STT 231 Test 1 Red

Give your answer in the scantron provided. Each question is worth 2 points.

Use the following for Problems 1-3: In a statistics class with 133 students, the professor records how much money each student has in their possession during the first class of the semester. The histogram shown below represents the data he collected.

1. Which of the following is true?
   A) The histogram is skewed to the left.
   B) There is no outlier present.
   C) The histogram is approximately symmetric
   D) The histogram is unimodal

2. What is approximately the percentage of students with under $10.00 in their possession?
   A) 45%  B) 40%  C) 35%  D) 50%  E) 60%

3. What is approximately the number of students with $30.00 or more in their possession?
   A) Less than 5  B) More than 100  C) About 30  D) About 10

Use the following to answer questions 4&5: The head of the quality control department at a publishing company is studying the effect of type of glue and type of binding on the strength of the bookbinding. The company has three possible glues to choose from and the book can either be bound as a paperback or a hardback.

4. What is/are the factor(s) in this study?
   A) The strength of the bookbinding.  B) Type of glue and type of binding.
   C) Three possible glues.  D) Paperback vs. hardback.
5. Many stacks of books are ready to be bound — some in paperback form, some in hardback form. As part of this study, 45 books are to be randomly selected from each type of binding (paperback or hardback), and then randomly assigned to one of the three types of glue. What type of sampling method is being used to select the books?

A) Simple random sample.  
B) Stratified sample.  
C) Multistage sample.  
D) None of the above.

Use the following to answer questions 6 & 7: The Consumers Union measured the gas mileage in miles per gallon of 38 automobiles from the 1978–79 model-years on a special test track. The pie chart below provides information about the country of manufacture of the automobiles used in this study by the Consumers Union.

6. What conclusion can we draw based on this pie chart?

A) Italian cars get significantly lower gas mileage than cars of other countries. This is because their slice of the pie is the smallest of the chart.

B) More than half of the cars in the study were from the United States.

C) German 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.
7. Which of the following bar graphs represents the same data as the pie chart in the previous problem?

A)

B)

C)

D)
8. The five number summary of credit hours for 24 students in an introductory statistics class is

<table>
<thead>
<tr>
<th>Min</th>
<th>Q1</th>
<th>Median</th>
<th>Q3</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>13.0</td>
<td>15.0</td>
<td>16.5</td>
<td>18.0</td>
<td>22.0</td>
</tr>
</tbody>
</table>

From this information, we know that the boxplot has
A) no outliers
B) at least one low outlier
C) at least one high outlier
D) both low and high outliers
E) none of the above

9. Which of the following cases use histograms to display information?
A) Annual expenses for a family of four on food, mortgage, healthcare, vacation, miscellaneous
B) GMs car sales by type during the Christmas Holiday season (Chevy, Pontiac, etc)
C) IQ cores of all MSU students
D) Number of in-state and out-of-state students at MSU

10. Which is true of the data shown in the histogram?

I. The distribution is symmetric or approximately symmetric.
II. The mean and median are equal or approximately equal.
III. The median and IQR summarize the data better than the mean and standard deviation.
A) I and III
B) I, II, and III
C) III only
D) I only
E) I and II

Use the following to answer questions 11 to 15: A medicine to remove the redness in eyes was tested in a group of 100 students. Each student took either the medicine or a placebo in both eyes. The specific treatment for each student was decided by flipping a
coin. The participants in the study did not know if heads or tails resulted in the medication.

11. Control was used in this experiment.
A) YES B) NO

12. Randomization was used in this experiment.
A) YES B) NO

13. Blinding was used in this experiment.
A) YES B) NO

14. Blocking was used in this experiment.
A) YES B) NO

15. **Fill in the blank.** The participants were given some free time after receiving their drops. The researcher did not keep track of what they did in that free time. It turns out that many of the people receiving the medicine spent their time outside and many of the people receiving the placebo spent their time inside. The results may now be biased because the variable location (inside vs. outside) is an example of a_____ variable.

