Identify the study as an observational study or a designed experiment.
1) A political pollster reports that his candidate has a 10% lead in the polls with 10% undecided.
   A) Designed experiment
   B) Observational study

2) 400 patients suffering from chronic back pain were randomly assigned to one of two groups. Over a four-month period, the first group received acupuncture treatments and the second group received a placebo. Patients who received acupuncture treatments improved more than those who received the placebo.
   A) Designed experiment
   B) Observational study

Provide an appropriate response.
3) Based on a random sample of 1000 people, a researcher obtained the following estimates of the percentage of people lacking health insurance in one U.S. city.

<table>
<thead>
<tr>
<th>Age</th>
<th>Percentage not covered</th>
</tr>
</thead>
<tbody>
<tr>
<td>18-24</td>
<td>28.2</td>
</tr>
<tr>
<td>25-39</td>
<td>24.9</td>
</tr>
<tr>
<td>40-54</td>
<td>19.1</td>
</tr>
<tr>
<td>55-65</td>
<td>16.5</td>
</tr>
</tbody>
</table>

Classify the study as either descriptive or inferential.
A) Descriptive
B) Inferential

4) The table below shows the average income by age group for the residents of one town in the year 1998. The average incomes for each age group are estimates based on a sample of size 100 from each group.

<table>
<thead>
<tr>
<th>Age group</th>
<th>Average income</th>
</tr>
</thead>
<tbody>
<tr>
<td>18-24</td>
<td>$17,180</td>
</tr>
<tr>
<td>25-39</td>
<td>$26,661</td>
</tr>
<tr>
<td>40-54</td>
<td>$32,471</td>
</tr>
<tr>
<td>55-70</td>
<td>$25,960</td>
</tr>
<tr>
<td>Over 70</td>
<td>$18,241</td>
</tr>
</tbody>
</table>

Classify the study as either descriptive or inferential.
A) Descriptive
B) Inferential

Answer the question.
5) In a poll of 50,000 randomly selected college students, 74% answered "yes" when asked "Do you have a television in your dorm room?" Identify the sample and population.
   A) Sample: the 50,000 selected college students; population: all college students
   B) Sample: the 50,000 selected college students; population: the 74% who answered "yes"
   C) Sample: all college students; population: the 50,000 selected college students
   D) Sample: the 74% who answered "yes"; population: all college students

6) A magazine publisher mails a survey to every subscriber asking about the quality of its subscription service. The total number of subscribers represents what?
   A) The population
   B) The sample

7) A magazine publisher mails a survey to every subscriber asking about the timeliness of its subscription service. The publisher finds that only 3% of the subscribers responded. This 3% represents what?
   A) The population
   B) The sample

Provide an appropriate response.
8) A mega-discount chain store just opened a new clothing store in town emphasizing mainly women's clothing. Before opening, management had to decide whether to only carry either men's, women's, boys', girls', or infants' clothing. After performing representative sampling of potential customers from each of these groups, it was decided to carry only women's clothing. Identify the type of sampling used in this example.
   A) Cluster sampling
   B) Systematic sampling
   C) Stratified sampling
   D) Multistage sampling
9) At a college there are 120 freshmen, 90 sophomores, 110 juniors, and 80 seniors. A school administrator selects a simple random sample of 12 of the freshmen, a simple random sample of 9 of the sophomores, a simple random sample of 11 of the juniors, and a simple random sample of 8 of the seniors. She then interviews all the students selected. Identify the type of sampling used in this example.
   A) Simple random sampling  
   B) Stratified sampling  
   C) Cluster sampling  
   D) Systematic random sampling

10) A newly-premiered play just ended that evening at a local theater. Theater management briefly interviews every tenth person leaving the theater to see if that person will recommend the play at that theater to other people. Identify the type of sampling used in this example.
   A) Stratified sampling  
   B) Cluster sampling  
   C) Systematic sampling  
   D) Multistage sampling

11) An education researcher randomly selects 38 schools from one school district and interviews all the teachers at each of the 38 schools. Identify the type of sampling used in this example.
   A) Systematic random sampling  
   B) Simple random sampling  
   C) Cluster sampling  
   D) Stratified sampling

