**HW4: T-Tests & Z-Tests**

1. A drug manufacturer asserts that a fixed dosage of a certain drug causes an average (mean) increase in pulse rate of 10 beats per minute with a standard deviation of 4. A group of 20 patients given the same dosage, showed a mean increase of 11 beats per minute with a variance, . Is there evidence to contradict the drug manufacturers’ claim?
2. State the Null Hypothesis and the Alternative Hypothesis. Show your work. (Total 3 pts: State H0 & Ha (1 pt), Z-value (1 pt), Result: Reject or Accept H0 (1 pt))
3. Make your conclusion. What is your probability of having made Type I and Type II error. (Total 3 pts: Conclusion (1 pt), Type I error (1 pt), Type II error (1 pt))
4. Let us suppose that you are interested in comparing the degree of anxiety of college professors with the anxiety level of the general public. Let us further suppose that you have constructed an index, designed to assess anxiety, such that the higher the score, the more anxiety ridden is the individual. The possible range of scores is between 0 and 99 and you are willing to assume that this constitutes an interval scale. The anxiety test is then standardized by administering to repeated samples form the general population. The overall mean and standard deviation (which you then assume are parameters) are found to be 50 and 20, respectively. The median=50; the mode=50. Armed with this standardized test you now collect data from a sample of 120 college professors, and obtain the following information (Note that all statistics calculated from ungrouped data):

Mean anxiety score for total sample=56.0,

Standard deviation for the sample=18.63,

Estimate of the population variance=350,

Sum of the squares of the deviations about the mean=41650.

1. Test the statistical significance of the difference between the mean anxiety level of college professors and the overall mean anxiety level of the general population. Use a two-tailed test and the 0.05 significance level. (Total 3 pts: State H0 & Ha (1 pt), Z-value (1 pt), Result: Reject or Accept H0 (1 pt))
2. Interpret your findings in question (1) above specifically in terms of the problem. (1 pt)
3. If you wished to estimate the mean anxiety score for all college professors, what would be your best single guess, i.e., what anxiety score value would you report? (1 pt) Show the logic of how you derived the answer. (1 pt)