Exam

Name___________________________________

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

Provide an appropriate response.

1) The government of a town needs to determine if the city’s residents will support the construction of a new town hall. The government decides to conduct a survey of a sample of the city’s residents. Which one of the following procedures would be most appropriate for obtaining a sample of the town’s residents?
   A) Survey a random sample of persons within each geographic region of the city.
   B) Survey a random sample of employees at the old city hall.
   C) Survey the first 200 people listed in the town’s telephone directory.
   D) Survey every 7th person who walks into city hall on a given day.

2) When the effects of the explanatory variable upon the response variable cannot be determined, then
   A) a lurking variable is present.
   B) the claim is invalid.
   C) confounding has occurred.
   D) there is sampling error.

3) Which of the following is not true about factors?
   A) Factors whose effect on the response variable is not of interest can be set after the experiment.
   B) Any combination of the values of the factors is called a treatment.
   C) One way to control factors is to fix their level at one predetermined value throughout the experiment.
   D) Factors whose effect on the response variable interests us should be set at predetermined levels.

4) Quantitative variables classify individuals in a sample according to
   A) numerical measure.
   B) exhibited trait.
   C) personality characteristic.
   D) physical attribute.

Determine the sampling technique which is used.

5) The names of 20 employees are written on 20 cards. The cards are placed in a bag, and three names are picked from the bag. What sampling technique was used?
   A) random
   B) cluster
   C) convenience
   D) systematic
   E) stratified

6) To avoid working late, the plant foreman inspects the first 60 microwaves produced that day. What sampling technique was used?
   A) stratified
   B) random
   C) systematic
   D) cluster
   E) convenience
Provide an appropriate response.

7) The legal profession conducted a study to determine the percentage of cardiologists who had been sued for malpractice in the last two years. The sample was randomly chosen from a national directory of doctors. Identify the individuals in the study.
   A) the doctor's area of expertise (i.e., cardiology, pediatrics, etc.)
   B) the responses: have been sued/have not been sued for malpractice in the last two years
   C) all cardiologists in the directory
   D) each cardiologist selected from the directory

Determine the sampling technique which is used.

8) An education researcher randomly selects 85 of the nation’s junior colleges and interviews all of the professors at each school. What sampling technique was used?
   A) convenience
   B) cluster
   C) stratified
   D) systematic
   E) random

Provide an appropriate response.

9) A farmer wishes to test the effects of a new fertilizer on her potato yield. She has four equal-sized plots of land— one with sandy soil, one with rocky soil, one with clay-rich soil, and one with average soil. She divides each of the four plots into three equal-sized portions and randomly labels them A, B, and C. The four A portions of land are treated with her old fertilizer. The four B portions are treated with the new fertilizer, and the four C's are treated with no fertilizer. At harvest time, the potato yield is recorded for each section of land. Identify the experimental units.
   A) the three types of fertilizer
   B) the potato yield at harvest time
   C) the potato plants on the various plots of land
   D) the four types of soil

10) A drug company wanted to test a new indigestion medication. The researchers found 200 adults aged 25–35 and randomly assigned them to two groups. The first group received the new drug, while the second received a placebo. After one month of treatment, the percentage of each group whose indigestion symptoms decreased was recorded and compared. What is the treatment in this experiment?
   A) the 200 adults aged 25–35
   B) the drug
   C) the one month treatment time
   D) the percentage who had decreased indigestion symptoms
Describe the shape of the distribution.

11) A) skewed to the right  B) skewed to the left  C) bell shaped  D) uniform

Determine what type of observational study is described. Explain.

12) A researcher wanted to determine whether women with children are more likely to develop anxiety disorders than women without children. She selected a sample of 900 twenty-year old women and followed them for a twenty-year period. At the start of the study, none of the women had children. By the end of the study 53% of the women had at least one child. The level of anxiety of each participant was evaluated at the beginning and at the end of the study and the increase (or decrease) in anxiety was recorded. The researchers analyzed the results to determine whether there was an association between anxiety and having children.
   A) retrospective; Individuals are asked to look back in time.
   B) cross-sectional; Information is collected at a specific point in time.
   C) cohort; Individuals are observed over a long period of time.

Determine the sampling technique which is used.

13) A writer for an art magazine randomly selects and interviews fifty male and fifty female artists. What sampling technique is used?
   A) convenience  B) systematic  C) random  D) stratified  E) cluster

Provide an appropriate response.

