1. Karen is constructing a pie graph to represent the number of hours her classmates do homework each day. She found that 8/24 did homework for three hours each day. In her pie graph, this would represent how many degrees?

A) 100  
B) 60  
C) 240  
D) 120

2. If a researcher manipulates one of the variables and tries to determine how the manipulation influences other variables, the researcher is conducting a(n)

A) manipulative study.  
B) independent study.  
C) observational study.  
D) experimental study.

3. Which of the following correctly describes the relationship between a sample and a population?

A) A population and a sample are not related.  
B) A sample is a group of subjects selected from a population to be studied.  
C) A sample is a group of populations that are subject to observation.  
D) A population is a group of samples that may or may not be included in a study.

4. The two variables in a scatter plot are called the

A) Independent variable and dependent variable  
B) Relative frequency and relative proportion  
C) Spread and pattern  
D) Lines and points

5. The amount of time needed to run the Boston marathon is an example of which type of variable?

A) continuous  
B) discrete  
C) qualitative  
D) none of the above

6. What type of sampling is being employed if the country is divided into economic classes and a random sample is chosen from each class to be surveyed?

A) cluster sampling  
B) random sampling  
C) systematic sampling  
D) stratified sampling
7. If the mean of a set of data is 18.00, and 14.00 has a \( z \) score of \(-1.00\), then the standard deviation must be:
   A) 4.00    B) 16.00    C) 2.00    D) 8.00

8. What kind of relationship does the scatter plot show between \( x \) and \( y \)?

   A) A positive linear relationship
   B) A negative linear relationship
   C) No linear relationship
   D) This is not a scatter plot

9. Find the \( z \) score for each student and indicate which one is higher.
   
   Art Major \( \bar{X} = 46 \)  \( \bar{X} = 50 \)  \( s = 5 \)
   Theater Major \( \bar{X} = 70 \)  \( \bar{X} = 75 \)  \( s = 7 \)

   A) Both students have the same score.
   B) Neither student received a positive score; therefore, the higher score cannot be determined.
   C) The theater major has a higher score than the art major.
   D) The art major has a higher score than the theater major.

10. If a student scored 74 points on a test where the mean score was 80 and the standard deviation was 6. What was the student's \( z \)-score?

11. Find the five number summary and then make a boxplot for the following data set.
    10, 44, 15, 23, 14, 18, 72, 56, 83, 55, 66, 70.
12. Which of the following graphs is the scatter plot for the data given below?

<table>
<thead>
<tr>
<th>x values</th>
<th>9</th>
<th>9</th>
<th>12</th>
<th>5</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>y values</td>
<td>4</td>
<td>2</td>
<td>9</td>
<td>6</td>
<td>6</td>
</tr>
</tbody>
</table>

A) ![Graph A]
B) ![Graph B]
C) ![Graph C]
D) ![Graph D]
13. How many possible outcomes would there be if three coins were tossed once?

14. How many different 5-student committees can be formed from a group of 20 students?

15. If a menu has a choice of 3 appetizers, 5 main courses, and 3 desserts, then the sample space for all possible dinners with one appetizer, one main course, and one dessert has how many outcomes?

16. In a second grade class containing 12 girls and 10 boys, 2 students are selected at random to give out the math papers. What is the probability that two students chosen are both girls?

17. An apartment building has the following apartments:

<table>
<thead>
<tr>
<th></th>
<th>1 bedroom</th>
<th>2 bedroom</th>
<th>3 bedroom</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st floor</td>
<td>3</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>2nd floor</td>
<td>1</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>3rd floor</td>
<td>1</td>
<td>4</td>
<td>1</td>
</tr>
</tbody>
</table>

If an apartment is selected at random, what is the probability that it is on the 2nd floor or has 3 bedrooms?

18. A bookcase contains 3 statistics books and 4 biology books. If 2 books are chosen at random, the chance that both are statistics books is
19. If the probability that it will rain tomorrow is 0.33, then what is the probability that it will not rain tomorrow?

20. A single card is drawn from a deck. Find the probability of selecting a heart or a 5.
   A) 17/52   B) 16/52   C) 5/52   D) 13/52

21. At a certain college, there were 400 science majors, 100 engineering majors, and 600 business majors. If one student was selected at random, the probability that they are an engineering major is
   A) 10/11   B) 1/1   C) 1/10   D) 1/11

22. If a die is rolled one time, find the probability of getting a number greater than 2.
   A) 2   B) −1   C) 5/6   D) 4/6

23. Choose the correct statement describing the following stem and leaf plot for grades on a linear algebra exam.

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

   A) The range of the grades is between 23 and 98.
   B) Of the 29 students who took the exam, half of them scored below 15.
   C) The data set is skewed to right.
   D) The data distribution is skewed to left.

24. Given eight students, three of which are females, if two students are selected at random, without replacement, what is the probability that both students are female?

25. Find $Q_1$, $Q_2$, and $Q_3$ for the following data set.
   7, 21, 32, 38.
   A) $Q_1 = 14$, $Q_2 = 26.5$, and $Q_3 = 35$
   B) $Q_1 = 10$, $Q_2 = 25$, and $Q_3 = 36$
   C) $Q_1 = 5$, $Q_2 = 20$, and $Q_3 = 39$
   D) $Q_1 = 14$, $Q_2 = 25$, and $Q_3 = 25$
Answer Key

1. 120
2. D
3. B
4. A
5. A
6. D
7. A
8. B
9. C
10. -1
11. (Min, Q1, Median, Q3, Max)=(10, 16.5, 49.5, 68, 83)
12. B
13. 8
14. 15504
15. 45
16. 66/231=(2/7)
17. 8/17
18. 3/21=(1/7)
19. 0.67
20. 16/52=(4/13)
21. 100/1100=(1/11)
22. D
23. D
24. 3/28
25. A