A designed experiment is described. Identify the specified element of the experiment.
12) In a clinical trial, 780 participants suffering from high blood pressure were randomly assigned to one of three groups. Over a one-month period, the first group received a low dosage of an experimental drug, the second group received a high dosage of the drug, and the third group received a placebo. The diastolic blood pressure of each participant was measured at the beginning and at the end of the period and the change in blood pressure was recorded. Identify the experimental units (subjects).
   A) The diastolic blood pressures of the participants  
   B) The participants in the experiment  
   C) The three different groups  
   D) The treatment (i.e., placebo, low dosage of drug, or high dosage of drug)

13) In a clinical trial, 780 participants suffering from high blood pressure were randomly assigned to one of three groups. Over a one-month period, the first group received a low dosage of an experimental drug, the second group received a high dosage of the drug, and the third group received a placebo. The diastolic blood pressure of each participant was measured at the beginning and at the end of the period and the change in blood pressure was recorded. Identify the levels of the factor.
   A) High blood pressure, low blood pressure  
   B) The experimental drug  
   C) Placebo, low dosage, high dosage  
   D) Diastolic blood pressure at the start, diastolic blood pressure at the end
14) In a clinical trial, 780 participants suffering from high blood pressure were randomly assigned to one of three groups. Over a one-month period, the first group received a low dosage of an experimental drug, the second group received a high dosage of the experimental drug, and the third group received a placebo. The diastolic blood pressure of each participant was measured at the beginning and at the end of the period and the change in blood pressure was recorded. Identify the treatments.
   A) Diastolic blood pressure at start, diastolic blood pressure at end
   B) The experimental drug
   C) Low dosage of drug, high dosage of drug
   D) Placebo, low dosage of drug, high dosage of drug

15) A herpetologist performed a study on the effects of the body type and mating call of the male bullfrog as signals of quality to mates. Four life-sized dummies of male bullfrogs and two sound recordings provided a tool for testing female response to the unfamiliar frogs whose bodies varied by size (large or small) and color (dark or light) and whose mating calls varied by pitch (high, normal, or low). The female bullfrogs were observed to see whether they approached each of the four life-sized dummies. Identify the treatments.
   A) The twelve different possible combinations of the three body sizes, two body colors, and two mating call pitches
   B) The twelve different possible combinations of the two body sizes, two body colors, and three mating call pitches
   C) The eighteen different possible combinations of the two body sizes, three body colors, and three mating call pitches
   D) The eight different possible combinations of the two body sizes, two body colors, and two mating call pitches

16) A herpetologist performed a study on the effects of the body type and mating call of the male bullfrog as signals of quality to mates. Four life-sized dummies of male bullfrogs and two sound recordings provided a tool for testing female response to the unfamiliar frogs whose bodies varied by size (large or small) and color (dark or light) and whose mating calls varied by pitch (high, normal, or low). The female bullfrogs were observed to see whether they approached each of the four life-sized dummies. Identify the levels of each factor.
   A) Body size has three levels: large, medium, and small. Body color has three levels: dark, medium, and light. Mating call pitch has two levels: high and low.
   B) Body size has three levels: large, medium, and small. Body color has three levels: dark, medium, and light. Mating call pitch has three levels: high, normal, and low.
   C) Body size has two levels: large and small. Body color has two levels: dark and light. Mating call pitch has three levels: high, normal, and low.
   D) There are three levels: body size, body color, and mating call pitch

Tell whether the statement is true or false.
17) A person’s blood type can be classified as A, B, AB, or O. In this example, "blood type" is the variable while A, B, AB, O constitute the data.
   A) True  B) False

18) The possible values of a discrete variable always form a finite set.
   A) True  B) False

Classify the data as either discrete or continuous.
19) The number of freshmen entering college in a certain year is 621.
   A) Discrete  B) Continuous

20) The average speed of cars passing a busy intersection between 4:30 P.M. and 6:30 P.M. on a Friday is 32.3 mi/h.
   A) Discrete  B) Continuous
21) The temperature in Manhattan at 1 p.m. on New Year's Day was 34.1°F.  
A) Discrete  B) Continuous

**Identify the variable.**

22) The following table shows the average weight of offensive linemen for each given football team.

