STA 570 — Spring 2012 — Dr. Charnigo

Written Assignment 2

This assignment is due on Thursday 16 February at 12 Noon. You may work in self-selected groups of two or three, submitting one copy of the assignment for the group.

[50] 1. Refer to {Sheet1} of {MedicineLDL.xls}, with which you have already worked in Written Assignment 1. Let μ and σ denote the mean and standard deviation of low density lipoprotein within a hypothetical population of adults with a history of elevated cholesterol who are placed on active treatment.

[10] a. Calculate a 90% confidence interval for μ, treating the sample size as "small". How (if at all) would you change the formula with a "large" sample size, and in that case would you need to assume normality of the low density lipoprotein measurements?

[10] b. Test $H_0 : \mu = 130$ against $H_1 : \mu \neq 130$ at significance level $\alpha = 0.05$.

[10] c. What power would you have to conduct the test in part b if the sample size (number of adults receiving active treatment) were 75?

[10] d. What sample size (number of adults receiving active treatment) would provide 95% power to conduct the test in part b?

[10] e. Calculate a 95% confidence interval for σ^2. How (if at all) would you change the formula with a "large" sample size, and in that case would you need to assume normality of the low density lipoprotein measurements?

[50] 2. Refer to sheet {Data} of {Diabetes.xls}. The variables contained therein are described in sheet {Information} of {DiabetesInfo.xls}. Let μ denote the mean number of pregnancies among individuals in the population of which the sample is representative. Let p denote the population proportion of individuals with multiple pregnancies.

[10] a. Calculate a 95% confidence interval for μ, treating the sample size as "large".

[10] b. Test $H_0 : \mu = 3$ against $H_1 : \mu > 3$ at significance level $\alpha = 0.01$.

[10] c. What power would you have to conduct the test in part b if the sample size were 300? Would the power be higher or lower if the significance level had been $\alpha = 0.05$?

[10] d. What sample size would provide 80% power to conduct the test in part b? Would the sample size be higher or lower if the significance level had been $\alpha = 0.05$?

[10] e. Calculate a 95% confidence interval for p, treating the sample size as "large".