they canoe?

    A) 26%   B) 0.26%   C) 4%   D) 400%

31) On a test, if 130 questions are answered and 33% of them are correct, what is the number of correct answers?

    A) 43   B) –17   C) 60   D) 83

32) On a test, 55% of the questions are answered correctly. If 44 questions are correct, how many questions are on the test?

    A) 80   B) 125   C) 11   D) 55

Provide an appropriate response.

33) An advertisement for a heating pad says that it can reduce back pain by 200%. What is wrong with this statement?

Determine whether the given description corresponds to an observational study or an experiment.

34) A marketing firm does a survey to find out how many people use a product. Of the one hundred people contacted, fifteen said they use the product.

    A) Observational study   B) Experiment

35) A clinic gives a drug to a group of ten patients and a placebo to another group of ten patients to find out if the drug has an effect on the patients' illness.

    A) Experiment   B) Observational study

36) A stock analyst selects a stock from a group of twenty for investment by choosing the stock with the greatest earnings per share reported for the last quarter.

    A) Observational study   B) Experiment

37) A doctor performs several diagnostic tests to determine the reason for a patient's illness.

    A) Experiment   B) Observational study

Identify which of these types of sampling is used: random, stratified, systematic, cluster, convenience.

38) 49, 34, and 48 students are selected from the Sophomore, Junior, and Senior classes with 496, 348, and 481 students respectively.
    A) Stratified
    B) Random
    C) Cluster
    D) Systematic
    E) Convenience

39) To avoid working late, a quality control analyst simply inspects the first 100 items produced in a day.
    A) Convenience
    B) Random
    C) Cluster
    D) Stratified
    E) Systematic

40) A sample consists of every 49th student from a group of 496 students.
    A) Systematic
    B) Random
    C) Cluster
    D) Convenience
    E) Stratified

41) The name of each contestant is written on a separate card, the cards are placed in a bag, and three names are picked from the bag.
    A) Random
    B) Convenience
    C) Systematic
    D) Cluster
    E) Stratified

Provide an appropriate response.

42) A psychology student wishes to investigate differences in political opinions between business majors and political science majors at her college. She randomly selects 100 students from the 260 business majors and 100 students from the 180 political science majors. Does this sampling plan result in a random sample? Simple random sample? Explain.
    A) No; no. The sample is not random because political science majors have a greater chance of being selected than business majors. It is not a simple random sample because some samples are not possible, such as a sample consisting of 50 business majors and 150 political science majors.
    B) Yes; no. The sample is random because all students have the same chance of being selected. It is not a simple random sample because some samples are not possible, such as a sample consisting of 50 business majors and 150 political science majors.
    C) No; yes. The sample is not random because political science majors have a greater chance of being selected than business majors. It is a simple random sample because all samples of size 200 have the same chance of being selected.
    D) Yes; yes. The sample is random because all students have the same chance of being selected. It is a simple random sample because all samples of size 200 have the same chance of being selected.

Identify the type of observational study (cross–sectional, retrospective, prospective).

43) A town obtains current employment data by polling 10,000 of its citizens this month.

    A) Cross–sectional   B) Retrospective   C) Prospective   D) None of these

44) A statistical analyst obtains data about ankle injuries by examining a hospital's records from the past 3 years.

    A) Retrospective   B) Prospective   C) Cross–sectional   D) None of these

Provide an appropriate response.

45) The following frequency distribution analyzes the scores on a math test. Find the class midpoint of scores interval 40–59.

Scores	Number of students
40–59	2
60–75	4
76–82	6
83–94	15
95–99	5

    A) 49.5   B) 48.5   C) 49.0   D) 50.5

46) The following frequency distribution analyzes the scores on a math test. Find the class boundaries of scores interval 95–99.

Scores	Number of students
40–59	2
60–75	4
76–82	6
83–94	15
95–99	5

    A) 94.5, 99.5   B) 95.5, 99.5   C) 94.5, 100.5   D) 95.5, 100.5

47) The frequency distribution below summarizes the home sale prices in the city of Summerhill for the month of June. Determine the width of each class.

