**Last Name: Tu First Name: John**

**Lab 9: 7.1 Inference for one population mean: σ unknown**

1. To try to discover the nature of the atmosphere long ago, we can examine the gas in bubbles inside ancient tree resin that has hardened and been trapped in rocks. The gas in bubbles should be a sample of the atmosphere. Measurements on specimens of tree resin from the late Cretaceous era (75 to 95 million years ago) give these percentages of nitrogen. Assume that these observations are an SRS from the late Cretaceous atmosphere.

63.4 65.0 64.4 63.3 54.8 64.5 60.8 49.1 51.0

a) Use a 99% confidence interval to estimate the mean percent of nitrogen in ancient air. Interpret your findings in the context of the problem.

A: The mean percent of nitrogen in ancient air is 59.58889%. It is 99% confident to interpret that the mean percent of nitrogen in ancient air falls between 52.59259 and 66.58159.

b) Do the data give good reason to think that the percent of nitrogen in the air during the Cretaceous era was different from the present 78.1%? Carry out a test of significance with *a* = 1%. Make sure to write the corresponding hypotheses before carrying out your test, and to answer the question posed here.

H0: mean equals to 78.1% H1: mean is different from 78.1%

Since the p-value is less than the confidence level, there is sufficient evidence that the percent of nitrogen in the air during the Cretaceous era differs from today’s percentage.

2. The heights (in inches) of adult males in the U.S. are believed to be normally distributed with mean µ. The average height of a random sample of 25 American adult males is found to be 69.72 inches and their standard deviation is found to be 4.15. Construct a 90% confidence interval for µ. Interpret your findings in the context of the problem.

A: It is 90% confident to say the average height of an American adult male will be between 68.3 inches and 71.14 inches.

3. (Moore and McCabe, 1998) The table below gives the pretest and posttest scores on MLA listening test in Spanish for 20 high school Spanish teachers who attended an intensive summer course in Spanish.



a) Give a 90% confidence interval for the mean *increase* in listening score due to attending the summer institute.

A: The confidence interval for the mean increase in listening score is between -2.6885062 and -0.2114938.

b) Is there evidence to conclude that attending an intensive summer course in Spanish will increase test scores? Carry out a test of significance with *a* = 5%.

A: Because the p-value is greater than the significance level, there is insufficient evidence to conclude that attending an intensive summer course will increase the test scores.

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* PUT YOUR CODE IN THE BOTTOM \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

