AP STATISTICS TEST – STUDENT CREATED

**Purpose**:

The purpose of this exam is to review the confidence intervals and significance tests that are presented in Chapters 8-11 of the textbook.

**Format:**

The test will be composed of four questions with each question being on its own page. The first two questions will ask students to create a confidence interval. The last two questions will ask students to perform a significance test. The context for each question should be unique. The exam should take around 60 minutes.

**Grading:**

The test is worth 30 points total. Each confidence interval will be worth 6 points and each significance test 9 points.

 **Confidence Intervals (6 points each)**

(1 point) STATE: parameter(s) being estimated is identified (1/2 point) along with a specific confidence level (1/2 point)

(2 points) PLAN: Correctly identify the type of confidence interval (1/2 point), and then correctly check the three conditions (1/2 point each) with the 🡪 “so what”

(2 points) DO: Correct general formula for a confidence interval (1/2 point), correct specific formula with variables (1/2 point), correct numbers substituted into the formula (1/2 point), and correct answer (1/2 point)

(1 point) CONCLUDE: The confidence interval is correctly interpreted in the context of the problem with appropriate units.

 **Significance Tests (9 points each)**

(2 points) STATE: Parameter(s) are identified (1/2 point), hypotheses are stated correctly (1/2 point), evidence for Ha is provided (1/2 point) and the appropriate alpha level is given (1/2 point)

(2 points) PLAN: Correctly identify the type of significance test (1/2 point), and then correctly check the three conditions (1/2 point each) with the 🡪 “so what”

(3 points) DO: Correct general formula for a test statistic (1/2 point), correct specific formula with variables (1/2 point), correct numbers substituted into the formula (1/2 point), correct test statistic (1/2 point), and correct P-value (1/2 point). Also included is a picture of the sampling distribution that includes a title and the type of distribution is identified (1/2 point).

(2 point) CONCLUDE: The conclusion is stated correctly and includes context.

Students will be responsible to create and grade these exams. Grading should be done in a fashion that is similar to the way that Mr. Wilcox grades his tests. Your grade on the test will be affected by the quality of the test you write.

**Example question:**

**Mr. Wilcox believes that this current group of AP Statistics students has a much better grasp of the various significance tests than the average AP Stats student. To test his idea, Mr. Wilcox randomly selects 35 of his students and gives them an exam that covers all of the significance tests from Chapters 8-11. The average score by the students sampled was 84.2% with a standard deviation of 7.2. The national average on this test is 81%. Think of the sample of 35 students as a random sample of the population of all AP Stats students that Mr. Wilcox has ever taught.**

**Create and interpret a 95% confidence interval for the average test score for Mr. Wilcox’s students.**

**STATE:  = the true mean test score for Mr. Wilcox’s students.**

**We are trying to estimate  at a 95% confidence level.**

**PLAN: ONE SAMPLE T-INTERVAL FOR MEAN**

 **Check conditions (1) Random – “randomly selects 35 of his students”**

 **🡪 so we can generalize to the population**

 **(2) Normal – n =35 > 30 and the Central Limit Theorem**

 **🡪 so the sampling distribution of is approximately normal.**

 **(3) Independent – n < 1/10 N because population of all of Mr. Wilcox’s AP students is very large.**

**🡪 so sampling without replacement is OK.**

**DO: Estimate Margin of Error**

 ** with df = 34**

 ** = [ 81.727, 86.673]**

**CONCLUDE: We can be 95% confident that the interval from 81.727 points and 86.673 points captures the true mean test scores for Mr. Wilcox’s AP Stats students.**

**Do the data provide good evidence that Mr. Wilcox’s students scores higher than the national average on this particular test.**

**STATE: Ho:  = 81  = the true mean test score for Mr. Wilcox’s AP Stats students**

 **Ha:  > 81 = 0.05**

**Evidence for Ha: =84.2 > 81**

**PLAN: ONE SAMPLE T-TEST FOR MEAN**

 **Check conditions (1) Random – “randomly selects 35 of his students”**

 **🡪 so we can generalize to the population**

 **(2) Normal – n =35 > 30 and the Central Limit Theorem**

 **🡪 so the sampling distribution of is approximately normal.**

 **(3) Independent – n < 1/10 N because population of all of Mr. Wilcox’s AP students is very large.**

**🡪 so sampling without replacement is OK.**

**DO:**

 **Test Statistic = **

 **  t = 2.63**

 **P-value = 0.00637**

**CONCLUDE:**

**Assuming Ho is true (Mr. Wilcox’s AP Stats students true mean score is 81), there is a .0006 probability of obtaining an value of 84.2 or higher purely by chance. This provides good evidence again Ho and is statistically significant at = 0.05. Therefore, we reject Ho and can conclude that Mr. Wilcox’s AP Stats students had an average score that was higher than the national average.**