A) explanatory B) confounding C) response D) control

**Use the following to answer questions 16-18:** The Insurance Institute for Highway Safety publishes data on the total damage suffered by compact automobiles in a series of controlled, low-speed collisions. The cost for a sample of 9 cars, in hundreds of dollars, is provided below.

| 10 | 6 | 8 | 10 | 4 | 3.5 | 7.5 | 8 | 9 |

16. What is the median cost of the total damage suffered for this sample of cars?
A) $400 B) $730 C) $800 D) $1000

17. What is the first quartile for the above data?
A) $350 B) $500 C) $600 D) $800

18. What is the interquartile range of the above data?
A) $300 B) $350 C) $400 D) $450
19. The following histogram pictures the number of students who visited the Career Center each week during the school year.

![Histogram of Career Center visits]

The shape of this graph could best be described as
A) symmetric  B) Bi-modal  C) Skewed to the left  D) Uniform  
E) Skewed to the right

20. School administrators collect data on students attending the school. Which of the following variables is quantitative?
A) Class (freshman, sophomore, junior, senior)  
B) Grade point average  
C) Whether the student is in AP classes  
D) Whether the student has taken SAT

21. Which of the following statements are true for the following data: 9, 7, 8, 6, 9, 10, 14?
A) The mean and median are equal  
B) The mean is larger than the median  
C) The mean is smaller than the median  
D) Not enough information to determine which one is larger

22. The following are the grades a professor gave on the first test in a statistics class:

52, 90, 88, 61, 75, 82, 75, 83, 88, and 86.

What was the median score on this test?
A) 82  B) 82.5  C) 78.5  D) 88  E) 75
Use the following to answer questions 23 & 24: In a 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 shown below represents the data he collected.

23. From the histogram, which of the following is true?
A) The mean is larger than the median.
B) The mean is 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.

24. What is the range of the data set?
A) 90  B) 100  C) 110
D) This cannot be determined from just the histogram.

25. A professor has kept records on grades that students have earned in his class. If he wants to examine the percentage of students earning the grades A, B, C, D and F during the most recent exam, which kind of plot should he make?
A) boxplot  B) timeplot  C) dotplot  D) pie chart  E) histogram

26. The mean weight of three gemstones is 20 grams. The weights of two of the stones are 15 grams and 17 grams. What is the weight of the third stone?
A) 16 grams  B) 10 grams  C) 28 grams  D) 14 grams  E) not enough information to determine the weight of the third stone
27. Suppose we have a skewed to the right histogram for a data of test scores. Which of the following is true in most cases?
A) Standard deviation will be a good (reliable) measure for the spread
B) The mean lies to the left of the median
C) The mean and the median are equal
D) The mean lies to the right of the median

28. The Michigan Department of Transportation (M-DOT) is working on a major project: 80% of the highways in Michigan need to be repaved. To speed completion of this project, many contractors will be working for M-DOT. Contractors are currently bidding on the next part of the project. To help make a decision about which contractor to hire, M-DOT collects many variables besides just the estimated cost. One of those variables is the contractor’s estimate of the number of work days required to finish the job. Twenty contractors have bid on the next job. The boxplot below represents their estimates of the number of work days required.

What is (approximately) the interquartile range, based on the boxplot?
A) 140 days  B) 270 days  C) 360 days  D) 760 days
Use the following to answer questions 29-30: The 94 students in a statistics class are categorized by gender and by the year in school. The numbers obtained are displayed below.

<table>
<thead>
<tr>
<th>Gender</th>
<th>Freshman</th>
<th>Sophomore</th>
<th>Junior</th>
<th>Senior</th>
<th>Graduate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>1</td>
<td>2</td>
<td>9</td>
<td>17</td>
<td>2</td>
</tr>
<tr>
<td>Female</td>
<td>23</td>
<td>17</td>
<td>13</td>
<td>7</td>
<td>3</td>
</tr>
</tbody>
</table>

29. What proportion of the statistics students in this class are sophomores?
A) 0.105  
B) 0.202  
C) 0.302  
D) 19

30. What proportion of the statistics students in this class are male?
A) 0.065  
B) 0.105  
C) 0.33  
D) 0.31