14) A researcher wants to study the effects of advertising by female models upon high school boys in small Midwestern towns. The research methodology calls for selecting several small Midwestern towns that have high schools. What is the frame for this study?
   A) all students attending high school from small Midwestern towns
   B) high school boys from the small Midwestern towns selected
   C) all high school boys from small Midwestern towns
   D) high school students from the small Midwestern towns selected

Determine whether the study depicts an observational study or an experiment.

15) A poll is conducted in which professional musicians are asked their ages.
   A) observational study  B) experiment

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

16) The average age of the 65 students in Ms Hope's political science class is 21 years 5 months.
   A) statistic  B) parameter
Determine the sampling technique which is used.
17) A sample consists of every 35th worker from a group of 4000 workers. What sampling technique was used?
   A) convenience  
   B) random  
   C) cluster  
   D) systematic  
   E) stratified

Determine whether the quantitative variable is discrete or continuous.
18) the low temperature in degrees Fahrenheit on January 1st in Cheyenne, Wyoming
   A) continuous  
   B) discrete

Determine what type of observational study is described. Explain.
19) Vitamin D is important for the metabolism of calcium and exposure to sunshine is an important source of vitamin D. A researcher wanted to determine whether osteoperosis was associated with a lack of exposure to sunshine. He selected a sample of 250 women with osteoperosis and an equal number of women without osteoperosis. The two groups were matched – in other words they were similar in terms of age, diet, occupation, and exercise levels. Histories on exposure to sunshine over the previous twenty years were obtained for all women. The total number of hours that each woman had been exposed to sunshine in the previous twenty years was estimated. The amount of exposure to sunshine was compared for the two groups.
   A) cross-sectional; Information is collected at a specific point in time.  
   B) retrospective; Individuals are asked to look back in time  
   C) cohort; Individuals are observed over a long period of time.

Provide an appropriate response.
20) A medical journal published the results of an experiment on anorexia. The experiment investigated the effects of a controversial new therapy for anorexia. Researchers measured the anorexia levels of 68 adult women who suffer moderate conditions of the disorder. After the therapy, the researchers again measured the women's anorexia levels. The differences between the pre- and post-therapy anorexia levels were reported. What is the response variable in this experiment?
   A) the disorder (anorexia or no anorexia)  
   B) the therapy  
   C) the differences between the pre- and post-therapy anorexia levels  
   D) the 68 adult women who suffer from anorexia

Determine the level of measurement of the variable.
21) the native language of a tourist
   A) interval  
   B) ratio  
   C) nominal  
   D) ordinal
The pie chart shows the percentage of votes received by each candidate in the student council presidential election. Use the pie chart to answer the question.

Student Council President

- Ming 20%
- Matt 34%
- Lili 14%
- Ann 32%

500 total votes

What percent of the votes did Lili and Ming receive together?
A) 14%  
B) 66%  
C) 34%  
D) 20%

The following double-bar graph illustrates the revenue for a company for the four quarters of the year for two different years. Use the graph to answer the question.

23) In what quarter was the revenue the greatest for 2000?
A) second quarter  
B) third quarter  
C) first quarter  
D) fourth quarter
Construct a frequency distribution for the data using five classes. Describe the shape of the distribution.

24) The data set: ages of dishwashers (in years) in 20 randomly selected households

12  6  4  9  11  1  7  8  9  8
9  13  5  15  7  6  8  8  2  1

A) uniform  B) bell shaped
C) skewed to the left  D) skewed to the right

Provide an appropriate response.

25) The bar graph below shows the political party affiliation of 1000 registered U.S. voters. What percentage of the 1000 registered U.S. voters belonged to one of the traditional two parties (Democratic and Republican)?

[Bar graph showing political party affiliation]

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

26) A student scores 74 on a geography test and 243 on a mathematics test. The geography test has a mean of 80 and a standard deviation of 5. The mathematics test has a mean of 300 and a standard deviation of 38. If the data for both tests are normally distributed, on which test did the student score better relative to the other students in each class?

A) The student scored better on the geography test.
B) The student scored the same on both tests.
C) The student scored better on the mathematics test.

Find the sample standard deviation.

27) 14, 15, 16, 17, 18

A) 2.5  B) 1.6  C) 1.5  D) 1.3
Provide an appropriate response.

28) For the stem-and-leaf plot below, what are the maximum and minimum entries? 

```
 1 | 14
 1 | 6 6 6 7 8 9
 2 | 0 1 1 2 3 4 4 5 6 6
 2 | 7 7 8 8 9 9 9
 3 | 0 1 1 2 3 4 5 5
 3 | 6 6 6 7 8 9 9 9
 4 | 0 6
```

A) max: 46; min: 11
B) max: 47; min: 14
C) max: 40; min: 11
D) max: 38; min: 7

29) When results from a scholastic assessment test are sent to test-takers, the percentiles associated with their scores are also given. Suppose a test-taker scored at the 59th percentile for their verbal grade and at the 28th percentile for their quantitative grade. Interpret these results.

