Directions: You may use any calculator without a QWERTY keyboard. For all questions, NOTA represents none of the above answers is correct.

For questions 1 and 2, the top 14 speeds, in miles per hour, for Pro-Stock drag racing over the past two decades are listed below.

181.1  202.2  190.1  201.4  191.3  201.4  192.2  
201.2  193.2  201.2  194.5  199.2  196.0  196.2

1) Find the mean speed.
   a) 195.8  b) 210.9  c) 196.1  d) 201.2  e) NOTA

2) Find the median speed.
   a) 196.7  b) 196.1  c) 195.8  d) 201.2  e) NOTA

3) Find the probability that of 23 randomly selected students, at least two share the same birthday. Round to the nearest thousandth.
   a) 0.493  b) 0.995  c) 0.569  d) 0.507  e) NOTA

4) Grade points are assigned as follows: A = 4, B = 3, C = 2, D = 1, and F = 0. Grades are weighted according to credit hours. If a student receives an A in a four-unit class, a D in a two-unit class, a B in a three-unit class and a C in a three-unit class, what is the student's grade point average?
   a) 3.00  b) 2.75  c) 2.50  d) 1.75  e) NOTA

5) Using class midpoints approximate the mean of the grouped data to the nearest tenth.

<table>
<thead>
<tr>
<th>Weight (in pounds)</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>135-139</td>
<td>19</td>
</tr>
<tr>
<td>140-144</td>
<td>11</td>
</tr>
<tr>
<td>145-149</td>
<td>5</td>
</tr>
<tr>
<td>150-154</td>
<td>12</td>
</tr>
<tr>
<td>155-159</td>
<td>14</td>
</tr>
</tbody>
</table>

   a) 12.2  b) 144.3  c) 146.3  d) 147.0  e) NOTA

6) The mean SAT verbal score is 412, with a standard deviation of 90. Use the Empirical Rule to determine what percent of the scores lie between 412 and 592. (Assume the data set has a bell-shaped distribution.)
   a) 34%  b) 49.9%  c) 68%  d) 47.5%  e) NOTA
7) The salaries of a random sample of a company's employees are summarized in the frequency distribution below. Using class midpoints approximate the sample standard deviation to the nearest cent.

<table>
<thead>
<tr>
<th>Salary ($)</th>
<th>Employees</th>
</tr>
</thead>
<tbody>
<tr>
<td>5,001-10,000</td>
<td>14</td>
</tr>
<tr>
<td>10,001-15,000</td>
<td>16</td>
</tr>
<tr>
<td>15,001-20,000</td>
<td>14</td>
</tr>
<tr>
<td>20,001-25,000</td>
<td>17</td>
</tr>
<tr>
<td>25,001-30,000</td>
<td>19</td>
</tr>
</tbody>
</table>

a) $7,192.81   b) $7,905.69   c) $17,500.00   d) $18,188.00   e) NOTA

8) 12 wrestlers compete in a competition. If each wrestler wrestles one match with each other wrestler, what are the total numbers of matches?

a) 78   b) 132   c) 66   d) 156   e) NOTA

9) A random sample of 25 community service projects is selected and the scores are recorded. Using the results shown in the histogram estimate the sample mean to the nearest tenth.

a) 96.7   b) 96.9   c) 97.1   d) 97.3   e) NOTA

10) A student applying to your graduate program in psychology has a GRE score that is 2.5 standard deviations above the mean. Suppose that the beta in a particular situation for predicting graduate school GPA from GRE scores is .6. What will be this person's predicted Z score for graduate school GPA?

a) 2.5   b) 2.7   c) 1.5   d) 0.25   e) NOTA

11) A tourist in Ireland wants to visit Ardee, Belfast, Clona, and Dingle. If the route is randomly selected, what is the probability that the tourist will visit the cities in alphabetical order? Round your answer to three decimal places.

a) 0.042   b) 0.250   c) 0.063   d) 0.167   e) NOTA
12) A random sample of 30 high school students is selected. Each student is asked how many hours he or she spent on the Internet during the previous week. Using the results shown in the histogram estimate the sample standard deviation to the nearest tenth.