(Sale price in thousand $)	Frequency
80.0 – 110.9	2
111.0 – 141.9	5
142.0 – 172.9	7
173.0 – 203.9	10
204.0 – 234.9	3
235.0 – 265.9	1

    A) 31   B) 61   C) 30   D) 28

Solve the problem.

48) Using a strict interpretation of the relevant criteria characterizing a normal distribution, does the frequency distribution below appear to have a normal distribution? Does the distribution appear to be normal if the criteria are interpreted very loosely?

Closing Share Price	Frequency
0–5	2
6–10	5
11–15	15
16–20	27

Provide an appropriate response.

49) The frequency distribution for the weekly incomes of students with part–time jobs is given below. Construct the corresponding relative frequency distribution. Round relative frequencies to the nearest hundredth of a percent if necessary.

Income ($)	Frequency
200–300	60
301–400	73
401–500	91
501–600	89
More than 600	15

A)

Income ($)	Relative Frequency
200–300	18.29%
301–400	22.26%
401–500	27.74%
501–600	27.13%
More than 600	4.57%

B)

Income ($)	Relative Frequency
200–300	12.5%
301–400	20.1%
401–500	37.3%
501–600	15.2%
More than 600	14.9%

C)

Income ($)	Relative Frequency
200–300	27.33%
301–400	27.38%
401–500	4.60%
501–600	18.07%
More than 600	27.41%

D)

Income ($)	Relative Frequency
201–300	15.5%
301–400	22.1%
401–500	31.3%
501–600	16.2%
More than600	14.9%

Construct the cumulative frequency distribution that corresponds to the given frequency distribution.

50)

Speed	Number of cars
0–29	4
30–59	16
60–89	60
90–119	20

A)

Speed	Cumulative Frequency
Less than 30	4
Less than 60	20
Less than 90	80
Less than120	100

B)

Speed	Cumulative Frequency
Less than 30	100
Less than 60	80
Less than 90	82
Less than120	4

C)

Speed	Cumulative Frequency
Less than 30	0.04
Less than 60	0.20
Less than 90	0.80
Less than120	1.00

D)

Speed	Cumulative Frequency
0–29	4
30–59	20
60–89	80
90–119	100

Provide an appropriate response.

51) In a survey, 26 voters were asked their ages. The results are shown below. Construct a histogram to represent the data (with 5 classes beginning with a lower class limit of 19.5 and a class width of 10). What is the approximate age at the center?

43 56 28 63 67 66 52 48 37 51 40 60 62
66 45 21 35 49 32 53 61 53 69 31 48 59
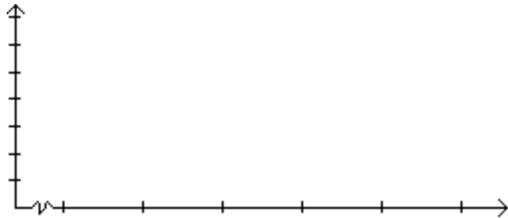
Find the original data from the stemplot.

52)

Stem	Leaves
15	1 7 7
16	1 3 9
17	1 7

A) 151, 157, 157, 161, 163, 169, 171, 177
B) 151, 157, 167, 161, 163, 169, 171, 187
C) 16, 22, 22, 17, 19, 25, 18, 24
D) 15177, 16139, 1717

Construct a pie chart representing the given data set.

53) The following data give the distribution of the types of houses in a town containing 44,000 houses.