A) This student performed better than 41% of the other test-takers in the verbal part and better than 72% in the quantitative part.
B) This student performed better than 59% of the other test-takers in the verbal part and better than 28% in the quantitative part.
C) This student performed better than 41% of the other test-takers in the verbal part and better than 28% in the quantitative part.
D) This student performed better than 59% of the other test-takers in the verbal part and better than 72% in the quantitative part.

30) Which is not a measure of dispersion?

A) Range  
B) Mean  
C) Variance  
D) Standard deviation

31) 

For the distribution drawn here, identify the mean, median, and mode.

A) A = mean, B = mode, C = median  
B) A = mode, B = mean, C = median  
C) A = mode, B = median, C = mean  
D) A = median, B = mode, C = mean
The following double-bar graph illustrates the revenue for a company for the four quarters of the year for two different years. Use the graph to answer the question.

![Double-Bar Graph]

32) What was the revenue for the fourth quarter of 2000?  
A) $55 million  
B) $12 million  
C) $11 million  
D) $60 million  

Provide an appropriate response.

33) Find the z-score for the value 76, when the mean is 63 and the standard deviation is 4.  
A) $z = 3.25$  
B) $z = -1.14$  
C) $z = 3.00$  
D) $z = 1.14$

34) Retailers are always interested in determining why a customer selected their store to make a purchase. A sporting goods retailer conducted a customer survey to determine why its customers shopped at the store. The results are shown below. What percentage of the customers responded that the merchandise was the reason they shopped at the store?  

![Frequency Bar Chart]

A) 43%  
B) 29%  
C) 50%  
D) 30%
35) SAS was used to compare the high school dropout rates for the 50 states in 1982 and 1984. The box plots generated for these dropout rates are shown below.

Compare the center of the distributions and the variation of the distributions for the two years.

![Box plots comparing dropout rates for 1982 and 1984](image)

A) Dropout rates had a lower average with more variability in 1982 than in 1984.
B) Dropout rates had a lower average with less variability in 1982 than in 1984.
C) Dropout rates had a higher average with less variability in 1982 than in 1984.
D) Dropout rates had a higher average with more variability in 1982 than in 1984.

36) Compute the range for the set of data.

36) 24, 39, 20, 43, 59
A) 20  B) 39  C) 59  D) 37

37) Provide an appropriate response.

37) An Excel printout of some descriptive statistics for a set of data is shown below. What is the IQR?

<table>
<thead>
<tr>
<th></th>
<th>Minimum</th>
<th>First Quartile</th>
<th>Median</th>
<th>Third Quartile</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Five-number Summary</strong></td>
<td></td>
<td>5</td>
<td>15</td>
<td>20.5</td>
<td>35</td>
</tr>
</tbody>
</table>

A) 15.5  B) 38  C) 15  D) 5.5
38) Health care issues are receiving much attention in both academic and political arenas. A sociologist recently conducted a survey of citizens over 60 years of age whose net worth is too high to qualify for government health care but who have no private health insurance. The ages of 25 uninsured senior citizens were as follows:

68 73 66 76 86 74 61 89 65 90 69 92 76
62 81 63 68 81 70 73 60 87 75 64 82

Find Q2 of the data.
A) 74  B) 72  C) 73  D) 65.5

39) A random sample of sale prices of homes yielded the following summary information:

MIN $42,000  25%: $81,000  Median: $138,000
MAX $271,000  75%: $169,000

Comment on a home that had a sale price of $415,000.
A) This value falls outside of the third quartile, but cannot be considered an outlier.
B) This sale price would be expected since it falls inside the lower and upper fences.
C) This sale price falls between the lower and upper fences. It can be considered a potential outlier.
D) This value falls outside the upper fence and is considered an outlier.

40) The commuting times of ten employees (in minutes) are listed below. Find the mode score.

65 66 67 66 67 70 67 70 71 68
A) 68 minutes  B) 67 minutes  C) 66 minutes  D) 65 minutes

41) The amount of television viewed by today's youth is of primary concern to Parents Against Watching Television (PAWT). 300 parents of elementary school-aged children were asked to estimate the number of hours per week that their child watched television. The mean and the standard deviation for their responses were 16 and 4, respectively. PAWT constructed a stem-and-leaf display for the data that showed that the distribution of times was a bell-shaped distribution. Give an interval around the mean where you believe most (approximately 95%) of the television viewing times fell in the distribution.