<table>
<thead>
<tr>
<th>Team</th>
<th>Average weight (pounds)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gators</td>
<td>303.52</td>
</tr>
<tr>
<td>Lakers</td>
<td>326.78</td>
</tr>
<tr>
<td>Eagles</td>
<td>290.61</td>
</tr>
<tr>
<td>Pioneers</td>
<td>321.96</td>
</tr>
<tr>
<td>Lions</td>
<td>297.35</td>
</tr>
<tr>
<td>Mustangs</td>
<td>302.49</td>
</tr>
<tr>
<td>Rams</td>
<td>345.88</td>
</tr>
<tr>
<td>Buffalos</td>
<td>329.24</td>
</tr>
</tbody>
</table>

Identify the variable under consideration in the first column?  
A) Gators  
B) team name  
C) pounds  
D) average weight of offensive linemen

**Provide an appropriate response.**

23) Shortly before an election, a market research firm took a poll to find out whether people were planning to vote for or against a particular ballot measure. The results are shown below.

<table>
<thead>
<tr>
<th>Position</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Against</td>
<td>3087</td>
</tr>
<tr>
<td>In favor</td>
<td>3691</td>
</tr>
<tr>
<td>Undecided</td>
<td>910</td>
</tr>
</tbody>
</table>

The ballot measure will pass if a simple majority (more than 50%) vote in favor of the measure. You wish to construct a graph to represent the data. It should be easy to see from your graph whether more than 50% of the people are planning to vote in favor of the measure. Which graph would be more useful, a bar graph or a pie chart? Explain your thinking.

**Construct a dotplot for the given data.**

25) Attendance records at a school show the number of days each student was absent during the year. The days absent for each student were as follows.  
9 3 4 2 8 6 3 4 0 6 7 3 4 2 2

24) Suppose you are comparing frequency data for two different groups, 25 managers and 150 blue collar workers. Why would a relative frequency distribution be better than a frequency distribution?

**Provide an appropriate response.**

26) Hospital records show the age at death of patients who die while in the hospital. A frequency histogram is constructed for the age at death of the people who have died at the hospital in the past five years. Roughly what shape would you expect for the distribution? Why?
27) Give an example of a data set whose distribution is likely to be bimodal. Describe the population from which the sample is selected and the variable that is measured for each person. Explain why you think the distribution will be bimodal.

A graphical display of a data set is given. State whether the distribution is (roughly) symmetric, right skewed, or left skewed.

28) The dotplot shows heights of football players.

A) Symmetric
B) Left skewed
C) Right skewed

29) A relative frequency histogram for the sale prices of homes sold in one city during 2006 is shown below.

A) Left skewed
B) Right skewed
C) Symmetric

A graphical display of a data set is given. Identify the overall shape of the distribution as (roughly) bell-shaped, triangular, uniform, reverse J-shaped, J-shaped, right skewed, left skewed, bimodal, or multimodal.

30) A die was rolled 200 times and a record was kept of the numbers obtained. The results are shown in the relative frequency histogram below.

A) Uniform
B) Triangular
C) Left skewed
D) J-shaped

31) Two dice were rolled and the sum of the two numbers was recorded. This procedure was repeated 400 times. The results are shown in the relative frequency histogram below.

A) Bell-shaped
B) Triangular
C) Left skewed
D) Right-skewed
Find the mean for the given sample data. Unless otherwise specified, round your answer to one more decimal place than that used for the observations.

32) Frank's Furniture employees earned $326.90, $262.82, $253.23, $254.01, $352.07, and $209.77 last week. Find the mean wage of the employees. Round your answer to the nearest cent.

A) $331.76  B) $319.76
C) $276.47  D) $414.70

Find the median for the given sample data.

33) 6, 7, 8, 21, 30, 30, 49

A) 25.5  B) 30
C) 21  D) 8

Find the range for the given data set.

34) The manager of an electrical supply store measured the diameters of the rolls of wire in the inventory. The diameters of the rolls (in m) are listed below.

0.5  0.659  0.138
0.432  0.312  0.117

A) 0.5 m  B) 0.117 m
C) 0.174 m  D) 0.542 m

Provide an appropriate response.