Capes	Garrisons	Splits
11,000	15,400	17,600
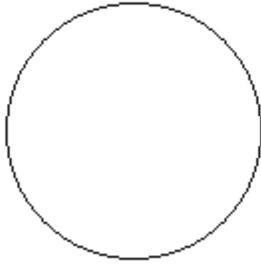
A)
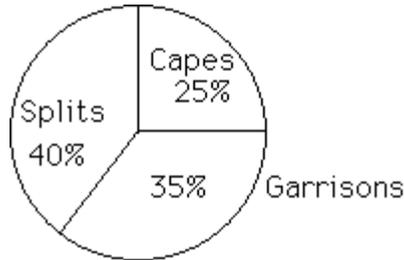
B)
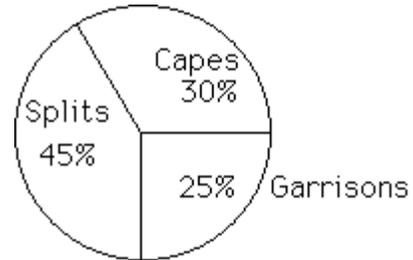
Find the mean for the given sample data. Unless indicated otherwise, round your answer to one more decimal place than is present in the original data values.

54) The weights (in pounds) of six dogs are listed below. Find the mean weight.

17 56 85 38 138 98

A) 72 lb B) 72.5 lb C) 86.4 lb D) 71.5 lb

Provide an appropriate response.

55) A parcel delivery service lowered its prices and finds that it has delivered twice as many parcels this year as it did last year. To illustrate this fact, the manager draws a graph as shown below. Each cube depicts a parcel. The side length of the "parcel" on the right is twice the side length of the "parcel" on the left. Why is this graph misleading? What visual impression is created by the graph?
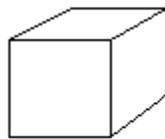
Last year   This year

Find the mean for the given sample data. Unless indicated otherwise, round your answer to one more decimal place than is present in the original data values.

56) The students in Hugh Logan's math class took the Scholastic Aptitude Test. Their math scores are shown below. Find the mean score.

536 608 344 340 596
357 343 566 470 482

A) 464.2 B) 473.7 C) 455.1 D) 476.0

Find the median for the given sample data.

57) A store manager kept track of the number of newspapers sold each week over a seven-week period. The results are shown below.

     80 39 214 152 264 239 232

Find the median number of newspapers sold.

    A) 214 newspapers   B) 174 newspapers   C) 152 newspapers   D) 232 newspapers

58) The number of vehicles passing through a bank drive-up line during each 15-minute period was recorded. The results are shown below. Find the median number of vehicles going through the line in a fifteen-minute period.

    24 26 24 27
    27 24 29 26
    34 30 30 28
    23 30 24 19
    14 26 26 26

    A) 26 vehicles   B) 25.85 vehicles   C) 30 vehicles   D) 27 vehicles

Find the mode(s) for the given sample data.

59) 20 42 46 42 49 42 49

    A) 42   B) 49   C) 41.4   D) 46

60) Listed below are the lengths (in inches) of each snake in the Clarmont Zoo's reptile house.

    9 15 86 13 16 101 85 10 14 17 102
    A) no mode
    B) 11 in.
    C) 21.3 in.
    D) 9 in.,15 in., 86 in., 13 in., 16 in., 101 in., 85 in., 10 in., 14 in., 17 in., 102 in.

61) The weights (in ounces) of 14 different apples are shown below.

    4.9   4.6   5.1   4.2   4.8   4.9   4.6
    4.3   4.1   4.2   4.9   4.3   4.2   5.4
    A) 4.9 oz, 4.2 oz   B) 4.9 oz   C) 4.55 oz   D) no mode

Find the midrange for the given sample data.

62) 3 6 9 0 4 1 11 5 9 14 3 8 2 15 0 9

    A) 7.5   B) 8   C) 15   D) 5.5

Find the range for the given sample data.

63) Fred, a local mechanic, recorded the price of an oil and filter change at twelve competing service stations. The prices (in dollars) are shown below.

    32.99   24.95   26.95   28.95
    18.95   28.99   30.95   22.95
    24.95   26.95   29.95   28.95
    A) $14.04   B) $12.00   C) $10.05   D) $32.99

Find the mean of the data summarized in the given frequency distribution.