A) between 8 and 24 hours per week
B) less than 12 and more than 20 hours per week
C) between 12 and 20 hours per week
D) between 4 and 28 hours per week

Determine whether the study depicts an observational study or an experiment.

42) A medical researcher obtains a sample of adults suffering from diabetes. She randomly assigns 52 people to a treatment group and 52 to a placebo group. The treatment group receives a medication over a period of three months and the placebo group receives a placebo over the same time frame. At the end of three months the patients' symptoms are evaluated.

A) experiment  B) observational study
Provide an appropriate response.

43) A drug company wanted to test a new depression medication. The researchers found 600 adults aged 25–35 and randomly assigned them to two groups. The first group received the new drug, while the second received a placebo. After one month of treatment, the percentage of each group whose depression symptoms decreased was recorded and compared. What is the response variable in this experiment?
   A) the 600 adults aged 25–35
   B) the one month treatment time
   C) the percentage who had decreased depression symptoms
   D) the type of drug (medication or placebo)

The pie chart shows the percentage of votes received by each candidate in the student council presidential election. Use the pie chart to answer the question.

44) Provide an appropriate response.

![Pie chart](image)

Who got the fewest votes?
   A) Gina
   B) Matt
   C) Lili
   D) Ann

Provide an appropriate response.

45) The table below summarizes the weights of almonds (in grams) for the almonds in a one pound bag. What is the class width of the classes?

<table>
<thead>
<tr>
<th>Weight (g)</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.7585–0.8184</td>
<td>1</td>
</tr>
<tr>
<td>0.8185–0.8784</td>
<td>1</td>
</tr>
<tr>
<td>0.8785–0.9384</td>
<td>1</td>
</tr>
<tr>
<td>0.9385–0.9984</td>
<td>3</td>
</tr>
<tr>
<td>0.9985–1.0584</td>
<td>157</td>
</tr>
<tr>
<td>1.0585–1.1184</td>
<td>171</td>
</tr>
<tr>
<td>1.1185–1.1784</td>
<td>8</td>
</tr>
</tbody>
</table>

   A) 0.408
   B) 0.4
   C) 0.06
   D) 0.059
The bar graph shows the number of tickets sold each week by the garden club for their annual flower show.

**Number of Tickets Sold Each Week**

46) During which week was the fewest number of tickets sold?  
A) week 4  
B) week 2  
C) week 5  
D) week 6

Provide an appropriate response.

47) The heights of ten female students (in inches) in a college math class are listed below. Find the mean.  
65 66 67 66 67 70 67 70 71 68  
A) 70.0 inches  
B) 65.5 inches  
C) 71.1 inches  
D) 67.7 inches

48) The commuting times (in minutes) of an employee for ten consecutive days are listed below. Find the median commute.  
71 67 67 72 76 72 73 68 72 72  
A) 71 minutes  
B) 72 minutes  
C) 67 minutes  
D) 73 minutes

Determine what type of observational study is described. Explain.

49) Researchers wanted to determine whether there was an association between high blood pressure and the suppression of emotions. The researchers looked at 1800 adults enrolled in a Health Initiative Observational Study. Each person was interviewed and asked about their response to emotions. In particular they were asked whether their tendency was to express or to hold in anger and other emotions. The degree of suppression of emotions was rated on a scale of 1 to 10. Each person’s blood pressure was also measured. The researchers analyzed the results to determine whether there was an association between high blood pressure and the suppression of emotions.  
A) cross-sectional; Information is collected at a specific point in time.  
B) retrospective; Individuals are asked to look back in time.  
C) cohort; Individuals are observed over a long period of time.
Describe the shape of the distribution.

50) _____

A) skewed to the right
B) skewed to the left
C) bell shaped
D) uniform
Answer Key
Testname: EXAM 1

1) A
2) C
3) A
4) A
5) A
6) E
7) D
8) B
9) C
10) B
11) A
12) C
13) D
14) C
15) A
16) B
17) D
18) A
19) B
20) C
21) C
22) C
23) D
24) B
25) D
26) A
27) B
28) A
29) B
30) B
31) C
32) D
33) A
34) A
35) C
36) B
37) A
38) C
39) D
40) B
41) A
42) A
43) C
44) A
45) C
46) B
47) D
48) B
49) A
Answer Key
Testname: EXAM 1

50) B