35) The heights of a group of professional basketball players are summarized in the frequency distribution below. Find the standard deviation. Round your answer to one decimal place.

<table>
<thead>
<tr>
<th>Height (in.)</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>70-under 72</td>
<td>3</td>
</tr>
<tr>
<td>72-under 74</td>
<td>7</td>
</tr>
<tr>
<td>74-under 76</td>
<td>16</td>
</tr>
<tr>
<td>76-under 78</td>
<td>12</td>
</tr>
<tr>
<td>78-under 80</td>
<td>10</td>
</tr>
<tr>
<td>80-under 82</td>
<td>4</td>
</tr>
<tr>
<td>82-under 84</td>
<td>1</td>
</tr>
</tbody>
</table>

A) 2.8  B) 2.9  C) 3.3  D) 3.2

Find the sample standard deviation for the given data. Round your final answer to one more decimal place than that used for the observations.

36) To get the best deal on a CD player, Tom called eight appliance stores and asked the cost of a specific model. The prices he was quoted are listed below:

$426  $123  $181  $406  $307  $336  $226  $3

A) $664,704.5  B) $304.0
C) $743,024.0  D) $105.8

Use the empirical rule to solve the problem.

37) The amount of Jen’s monthly phone bill has a roughly bell-shaped distribution with a mean of $80 and a standard deviation of $8. What percentage of her phone bills are between $56 and $104?

A) 68%  B) 99.7%
C) 95%  D) 99.99%

38) Consider the following sample of exam scores, arranged in increasing order:

22  35  44  55  67  70
78  81  81  82  84  88
88  89  90  90  91  92
92  93  94  94  95  96
95  96  96  97  99  100

Note: The sample mean and sample standard deviation of these weights are, respectively, 82.4 and 19.5.

(i) Use the Empirical rule to estimate the percentages of the observations that lie within 3 standard deviation(s) to either side of the mean.
(ii) Use the data to obtain the exact percentages of the observations that lie within 3 standard deviation(s) to either side of the mean.

A) (i) Assuming that the scores have a roughly bell-shaped distribution, approximately 99.7% of the observations should lie within 19.5 points of the mean 82.4 or within the interval from 23.4 to 141.4;
(ii) 29 of the 30 observations (96.7%) lie between 23.4 and 141.4.
B) (i) Assuming that the scores have a roughly bell-shaped distribution, approximately 99.7% of the observations should lie within 19.5 points of the mean 82.4 or within the interval from 23.9 to 140.9; 
(ii) 27 of the 30 observations (90%) lie between 23.9 and 140.9.

C) (i) Assuming that the scores have a roughly bell-shaped distribution, approximately 99.7% of the observations should lie within 19.5 points of the mean 82.4 or within the interval from 23.9 to 140.9; 
(ii) 29 of the 30 observations (96.7%) lie between 23.9 and 140.9.

D) (i) Assuming that the scores have a roughly bell-shaped distribution, approximately 99.7% of the observations should lie within 19.5 points of the mean 82.4 or within the interval from 22.7 to 142.7; 
(ii) 30 of the 30 observations 100% lie between 22.7 to 142.7.

39) The systolic blood pressure of 18-year-old women is a roughly bell-shaped distribution with a mean of 120 mmHg and a standard deviation of 12 mmHg. What percentage of 18-year-old women have a systolic blood pressure between 96 mmHg and 144 mmHg?
   A) 95%  B) 68%  C) 99.99%  D) 99.7%

40) At one college, GPA’s have a roughly bell-shaped distribution with a mean of 2.6 and a standard deviation of 0.6. What percentage of students at the college have a GPA between 2 and 3.2?
   A) 68%  B) 95%  C) 84.13%  D) 99.7%

41) Describe any similarities or differences in the two distributions represented by the following boxplots. Assume the two boxplots have the same scale. Explain your reasoning.

42) A population consists of 100 professional gymnasts and 100 professional basketball players. For this group, the average height is 70 inches. However, most of the gymnasts are between 57 and 61 inches tall while most of the basketball players are between 78 and 82 inches tall. For this group, observations far from the mean are more common than observations close to the mean. Describe what a boxplot for the heights of this group would look like. Discuss, in particular, the lengths of the whiskers relative to the width of the box and explain your reasoning.

