

Statistics
Assignment #11

Due: Dec.29.2016

1. A random sample of 10 observations was drawn from a normally distributed population. These are: 6, 4, 4, 7, 5, 5, 4, 5, 6, and 4. Test to determine if we can infer at $\alpha = 0.05$ that the population mean is less than 6.
2. Test the hypotheses $H_0 : \sigma^2 = 0.01$ vs. $H_1 : \sigma^2 \neq 0.01$ at the 5% significance level, given that a random sample of 10 observations was drawn from a normal population, and the sample standard deviation was .043
3. A financial analyst is concerned with the risk associated with a portfolio of stocks. She draws a random sample of nine monthly returns (expressed as a percentage of the initial investment). These data follows: 2, 5, -6, 10, 1, 2, -3, 0, and 7. Find a 95% confidence interval estimate of the population variance.
4. To university professors, a large variance in the final marks indicates that the exam was successful in identifying good students. In the past a statistics professor has observed that the variance in the final marks in his course was 450. In order to determine if the variance has decreased, she draws a random example of 10 students from a large class and finds that the sample variance is 360. Can she conclude at the 10% significance level that the variance has decreased?
5.
 - a. In a random sample of 500 observations, we found the proportion of successes to be 48%. Estimate with 95% confidence the population the population proportion of successes.
 - b. Repeat part a with $n=400$
 - c. Repeat part a with $n=300$
 - d. Describe the effect on the width of the confidence interval estimate of reducing the sample proportion.
6.
 - a. calculate the p-value of the test of the following hypothesis given the $\hat{p} = 0.63$ and $n=100$. $H_0 : P = 0.6$; $H_1 : P > 0.6$
 - b. Repeat part a with $n=200$
 - c. Repeat part a with $n=400$
 - d. Describe the effect on the p-value of increasing the sample size.
7. The dean of NTU business school wanted to know whether the graduates of his school used a statistic inference skill during their first year of employment after graduation. She surveyed 418 graduates and ask about the use of statistical skills. After the survey, she found that 217 used statistical inference within 1 year of graduation. Estimate with

90% confidence the proportion of all business school graduates who use their statistical education within a year of graduation.

8. The Canada MRT transportation system believes that the travelers are expected to buy their tickets before boarding the MRT. Only a small number of people people will be checked on the train to see whether they bought a ticket. Suppose that a random sample of 400 train travelers were sampled and 68 of them failed to buy a ticket.
 - (a) Estimate with 95% confidence the proportion of all train travelers who do not buy a ticket
 - (b) Can MRT transportation claims that more than 60% traveler do not buy the tickets at $\alpha=0.05$?