Math 160
Exam 3
SAMPLE QUESTIONS **Name:** _____

Directions: You have 80 minutes to complete this N question exam. You may use a calculator. The use of any other electronic devices are strictly prohibited throughout the entire exam. You will not be allowed to leave to use the restroom. Show your work on ALL of the questions, including the multiple choice.

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1. (1 point) State which calculator you are using. _____

2. ***Sample Size Determination*** How many women must be randomly selected to estimate the mean weight of women in one age group. We want 90% confidence that the sample mean is within 2.7 lb of the population mean, and the population standard deviation is known to be 22 lb.

   (a) (4 points) ***Multiple Choice Question*** Circle the sample size suggested by this statement. Show your work below.

   A. 180
   B. 256
   C. 161
   D. 314
   E. 5150

   (b) (4 points) What formula did you use? _____

3. ***Confidence Interval*** A group of 56 randomly selected students have a mean score of 20.4 with a standard deviation of 4.4 on a placement test. What is the 90% confidence interval for the mean score, μ, of all students taking the test?

   (a) (3 points) What formula should you use for the margin of error, E? (State the correct formula even if you use the TI-84 to find the confidence interval.)

   (b) (5 points) ***Multiple Choice Question*** Circle the correct confidence interval estimate. Show your work below.

   A. $19.4 < \mu < 21.4$
   B. $19.2 < \mu < 21.6$
   C. $18.9 < \mu < 21.9$
   D. $19.0 < \mu < 21.8$

4. ***Hypothesis Test*** A poll of 1068 adult Americans reveals that 48% of the voters surveyed prefer the Democratic candidate for the presidency. At the 0.05 level of significance, test the claim that at least half of all voters prefer the Democrat. Use the p-value method. Do not use the critical value method.

(a) (1 point) Write the symbolic form of the claim.

(b) (2 points) STEPS 1 & 2: State the null and alternative hypotheses.

(c) (1 point) STEP 3: What formula should be used for the test statistic?

(d) (2 points) Compute or state the value of the test statistic. If you are stating the value of the test statistic, then also state which test you are using on the calculator.

(e) (2 points) STEP 4: $\boxed{p\text{-value method}}$

(f) (2 points) STEP 5: State a full sentence conclusion using the statistical language learned in the class.

5. ***Hypothesis Test*** The standard deviation of math test scores at one high school is 16.1. A teacher claims that the standard deviation of the girls' test scores is smaller than 16.1. A random sample of 22 girls results in scores with a standard deviation of 14.1. Use a significance level of 0.01 to test the teacher's claim. Use the critical value method. Do not use the p-value method.

(a) (1 point) Write the symbolic form of the claim.

(b) (2 points) STEPS 1 & 2: State the null and alternative hypotheses.

(c) (1 point) STEP 3: What formula should be used for the test statistic?

(d) (2 points) Compute or state the value of the test statistic. If you are stating the value of the test statistic, then also state which test you are using on the calculator.

(e) (2 points) STEP 4: critical value method

(f) (2 points) STEP 5: State a full sentence conclusion using the statistical language learned in the class.