Determine the quartile or interquartile range as specified.

43) Find Q3.
   1, 4, 6, 7, 9, 1, 4, 6, 7, 9
   A) 7.5  B) 7  C) 6  D) 9

44) The test scores of 19 students are listed below. Find the interquartile range.
   91  48  86  68  58  
   64  97  55  90  78  
   82  83  51  88  72  
   44  92  94  67
   A) 28  B) 31.5  C) 32  D) 32.5
Identify potential outliers, if any, for the given data.
45) The ages of the 21 members of a track and field team are listed below.

15 18 18 19 22 23 24
24 24 25 26 26 27
28 28 30 32 33 40 42

A) 40, 42  B) 15, 42  C) 42  D) None

Obtain the five-number summary for the given data.
46) The test scores of 15 students are listed below.

43 47 49 53 56
63 67 69 74 80
85 87 90 94 95

A) 43, 54.5, 69, 86, 95  B) 43, 52.00, 71.5, 85.5, 95
C) 43, 52.00, 69, 85.5, 95  D) 43, 53, 71.5, 87, 95

Provide an appropriate response.
47) A machine fills bottles with juice. The average amount filled in the bottles is 16 ounces; however, this amount varies slightly from bottle to bottle. The manufacturer is interested in knowing how much the amount of juice varies from bottle to bottle. In this context, what is the population of interest and what does σ represent?

48) In Mary’s first math test she scored 87%. The mean and standard deviation for the class were 71% and 18% respectively. In her second math test, Mary scored 66%. The mean and standard deviation for the class were 53% and 14% respectively. In which test did Mary do better relative to the rest of the class? Explain your reasoning. (Hint: find the z-scores corresponding to her two test scores.)

49) 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 it is at least three standard deviations above or below the mean. Round the z-score to one decimal place, if necessary.

A time for the 100 meter sprint of 14.8 seconds at a school where the mean time for the 100 meter sprint is 17.5 seconds and the standard deviation is 2.1 seconds.
A) 1.3; not unusual  B) -2.7; unusual
C) -1.3; not unusual  D) -1.3; unusual

50) 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 it is at least three standard deviations above or below the mean. Round the z-score to one decimal place, if necessary.

A weight of 96 pounds among a population having a mean weight of 164 pounds and a standard deviation of 22.0 pounds.
A) -3.1; not unusual  B) -3.1; unusual
C) -68.2; unusual  D) 3.1; not unusual

51) 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 it is at least three standard deviations above or below the mean. Round the z-score to one decimal place, if necessary.

A test score of 87.2 on a test having a mean of 68 and a standard deviation of 12.
A) 1.6; unusual  B) 1.6; not unusual
C) -1.6; not unusual  D) 19.2; unusual

52) Find the population mean. Round to one decimal place as needed.

0, 3, -2, 6
A) 3.1  B) 1.8  C) 7  D) 3.5
53) Following is the number of reported cases of influenza for two cities for the years 1996 through 2005:

<table>
<thead>
<tr>
<th></th>
<th>City A</th>
<th></th>
<th>City B</th>
</tr>
</thead>
<tbody>
<tr>
<td>1996</td>
<td>1163</td>
<td>1954</td>
<td>937</td>
</tr>
<tr>
<td>1997</td>
<td>1487</td>
<td>843</td>
<td>1023</td>
</tr>
<tr>
<td>1998</td>
<td>1864</td>
<td>829</td>
<td>843</td>
</tr>
<tr>
<td>1999</td>
<td>1779</td>
<td>965</td>
<td>965</td>
</tr>
<tr>
<td>2000</td>
<td>1244</td>
<td>1011</td>
<td>943</td>
</tr>
<tr>
<td>2001</td>
<td>1332</td>
<td>831</td>
<td>831</td>
</tr>
<tr>
<td>2002</td>
<td>1299</td>
<td>976</td>
<td>976</td>
</tr>
<tr>
<td>2003</td>
<td>1353</td>
<td>858</td>
<td></td>
</tr>
<tr>
<td>2004</td>
<td>1802</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2005</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(i) Without doing any calculations, decide for which city the standard deviation of the number cases of influenza is larger. Explain.
(ii) Find the individual population standard deviations of the number of cases of influenza. Round your final answer to two decimal places. Compare these answers with part (i).