![Histogram of Internet usage hours]

- a) 2.4 hr
- b) 2.6 hr
- c) 2.2 hr
- d) 2.0 hr
- e) NOTA

13) In a raffle, 1,000 tickets are sold for $2 each. One ticket will be randomly selected and the winner will receive a laptop computer valued at $1200. What is the expected value for a person that buys one ticket?

- a) $1.20
- b) -$0.80
- c) $0.80
- d) -$1.20
- e) NOTA

14) Use the box-and-whisker plot below to determine which statement is accurate.

![Box-and-whisker plot of cholesterol levels]

- a) About 75% of the adults have cholesterol levels less than 180.
- b) One half of the cholesterol levels are between 180 and 211.
- c) About 25% of the adults have cholesterol levels of at most 211.
- d) One half of the cholesterol levels are between 180 and 197.5.
- e) NOTA

15) Find the indicated probability. A sample of 4 different calculators is randomly selected from a group containing 18 that are defective and 37 that have no defects. What is the probability that at least one of the calculators is defective? Round to the nearest thousandth.

- a) 0.795
- b) 0.205
- c) 0.194
- d) 0.806
- e) NOTA
16) A radio station claims that the amount of advertising per hour of broadcast time has an average of 17 minutes and a standard deviation equal to 2.2 minutes. You listen to the radio station for 1 hour, at a randomly selected time, and carefully observe that the amount of advertising time is equal to 15 minutes. Calculate the z-score for this amount of advertising time to the nearest hundredth.
   
a) \( z = -0.75 \)  
b) \( z = -0.91 \)  
c) \( z = 0.75 \)  
d) \( z = 0.91 \)  
e) NOTA

17) You are dealt two cards successively without replacement from a standard deck of 52 playing cards. Find the probability that the first card is a two and the second card is a ten. Round your answer to three decimal places.
   
a) 0.994  
b) 0.500  
c) 0.250  
d) 0.006  
e) NOTA

18) A multiple-choice test has five questions, each with five choices for the answer. Only one of the choices is correct. You randomly guess the answer to each question. After answering all questions (not leaving any blank), what is the probability that only the first two questions are answered correctly?
   
a) 0.04  
b) 0.2  
c) 0.4  
d) 0.02  
e) NOTA

19) Use Bayes' theorem to solve this problem. A storeowner purchases stereos from two companies. From Company A, 450 stereos are purchased and 6% are found to be defective. From Company B, 550 stereos are purchased and 4% are found to be defective. Given that a stereo is defective, find the probability that it came from Company A.
   
a) \( \frac{27}{49} \)  
b) \( \frac{22}{49} \)  
c) \( \frac{18}{49} \)  
d) \( \frac{33}{49} \)  
e) NOTA

20) According to police sources, a car with a certain protection system will be recovered 94% of the time. If 400 stolen cars are randomly selected, what is the mean and standard deviation of the number of cars recovered after being stolen?
   
a) mean: 376; standard deviation: 22.56  
b) mean: 376; standard deviation: 4.75  
c) mean: 122; standard deviation: 4.75  
d) mean: 122; standard deviation: 22.56  
e) NOTA

21) A statistics professor finds that when he schedules an office hour at the 10:30 a.m. time slot, an average of three students arrives. Use the Poisson distribution to find the probability that in a randomly selected office hour no students will arrive to four decimal places.
   
a) 0.1108  
b) 0.1225  
c) 0.0743  
d) 0.0498  
e) NOTA
22) A researcher was interested in comparing the GPAs of students at two different colleges. Independent simple random samples of 8 students from college A and 13 students from college B yielded the following GPAs. Construct a 95% confidence interval for the difference between the mean GPA of college A students and the mean GPA of college B students rounding to two decimal places.

