Directions

• You will have 4 minutes to answer each question.
• The scoring will be 16 points for a correct response in the 1st minute, 12 points for a correct response in the 2nd minute, 8 points for a correct response in the 3rd minute, 4 points for a correct response in the 4th minute. A sliding scale will be used.
• Once your hand has been raised with the answer sheet, it must stay up. If you put your hand down, your answer will be disqualified for that question.
• Your answer must be submitted on the official answer sheet that has been correctly filled out. Otherwise your answer will be disqualified.
• Your answer must be in the specific form that the question asks for.
Directions......

• If not otherwise noted, the answers should be in one of the following generally accepted forms:
  – Denominators rationalized
  – Simplest radical form
  – Fractions, improper fractions, or mixed numbers in simplest form
  – Equations should have integral coefficients in standard form

• No units are necessary
• Calculators are not allowed in any division except Statistics.
• Headphones, beepers, cell phones, or electronic devices are not permitted.
• Sunglasses and hats are not to be worn during the competition.

1) 12 Table Tennis players compete in a competition. If each Table Tennis player has one match with each other Table Tennis player, what is the total number of matches?
2) Given the data set (x): 64, 32, 25, 39, 23, 19, 12, 0, 58, 69 and 69. Let A = the median, B = the mode, C = the midrange, D = \( \sum X^2 \), E = sample size, and F = \( \sum X \). Find the value of:

\[
(A \times B \times E \times F) / (C \times D)
\]

(\text{round final answer to 2 decimal places})

3) A 98% confidence interval for the mean of a sample of size 47 is found to be (32.63, 39.37). Determine the value of the square root of the sample mean, divided by the Margin of Error. (Round to four decimal places.)
4) A group of thirty people attend the grand opening of a local art exhibit in Cape Coral. Five of the attendees will be given a door prize for attending (all prizes are the same). Of the 30 attendees, 12 are men and 18 are women. What is the probability that all the prize winners are men? What is the probability that at least one prize winner is a woman?

5) A local pizzeria offers a free pizza if it is not delivered in 30 minutes or less. The distribution of delivery times is approximately normal. The mean time for deliveries is 24 minutes with a standard deviation of three minutes. What percentage of pizza will be given away for free?
6) Teenagers spend on average 12.5 hours/week and it is known that the population standard deviation of the number of hours is 3 hours/week. For a random sample of 110 teenagers what is the probability they will spend more than 13 hours/week texting?

7) In a batch of 8,000 clock radios 6% are defective. A sample of 8 clock radios is randomly selected without replacement from the 8,000 and tested. The entire batch will be rejected if at least one of those tested is defective. What is the probability that the entire batch will be rejected?
8) A cable company reports that 51% of customers subscribe to high speed internet service. If 180 customers are randomly selected, what is the probability that more than 94 of them are high speed service subscribers?

9) The test scores of 30 students are listed below. Find the value associated with the 30th percentile.

31 41 45 48 52 55 56 56 63 65 67 67 69 70
70 74 75 78 79 79 80 81 83 85 85 87 90 92
95 99
10) Use the same test scores of 30 students to determine what two values would qualify as the lower outlier boundary and the upper outlier boundary.

31 41 45 48 52 55 56 56 63 65 67 67 69 70 70 74 75 78 79 79 80 81 83 85 85 87 90 92 95 99

11) Correlation with a large sample is found to be statistically significant (P<0.001). The variation in Y that is not explained by the Linear Regression model Y=a+bx is found to be 0.6156. Using this information find the magnitude of the correlation coefficient ($r$).
12) Over a period of five years a homeowner compares the electric bills received for the months of March and April to see if there is any significant difference between the two months. Derive the P-Value of a dependent samples test.

<table>
<thead>
<tr>
<th>March</th>
<th>April</th>
</tr>
</thead>
<tbody>
<tr>
<td>$119.75</td>
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</tr>
<tr>
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<tr>
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<td>$49.64</td>
</tr>
<tr>
<td>$66.01</td>
<td>$68.52</td>
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</tbody>
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13) A researcher wants to construct a 98% confidence interval for the proportion of elementary school students in Hendry County who receive free or reduced-price school lunches. A state-wide survey indicates that the proportion is 0.45. Using this estimate, what sample size is needed so that the confidence interval will have a margin of error of 0.08?
14) The concentration of hexane was measured in units of µg/L for a simple random sample of 13 specimens of untreated water. The sample mean was 424 with a sample standard deviation of 6.5. Then 14 specimens of treated water had an average hexane concentration of 246 with a standard deviation of 5.9. Assume that the samples come from populations that are approximately normal and that population variances are equal. Construct a 99% confidence interval for the reduction of hexane concentration after treatment. (Round answer to one decimal place)

15) An analyst compares the rates of virus infection for PC’s protected by security software A with the rates of infection for PC’s protected by security software B. She found that out of 637 PC’s with security software A, 23 became infected after 1000 hours of internet usage. For security software B, 28 out of 645 PC’s became infected after 1000 hours of internet usage. Assume these are random samples of infection rates for the two software packages, construct a 95% confidence interval for the difference between the proportions of infection for the two types of security software packages.