A) (i) The range of the values for City A is 767, while it is only 121 for City B, so City A is likely to have the larger standard deviation.
   (ii) City A’s population standard deviation is 277.37; City B’s population standard deviation is 72.01, so City A did have the larger standard deviation.

B) (i) The range of the values for City A is 767, while it is only 121 for City B, so City A is likely to have the larger standard deviation.
   (ii) City A’s population standard deviation is 261.80; City B’s population standard deviation is 69.47, so City A did have the larger standard deviation.

C) (i) The range of the values for City A is 791, while it is only 192 for City B, so City A is likely to have the larger standard deviation.
   (ii) City A’s population standard deviation is 278.43; City B’s population standard deviation is 71.25, so City A did have the larger standard deviation.

D) (i) The range of the values for City A is 791, while it is only 192 for City B, so City A is likely to have the larger standard deviation.
   (ii) City A’s population standard deviation is 277.40; City B’s population standard deviation is 71.29, so City A did have the larger standard deviation.

54) Find the population standard deviation. Round to one decimal place as needed.

\[ \begin{align*}
1, 3, 4, 7, 7 & \\
A) \ 5.4 & B) \ 1.5 \\
C) \ 2.3 & D) \ 10.2 \\
\end{align*} \]

Solve the problem.

55) The mean of a set of data is -1.55 and its standard deviation is 3.40. Find the z-score for a value of 6.28. Round your final answer to two decimal places.

\[ \begin{align*}
A) \ 2.60 & B) \ 2.07 \\
C) \ 2.30 & D) \ 2.53 \\
\end{align*} \]

56) A meteorological office keeps records of the annual precipitation in different cities. For one city, the mean annual precipitation is 29.2 and the standard deviation of the annual precipitation amounts is 5.4. Let x represent the annual precipitation in that city. Determine the z-score for an annual precipitation in that city of 20.0 inches. Round your final answer to two decimal places.

\[ \begin{align*}
A) \ -1.70 & B) \ 1.70 \\
C) \ 0.50 & D) \ 9.11 \\
\end{align*} \]

Determine the regression equation for the data. Round the final values to three significant digits, if necessary.

57) Two different tests are designed to measure employee productivity (x) and dexterity (y). Several employees were randomly selected and tested, and the results are given below.

\[ \begin{align*}
x & 23 \quad 28 \quad 21 \quad 25 \quad 26 \quad 30 \quad 34 \quad 36 \\
y & 49 \quad 53 \quad 42 \quad 47 \quad 53 \quad 55 \quad 63 \quad 67 \quad 75 \\
\end{align*} \]

\[ \begin{align*}
A) \ y &= 2.36 + 0.03x \\
B) \ y &= 75.3 - 0.329x \\
C) \ y &= 5.05 + 1.91x \\
D) \ y &= 10.7 + 1.53x \\
\end{align*} \]
Is the data point, P, an outlier, a potential influential observation, both, or neither?

58) A) Potential influential observation  
   B) Both  
   C) Neither  
   D) Outlier

Use the regression equation to predict the y-value corresponding to the given x-value. Round your answer to the nearest tenth.

59) Eight pairs of data yield the regression equation \( y = 55.8 + 2.79x \). Predict y for x = 2.5.
   A) 142.3  
   B) 71.1  
   C) 62.8  
   D) 57.8

Provide an appropriate response.

60) For a particular regression analysis, the following regression equation is obtained:
\( \hat{y} = 2.12 + 0.56x \). Furthermore, the coefficient of determination is 0.062. How useful would the regression equation be for making predictions? How can you tell?