64) The test scores of 40 students are summarized in the frequency distribution below. Find the mean score.

Score	Students
50–59	13
60–69	6
70–79	7
80–89	7
90–99	7

A) 71.8   B) 74.5   C) 68.2   D) 64.6

Find the midrange for the given sample data.

65) A meteorologist records the number of clear days in a given year in each of 21 different U.S. cities. The results are shown below. Find the midrange.

72   143   52   84   100   98   101
120   99   121   86   60   59   71
125   130   104   74   83   55   169

A) 110.5 days   B) 112 days   C) 117 days   D) 98 days

Solve the problem.

66) Michael gets test grades of 73, 77, 82, and 86. He gets a 93 on her final exam. Find the weighted mean if the tests each count for 15% and the final exam counts for 40% of the final grade. Round to one decimal place.

A) 84.9   B) 243.9   C) 82.2   D) –74.1

67) A student earned grades of C, A, B, and A. Those courses had these corresponding numbers of credit hours: 4, 5, 1, and 5. The grading system assigns quality points to letter grades as follows: A = 4, B = 3, C = 2, D = 1, and F = 0. Compute the grade point average (GPA) and round the result to two decimal places.

A) 3.40   B) 8.75   C) 3.50   D) 2.18

Find the range for the given sample data.

68) Jorge has his own business as a painter. The amounts he made in the last five months are shown below.
$2416 $2423 $1644 $2036 $1267

A) $1156   B) $1149   C) $779   D) $772

Find the variance for the given data. Round your answer to one more decimal place than the original data.

69) 6.6   8.5   4.6   1.7   2.4

A) 8.08   B) 6.46   C) 7.98   D) 12.80

70) A class of sixth grade students kept accurate records on the amount of time they spent playing video games during a one–week period. The times (in hours) are listed below:

20.6   20.0   28.9   22.9   27.5
17.1   23.4   15.5   30.8   29.9

A) 29.46 hr^2 B) 26.51 hr^2 C) 29.36 hr^2 D) 193.51 hr^2

Find the standard deviation for the given sample data. Round your answer to one more decimal place than is present in the original data.

71) 20.0   21.5   27.4   47.3   13.1   11.1

A) 13.11   B) 37.3   C) 4145.1   D) 3285.4

72) The top nine scores on the organic chemistry midterm are as follows.

66, 43, 86, 45, 68, 62, 29, 62, 90

A) 19.8   B) 18.7   C) 7.7   D) 21.2

Find the coefficient of variation for each of the two sets of data, then compare the variation. Round results to one decimal place.

73) Listed below are the systolic blood pressures (in mm Hg) for a sample of men aged 20–29 and for a sample of men aged 60–69.

Men aged 20–29: 116   125   132   118   131   123
Men aged 60–69: 128   151   140   125   164   139

A) Men aged 20–29: 5.3%
    Men aged 60–69: 10.3 %
    There is substantially more variation in blood pressures of the men aged 60–69.

B) Men aged 20–29: 5.5%
    Men aged 60–69: 10.7%
    There is substantially more variation in blood pressures of the men aged 60–69.

C) Men aged 20–29: 5.0%
    Men aged 60–69: 8.4%
    There is substantially more variation in blood pressures of the men aged 60–69.

D) Men aged 20–29: 8.7%
    Men aged 60-69: 4.7%
    There is more variation in blood pressures of the men aged 20–29.

Find the range, variance, and standard deviation for each of the two samples, then compare the two sets of results.

74) When investigating times required for drive–through service, the following results (in seconds) were obtained.

Restaurant A	120	67	89	97	124	68	72	96
Restaurant B	115	126	49	56	98	76	78	95

A) Restaurant A: 57 sec; 493.98 sec^2; 22.23 sec

    Restaurant B: 77 sec; 727.98 sec^2; 26.98 sec
    There is more variation in the times for restaurant B.

