STA 580 — Fall 2008 — Dr. Charnigo

Written Assignment 2

This assignment is due on Thursday 02 October at 5:20 p.m. You may work in self-selected groups of two or three, in which case you may hand in one copy of the assignment for the group.

[50] 1. Refer to {Sheet1} of {SMKandSBP.xls}, with which you have already worked in Written Assignment 1. Let μ and σ denote the population mean and standard deviation for systolic blood pressure among smokers. *Your responses to questions calling for "Yes" or "No" answers should also include brief explanations for the answers.*

[10] a. Construct a 95% confidence interval for μ, treating the sample size as "small". Must the systolic blood pressure measurements be normally distributed to ensure the validity of your confidence interval?

[10] b. Consider testing $H_0 : \mu = 140$ against $H_1 : \mu \neq 140$ at significance level $\alpha = 0.05$. Based on your answer to a, does your intuition suggest that the null hypothesis will be rejected? Carry out the hypothesis test and see whether the result accords with your intuition.

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

[10] d. What sample size (number of smokers) would provide 90% power to conduct the test in part b?

[10] e. Construct a 95% confidence interval for σ. Must the systolic blood pressure measurements be normally distributed to ensure the validity of your confidence interval?

[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 plasma glucose concentration in the population of which the sample is representative. Let p denote the population proportion of individuals for whom the plasma glucose concentration exceeds 126.

[10] a. Construct a 95% confidence interval for μ, treating the sample size as "large". Must the plasma glucose concentration measurements be normally distributed to ensure the validity of your confidence interval?

[10] b. Test $H_0 : \mu = 126$ against $H_1 : \mu > 126$ at significance level $\alpha = 0.05$.

[10] c. What power would you have to conduct the test in part b if the sample size were 500?

[10] d. What sample size would provide 80% power to conduct the test in part b?

[10] e. Construct a 95% confidence interval for p. Must the plasma glucose concentration measurements be normally distributed to ensure the validity of your confidence interval?