<table>
<thead>
<tr>
<th>College A</th>
<th>College B</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.7</td>
<td>3.8</td>
</tr>
<tr>
<td>3.2</td>
<td>3.2</td>
</tr>
<tr>
<td>3.0</td>
<td>3.0</td>
</tr>
<tr>
<td>2.5</td>
<td>3.9</td>
</tr>
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<td>2.7</td>
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<td>4.0</td>
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<td>3.6</td>
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<td>2.6</td>
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<td></td>
<td>4.0</td>
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<tr>
<td></td>
<td>3.6</td>
</tr>
</tbody>
</table>

\[ a) -0.72, 0.07 \quad b) -0.78, 0.13 \quad c) -0.81, 0.15 \quad d) -0.65, -0.01 \quad e) \text{NOTA} \]

23) The weekly earnings of students in one age group are normally distributed with a standard deviation of 81 dollars. A researcher wishes to estimate the mean weekly earnings of students in this age group. Find the sample size needed to assure with 98% confidence that the sample mean will not differ from the population mean by more than 5 dollars. (Use a z critical value of two decimal places).

\[ a) 1425 \quad b) 10 \quad c) 700 \quad d) 88 \quad e) \text{NOTA} \]

24) A survey of shoppers is planned to see what percentage use credit cards. Prior surveys suggest 63% of shoppers use credit cards. How many randomly selected shoppers must we survey in order to estimate the proportion of shoppers who use credit cards to within 4% with 95% confidence?

\[ a) 504 \quad b) 967 \quad c) 560 \quad d) 1513 \quad e) \text{NOTA} \]

25) A final exam in AP Statistics has a mean of 73 with standard deviation 7.8. If 24 students are randomly selected, find the probability that the mean of their test scores is less than 70.

\[ a) 0.0278 \quad b) 0.0298 \quad c) 0.0301 \quad d) 0.9699 \quad e) \text{NOTA} \]
26) A local eat-in pizza restaurant wants to investigate the possibility of starting to deliver pizzas. The owner of the store has determined that home delivery will be successful if the average time spent on the deliveries does not exceed 25 minutes. The owner has randomly selected 18 customers and has delivered pizzas to their homes in order to test if the mean delivery time actually exceeds 25 minutes. What assumption is necessary for this test to be valid?

a) The population of delivery times must have a normal distribution.
b) The population of delivery times must have a binomial distribution.
c) None. The Central Limit Theorem makes any assumptions unnecessary.
d) The sample mean delivery time must equal the population mean delivery time.
e) NOTA

27) What is the difference between a positive correlation and a negative correlation?

a) In a negative correlation high scores go with low scores and low with high; in a positive correlation high scores go with high scores and low with low
b) In a negative correlation high scores go with high scores and low with low; in a positive correlation high scores go with low scores and low with high
c) Negative correlations are curvilinear; positive correlations are straight lines
d) Negative correlations represent a weak relationship; positive correlations represent a strong relationship.
e) NOTA

28) A study found that absenteeism from work had a negative linear correlation with job satisfaction. This means that:

a) the lower the level of job satisfaction, the lower the level of absenteeism
b) the lower the level of job satisfaction, the higher the level of absenteeism
c) the higher the level of job satisfaction, the higher the level of absenteeism
d) level of job satisfaction is unrelated to absenteeism
e) NOTA
A significance test is used to prevent a machine from under filling or over filling liter bottles of cola. On the basis of a sample, the null hypothesis is rejected and the machine is shut down for inspection. A thorough examination reveals there is nothing wrong with the filling machine. From a statistical point of view:

a) A Type I error was made.  

b) A correct decision was made.  
c) A Type II error was made.  

d) Both Type I and Type II errors were made.  
e) NOTA

In a population of 190 women, the heights of the women are normally distributed with a mean of 64.5 inches and a standard deviation of 3.2 inches. If 49 women are selected at random, find the mean μ with and standard deviation σ of the sampling distribution. Assume that the sampling is done without replacement and use a finite population correction factor.

a) 64.5 inches, 0.46 inches  
b) 64.5 inches, 0.39 inches  
c) 55.7 inches, 0.46 inches  

d) 64.5 inches, 3.2 inches  
e) NOTA