61) For a particular regression analysis, the following regression equation is obtained:
\( \hat{y} = 8.3x + 32 \), where x represents the number of hours studied for a test and y represents the score on the test. True or false? If the coefficient of determination is 0.976, the number of hours studied is very useful for predicting the test score.
   A) True  
   B) False

62) True or false? In the context of regression analysis, the regression sum of squares is the variation in the observed values of the response variable explained by the regression.
   A) True  
   B) False

Determine the percentage of variation in the observed values of the response variable that is explained by the regression. Round to the nearest tenth of a percent if needed.

63) \[
\begin{array}{c|cccccc}
   x & 5 & 10 & 4 & 6 & 10 & 9 \\
   \hline
   y & 64 & 86 & 69 & 86 & 59 & 87 \\
\end{array}
\]
   A) 0%  
   B) 67.8%  
   C) 22.4%  
   D) 5.0%

Solve the problem.

64) The paired data below consist of the temperatures on randomly chosen days and the amount a certain kind of plant grew (in millimeters):
\[
\begin{array}{c|cccccccc}
   x & 62 & 76 & 50 & 51 & 71 & 46 & 51 & 44 & 79 \\
   \hline
   y & 36 & 39 & 50 & 13 & 33 & 33 & 17 & 6 & 16 \\
\end{array}
\]
Find the SSR.
   A) 242.951  
   B) 64.328  
   C) 0  
   D) 243

65) A study was conducted to compare the average time spent in the lab each week versus course grade for computer students. The results are recorded in the table below.

<table>
<thead>
<tr>
<th>Number of hours spent in lab</th>
<th>Grade (percent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>96</td>
</tr>
<tr>
<td>11</td>
<td>51</td>
</tr>
<tr>
<td>16</td>
<td>62</td>
</tr>
<tr>
<td>9</td>
<td>58</td>
</tr>
<tr>
<td>7</td>
<td>89</td>
</tr>
<tr>
<td>15</td>
<td>81</td>
</tr>
<tr>
<td>16</td>
<td>46</td>
</tr>
<tr>
<td>10</td>
<td>51</td>
</tr>
</tbody>
</table>

Determine the percentage of variation in the observed values of the response variable explained by the regression.
   A) 33.5%  
   B) 0.335%  
   C) 11.2%  
   D) 0.112%
1) B  
**Objective:** (1.1)  
Classify Observation  
al Study or Designed Experiment  

2) A  
**Objective:** (1.1)  
Classify Observation  
al Study or Designed Experiment  

3) B  
**Objective:** (1.1)  
Classify Study as Descriptive or Inferential  

4) B  
**Objective:** (1.1)  
Classify Study as Descriptive or Inferential  

5) A  
**Objective:** (1.1)  
Identify Sample and Population  

6) A  
**Objective:** (1.1)  
Identify Sample and Population  

7) B  
**Objective:** (1.1)  
Identify Sample and Population  

8) C  
**Objective:** (1.3)  
Identify Method of Sampling Used  

9) B  
**Objective:** (1.3)  
Identify Method of Sampling Used  

10) C  
**Objective:** (1.3)  
Identify Method of Sampling Used  

11) C  
**Objective:** (1.3)  
Identify Method of Sampling Used  

12) B  
**Objective:** (1.4)  
Identify Elements of Designed Experiment I  

13) C  
**Objective:** (1.4)  
Identify Elements of Designed Experiment I  

14) D  
**Objective:** (1.4)  
Identify Elements of Designed Experiment I  

15) B  
**Objective:** (1.4)  
Identify Elements of Designed Experiment II  

16) C  
**Objective:** (1.4)  
Identify Elements of Designed Experiment II  

17) B  
**Objective:** (2.1) *Know Concepts: Variables and Data  

18) B  
**Objective:** (2.1) *Know Concepts: Variables and Data  

19) A  
**Objective:** (2.1)  
Classify Data as Discrete or Continuous  

20) B  
**Objective:** (2.1)  
Classify Data as Discrete or Continuous  

21) B  
**Objective:** (2.1)  
Classify Data as Discrete or Continuous  

22) B  
**Objective:** (2.1)  
Identify Variable Given Data  

23) Answers will vary.  
Possible answer: A pie chart would be more useful. A pie chart is useful for comparing the size of each category with the whole (i.e., the proportion of the whole population falling in each category). A bar graph is more useful for comparing the sizes of different categories with each other.  