B) Restaurant A: 75 sec; 493.98 sec^2; 22.23 sec

    Restaurant B: 70 sec; 727.98 sec^2; 26.98 sec
    There is more variation in the times for restaurant B.

C) Restaurant A: 57 sec; 493.98 sec^2; 22.23 sec

    Restaurant B: 56 sec; 727.98 sec^2; 32.89 sec
    There is more variation in the times for restaurant B.

D) Restaurant A: 57 sec; 793.98 sec^2; 28.18 sec

    Restaurant B: 77 sec; 727.98 sec^2; 26.98 sec
    There is more variation in the times for restaurant A.

Find the standard deviation of the data summarized in the given frequency distribution.

75) A company had 80 employees whose salaries are summarized in the frequency distribution below. Find the standard deviation.

Salary (dollars)	Employees
5,001–10,000	12
10,001–15,000	13
15,001–20,000	14
20,001–25,000	19
25,001–30,000	22

  A) $7105.7   B) $7461.0   C) $7674.1   D) $7887.3

Use the range rule of thumb to estimate the standard deviation. Round results to the nearest tenth.

76) The race speeds for the top eight cars in a 200–mile race are listed below.

    185.9   179.5   189.2   176.7   175.6   188.7   186.3   177.9

  A) 3.4   B) 6.8   C) 7.5   D) 1.1

Use the empirical rule to solve the problem.

77) At one college, GPA's are normally distributed with a mean of 2.9 and a standard deviation of 0.6. What percentage of students at the college have a GPA between 2.3 and 3.5?

  A) 68%   B) 99.7%   C) 84.13%   D) 95%

Solve the problem.

78) The heights of the adults in one town have a mean of 67.5 inches and a standard deviation of 3.4 inches. What can you conclude from Chebyshev's theorem about the percentage of adults in the town whose heights are between 57.3 and 77.7 inches?

  A) The percentage is at least 88.9%   B) The percentage is at most 88.9%

  C) The percentage is at most 99.7%   D) The percentage is at least 99.7%

Solve the problem. Round results to the nearest hundredth.

79) The mean of a set of data is 5.73 and its standard deviation is 3.44. Find the z score for a value of 13.87.

  A) 2.37   B) 2.61   C) 2.13   D) 2.67

80) The mean of a set of data is 359.53 and its standard deviation is 63.94. Find the z score for a value of 445.29.

  A) 1.34   B) 1.48   C) 1.21   D) 1.64

Find the number of standard deviations from the mean. Round your answer to two decimal places.

81) The annual snowfall in a town has a mean of 38 inches and a standard deviation of 10 inches. Last year there were 63 inches of snow. How many standard deviations from the mean is that?

  A) 2.50 standard deviations above the mean   B) 2.50 standard deviations below the mean

  C) 0.44 standard deviations below the mean   D) 0.44 standard deviations above the mean

Find the z–score corresponding to the given value and use the z–score to determine whether the value is unusual. Consider a score to be unusual if its z–score is less than –2.00 or greater than 2.00. Round the z–score to the nearest tenth if necessary.

82) A test score of 50.0 on a test having a mean of 69 and a standard deviation of 10.

  A) –1.9; not unusual   B) –1.9; unusual   C) 1.9; not unusual   D) –19; unusual

Determine which score corresponds to the higher relative position.

83) Which is better, a score of 92 on a test with a mean of 71 and a standard deviation of 15, or a score of 688 on a test with a mean of 493 and a standard deviation of 150?
   A) A score of 92
   B) A score of 688
   C) Both scores have the same relative position.

Find the percentile for the data value.

84) Data set: 4 6 14 10 4 10 18 18 22 6 6 18 12 2 18;
   data value: 14
   A) 60   B) 70   C) 35   D) 52

Find the indicated measure.

85) The weights (in pounds) of 30 newborn babies are listed below. Find P_{16}.

