STT 200 Test 1 Yellow
Give your answer in the scantron provided. Each question is worth 2 points.

1. Which one of the following statements below contains no mistake?
   A) The correlation between height and weight is 0.568 inches per pound
   B) The correlation between height and weight is 0.568
   C) The correlation between the breed of a dog and its weight is 0.568
   D) The correlation between gender and age is -0.568
   E) If the correlation between blood alcohol level and reaction time is 0.73, then the correlation between reaction time and blood alcohol level is -0.73.
   Answer B

2. A national consumer magazine reported the following correlations: The correlation between car weight and car reliability is -0.30 and the correlation between car weight and annual maintenance cost is 0.20. Which of the following statements are true?
   I. Heavier cars tend to be less reliable
   II. Heavier cars tend to cost more to maintain.
   III. Car weight is related more strongly to reliability than to maintenance cost.
   A) I only        B) II only        C) III only        D) I and II
   E) I, II and III
   Answer E

3. In the graph below the circled point is

   ![Graph with points and a circled point](image)

   A. an influential point. Deleting it should reduce the correlation and improve the fit.
   B. not an influential point because its y value is not unusually large or small.
   C. an influential point. Deleting it should increase the estimate of the slope.
   Answer C

4. 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
   Answer B
5. The following histogram pictures the number of students who visited the Career Center each week during the school year.

![Histogram Image]

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
**Answer E**

6. 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
**Answer B**

7. 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
**Answer A**

8. A residuals plot is useful because
I. it will help us to see whether a linear model makes sense
II. it might show a pattern in the data that was hard to see in the original scatterplot
Which of the following is true?
A) I only
B) II only
C) I and II
D) neither I nor II
**Answer C**

9. A correlation of zero between two quantitative variables means that
A) we have done something wrong in our calculation. It is impossible for correlation to be 0.
B) there is no association between the two variables
C) there is no linear association between the two variables
D) re-expressing the data will guarantee a linear association between the two variables

Answer C

10. A study is conducted to determine if one can predict the yield of a crop based on the amount of yearly rainfall. The response variable in this study is
A) the amount of rainfall
B) the crop yield
C) the average temperature during the study time
D) the researchers who conducted the study

Answer B

11. The following values are listed as coefficients of correlation (r). Which one indicates a strong negative relationship between the variables $x$ and $y$?
A) -0.05
B) -0.9
C) 0.4
D) 1.1
E) -1.2

Answer B

12. 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

Answer D

13. 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

Answer C

14. Suppose that a Normal model described student scores in a history class. Parker has a standardized score ($z$-score) of +2.5. This means that Parker
A) is 2.5 standard deviations above average for the class.
B) is 2.5 points above average for the class.
C) has a standard deviation of 2.5.
D) has a score that is 2.5 times the average for the class.
E) none of these

Answer A

15. Residuals are
A) variation in the data that is explained by the model.
B) possible models not explored by the researcher.
C) data collected from individuals that is not consistent with the rest of the group.
D) the difference between observed responses and values predicted by the model.
E) none of these

Answer D
16. 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
Answer D

17. Foresters use regression to predict the volume of timber in a tree using easily measured quantities such as diameter. Let $Y$ be the volume of timber in cubic feet and $X$ be the diameter in feet (measured at 3 feet above ground level, 1 ft = 12 inches). One set of data gives $Y = -30 + 60x$. The predicted volume for a tree of diameter = 18 inches is
A) 1050 cubic feet  
B) 65 cubic feet  
C) 90 cubic feet  
D) 100 cubic feet  
E) 60 cubic feet
Answer E

Use the following for Problems 18 – 20. 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.

18. 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
19. What is approximately the percentage of students with under $10.00 in their possession?
A) 45%  
B) 40%  
C) 35%  
D) 50%  
Answer A

20. 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  
Answer D

Use the following to answer questions 21 and 22: The Consumers Union measured the gas mileage in miles per gallon of 38 automobiles from the 1978–79 model-year 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.

21. 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.

Answer B
Which of the following bar graphs represents the same data as the pie chart in the previous problem?

A)

B)

C)

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

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<th>Min</th>
<th>Q1</th>
<th>Median</th>
<th>Q3</th>
<th>Max</th>
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<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

Answer A

24. 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

Answer C

25. 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  
**Answer E**

26. The residuals plot for a linear model is shown below.

![Residuals Plot](image)

Which is true?

A) The linear model is okay because approximately the same number of points are above the line as below it.  
B) The linear model is no good because of the curve in the residuals.  
C) The linear model is no good since some residuals are large.  
D) The linear model is no good since the correlation is near 0.  
E) The linear model is okay because the association between the two variables is fairly strong.  
**Answer B**

27. Which of the following is true about the standard normal distribution?

A) Its mean is 1  
B) Its standard deviation is 1  
C) It is a skewed distribution  
D) Its median is 1  
E) all of the above are true.  
**Answer B**

**For Questions 28 & 29:** It is known that the distribution of starting salaries for MSU Education majors has a mean of $30,000 and a standard deviation of $3,000.

28. What percentage of starting salaries is lower than $33,000 if the distribution is approximately normal?

A. Approximately 84%  
B. 34%  
C. At most 11%  
D. Approximately 2.5%  
E. Approximately 26%  
**Answer A**

29. If the distribution is known to be normal, what percentage of the starting salaries is higher than $36,000?

A. Approximately 5%  
B. 12.5%
C. At most 11%
D. Approximately 2.5%
E. Approximately 47%
Answer D

30. The time to complete a standardized exam is approximately normal with a mean of 70 minutes and a standard deviation of 10 minutes. Using the 68-95-99.7 rule, what percentage of students will complete the exam in under an hour?

A) 68%  B) 32%  C) 16%  D) 5%
Answer C

31. The weight of apples in a farm is normally distributed, with a mean of 110 grams, and a standard deviation of 15 grams. Find the probability that an apple selected at random will weigh between 95 and 115 grams.

A) 0.84  B) 0.5  C) 0.16  D) 0.47
Answer D

32. IQ scores are normally distributed with mean 100 and a standard deviation of 12. If a university offers scholarships for first year students whose IQ score is in the top 3%, what is the minimum IQ score that a student must have to qualify for these scholarships?

A) 77  B) 123  C) 120  D) 110
Answer B

33. Find the probability that a standard normal random variable has a value greater than -1.75, P(Z > -1.75)

A) 0.96  B) 0.04  C) 0.92  D) 0.08
Answer A

34. Let Z be a standard normal random variable. Find P(-2.5 < Z < 2.5).

A) 0.05  B) 0.01  C) 0.90  D) 0.006  E) 0.9876
Answer E

35. Let Z be a standard normal random variable. Find the 85th percentile of Z.

A) 1.036  B) 0.85  C) -1.036  D) 0.17
Answer A