**Objective:** (2.2) *Know Concepts: Organizing Qualitative Data  

24) Answers will vary.  
Possible answer: Since the two groups are of different sizes, comparing the number (frequency) of managers falling into a given class with the number of employees falling in the same class would not be very meaningful. It would be more useful to compare the proportion (relative frequency) of managers falling into a given class with the proportion of employees falling in the same class.  

**Objective:** (2.2) *Know Concepts: Organizing Qualitative Data
25) C
Objective: (2.3) Construct Dotplot

26) Answers will vary. The distribution will probably be left skewed.
Objective: (2.4) *Know Concepts: Distribution Shapes

27) Answers will vary. Typically a bimodal distribution occurs when the population has two distinct subgroups each with its own mean.
Objective: (2.4) *Know Concepts: Distribution Shapes

28) B
Objective: (2.4) Classify Distribution as Symmetric or Skewed

29) B
Objective: (2.4) Classify Distribution as Symmetric or Skewed

30) A
Objective: (2.4) Identify Shape of Distribution

31) B
Objective: (2.4) Identify Shape of Distribution

32) C
Objective: (3.1) Find Mean, Median, and Mode

33) C
Objective: (3.1) Find Median

34) D
Objective: (3.2) Find Range

35) A
Objective: (3.2) Find Sample Standard Deviation (Grouped Data)

36) D
Objective: (3.2) Find Sample Standard Deviation

37) B
Objective: (3.2) Use the Empirical Rule

38) C
Objective: (3.2) Use the Empirical Rule

39) A
Objective: (3.2) Use the Empirical Rule

40) A
Objective: (3.2) Use the Empirical Rule

41) Answers will vary. Possible answer: The distribution represented by the first boxplot is roughly uniform, while the distribution represented by the second boxplot is left-skewed.
Objective: (3.3) *Know Concepts: The Five-Number Summary

42) Answers will vary. Possible answer: For this data, the whiskers will be very short relative to the width of the box since the first and third quartiles will be far apart.
Objective: (3.3) *Know Concepts: The Five-Number Summary

43) B
Objective: (3.3) Find Quartile/Interquartile Range

44) A
Objective: (3.3) Find Quartile/Interquartile Range

45) A
Objective: (3.3) Identify Outliers

46) A
Objective: (3.3) Obtain Five-Number Summary

47) The population of interest is all the bottles that have ever been or will ever be filled by the machine. \( \sigma \) represents the standard deviation of the amounts of juice in all such bottles.
Objective: (3.4) *Know Concepts: Descriptive Measures for Populations

48) Relative to the rest of the class, Mary did better in the second test. Her \( z \)-score on the first test was 0.89 while her \( z \)-score on the second test was 0.93.
Objective: (3.4) *Know Concepts: Descriptive Measures for Populations

49) C
Objective: (3.4) Compare Relative Standing

50) B
Objective: (3.4) Compare Relative Standing

51) B
Objective: (3.4) Compare Relative Standing

52) B
Objective: (3.4) Find Population Standard Deviation

53) D
Objective: (3.4) Find Population Standard Deviation

54) C
Objective: (3.4) Find Standardized Variable

55) C
Objective: (3.4) Find Standardized Variable

56) A
Objective: (3.4) Find Standardized Variable
57) C  
Objective: (4.2)  
Determine Regression Equation

58) D  
Objective: (4.2)  
Identify Outlier/Potential Influential Observation

59) C  
Objective: (4.2) Use Regression Equation to Make Prediction

60) The regression equation would not be very useful for making predictions. The value of the coefficient of determination, \( r^2 \), is near 0, which indicates that the regression equation is not very useful for making predictions.

Objective: (4.3) *Know Concepts: The Coefficient of Determination

61) A  
Objective: (4.3) *Know Concepts: The Coefficient of Determination

62) A  
Objective: (4.3) *Know Concepts: The Coefficient of Determination

63) D  
Objective: (4.3)  
Determine Percentage of Variation Explained by Regression

64) B  
Objective: (4.3) Solve Apps: The Coefficient of Determination

65) C  
Objective: (4.3) Solve Apps: The Coefficient of Determination