   5.5 5.7 5.8 5.9 6.1 6.1 6.4 6.4 6.5 6.6
   6.7 6.7 6.7 6.9 7.0 7.0 7.0 7.1 7.2 7.2
   7.4 7.5 7.7 7.7 7.8 8.0 8.1 8.1 8.3 8.7
   A) 6.1 lb   B) 4.8 lb   C) 5.9 lb   D) 6.0 lb

86) The weights (in pounds) of 30 newborn babies are listed below. Find Q_1.

   5.5 5.7 5.8 6.0 6.1 6.1 6.3 6.4 6.5 6.6
   6.7 6.7 6.7 6.9 7.0 7.0 7.0 7.1 7.2 7.2
   7.4 7.5 7.7 7.7 7.8 8.0 8.1 8.1 8.3 8.7
   A) 6.4 lb   B) 7.5 lb   C) 6.3 lb   D) 5.8 lb

Construct a boxplot for the given data. Include values of the 5−number summary in all boxplots.

87) The test scores of 32 students are listed below. Construct a boxplot for the data set.

   32 37 41 44 46 48 53 55
   57 57 59 63 65 66 68 69
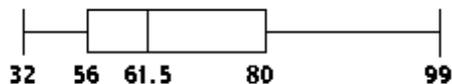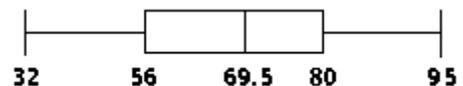   70 71 74 74 75 77 78 79
   81 82 83 86 89 92 95 99

   A)
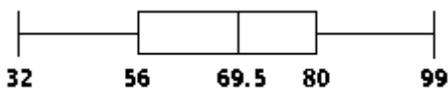
   B)
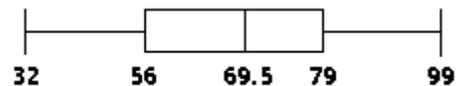
   C)

   D)

Provide an appropriate response.

88) Human body temperatures have a mean of 98.20° F and a standard deviation of 0.62°. Sally's temperature can be described by $z = 1.4$. What is her temperature? Round your answer to the nearest hundredth.
   A) 99.07°F   B) 97.33°F   C) 99.60°F   D) 100.45°F

Construct a modified boxplot for the data. Identify any outliers.
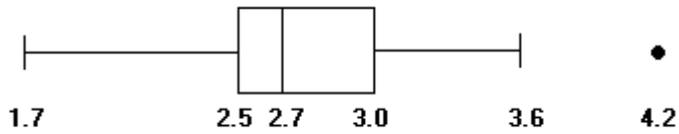
89) The weights (in ounces) of 27 tomatoes are listed below.

    1.7 2.0 2.2 2.2 2.4 2.5 2.5 2.5 2.6
    2.6 2.6 2.7 2.7 2.7 2.8 2.8 2.8 2.9
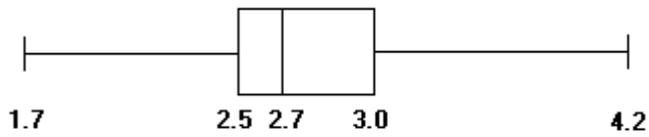   2.9 2.9 3.0 3.0 3.1 3.1 3.3 3.6 4.2
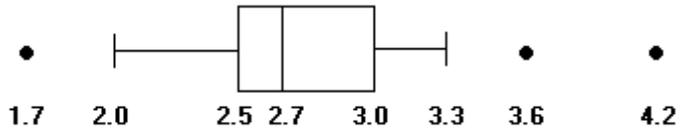
A) Outliers: 1.7 oz, 4.2 oz
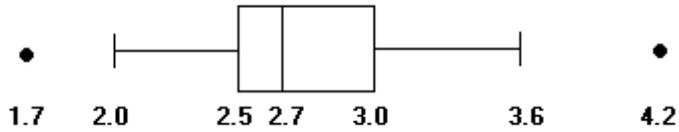
B) Outlier: 4.2 oz

C) No outliers

D) Outliers: 1.7 oz, 3.6 oz, 4.2 oz

1) Qualitative data can be separated into categories that are distinguished by nonnumeric characteristics. Quantitative data consist of numbers representing counts or measurements. Examples will vary.

