Math 4397/6397
Problem Set 9, due Thu, Nov 12, 2009

Problem 1. Refer to Problems 1 and 2 from Homework Set 7. Test whether or not there is a difference in the declines between smokers and non-smokers. Give the appropriate null and alternative hypotheses. Give the appropriate null and alternative hypotheses. State your assumptions and interpret your test.

Problem 2. Much discussion has focused in recent years on the role of diet in the development of heart disease. The serum cholesterol levels of a group of persons who eat a primarily macrobiotic diet are measured and it is found that among 24 persons ages 20-39, the sample mean of cholesterol is 220 with a sample standard deviation of 35.

   a. If the mean cholesterol level in the general population in this age group is 230 and is assumed to be normally distributed, then test the hypothesis that the group of persons on a macrobiotic diet have lower cholesterol levels than the general population. Find the p-value. Interpret.

   b. Compute a 95% confidence interval for the true mean cholesterol level for people on the macrobiotic diet.

   Suppose a larger study is now being planned. We anticipate recruiting 100 subjects on the macrobiotic diet.

   c. Compute the power of a one-sided test with significance level $\alpha = .05$ if the true mean serum cholesterol for this group is 225. Do the same calculation assuming that the true mean serum cholesterol for this group is 223 or 220, respectively.

Problem 3. A study was conducted comparing muscle function between toads that grew from carnivorous tadpoles (CA) and those from vegetarian tadpoles (VG). A 10-point scale was used to assess sprint performance where a high score indicates a faster sprint.

	Mean Score	SD	N
CA	3.2	1.6	36
VG	2.7	1.4	30

   a. Test if the variances of CA and VG scores are equal.

   b. Test if mean scores are the same for CA and VG subjects, report a p-value. State all assumptions of your test procedure.