2) In an observational study, we observe and measure specific characteristics, but we don't attempt to manipulate or modify the subjects being studied. In an experiment we apply some treatment and then proceed to observe its effects on the subjects. In the experiment, the group receiving the treatment is called the treatment group. The placebo group is the group that is not given the treatment.

3) Stratified sampling subdivides the population into at least two different subpopulations and then draws a sample from each stratum. Systematic sampling selects a beginning point and then selects every kth element in the population. In cluster sampling, the population is divided into sections, then sections are randomly selected, and then all members of the randomly selected sections are surveyed. Convenience sampling uses readily available results. Examples will vary.

4) No. A hip hop show is likely to attract a younger audience. Listeners to the show will not be representative of all adults in Puddleton so a sample from those listeners, however well selected, will not be representative. No, this sample will not be representative of all listeners to the show because it is a voluntary response sample – listeners themselves choose whether to respond. Those with stronger opinions are more likely to respond so the sample is unlikely to be representative of all listeners to the show.

5) An observational study would be more appropriate. An experiment would not be appropriate because it would be unethical to administer as a treatment a substance known to be toxic. However a retrospective observational study, for example, could be carried out by examining records from the past and observing the effects where the substance had been accidentally ingested.

6) No. In terms of income, the teacher's friends are unlikely to be representative of all adults in the United States. So a sample from this group, however well selected, is unlikely to be representative of all adults in the United States.

7) A
8) A
9) A
10) A
11) A
12) A
13) A
14) A
15) A
16) A
17) A
18) A
19) A
20) A
21) Sample: the 3 selected customers; population: all customers; not representative
22) Sample: the 50,000 selected college students; population: all college students; representative
23) Desk job workers are confined to their chairs for most of their work day. Other jobs require standing or walking around which burns calories. It is probably the lack of exercise that causes higher weights, not the desk job itself. Avoid causality altogether by saying lack of walking and exercise is associated with higher weights.
24) A
25) A
26) A
27) A
28) A
29) A
30) A
31) A

32) A

33) If a person's back pain was reduced by 100%, it would be completely eliminated, so it is not possible for a person's back pain to be reduced by more than 100%.

34) A

35) A

36) A

37) A

38) A

39) A

40) A

41) A

42) A
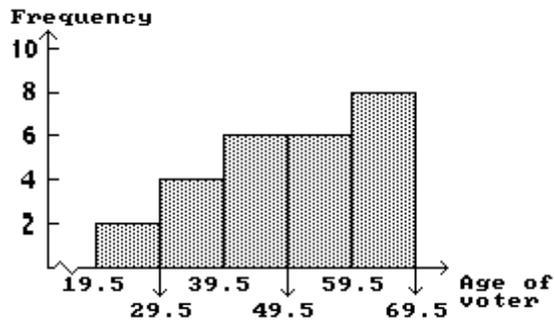
43) A

44) A

45) A

46) A

47) A

48) No; no; The frequencies do not increase, reach a maximum, and then decrease.

49) A

50) A

51) The approximate age at the center is 50.

52) A

53) A

54) A

55) The volume of the cube on the right is eight times (not twice) the volume of the cube on the left. The graph gives the visual impression that eight times as many parcels were delivered this year as last year.

56) A

57) A

58) A

59) A

60) A

61) A

62) A

63) A

64) A

65) A

66) A

67) A

68) A
69) A
70) A
71) A
72) A
73) A
74) A
75) A
76) A
77) A
78) A
79) A
80) A
81) A
82) A
83) A
84) A
85) A
86) A
87) A
88) A
89) A