Math 220 : Elementary Statistics Kane Nashimoto
Exam 3 - Ch. 8, 9, 10
Summer 2006 Name : _____

Directions: This exam contains four problems worth a total of 100 points. For each computational problem, you must first write the formula to be used and present all your subsequent work in order to receive full or partial credit. Circle your final answers.

1. The mean forced vital capacity (amount of air one can force out of lungs; FVC) for young women in America is 3.40 liters, and the standard deviation is 0.20. A swimming coach at a college claims that the average FVC of his female swimmers is greater than the national average. He measured FVCs for randomly selected 34 swimmers from his team. The observed a sample mean was 3.48 liters.

   (a) At a significance level of .10, test the truth of the coach's claim. (15 pts.)

   H_0 : _____ vs. H_a : _____

   Compute the test statistic and define the rejection rule.

   Should the null hypothesis be rejected? Circle one. Yes No

   (b) Regardless of what you actually computed, suppose that the test statistic in (a) was $z^* = 2.35$. Compute the p-value of the test. (10 pts.)

2. A fast-food store currently sells Coke products at its store. However, the store is willing to switch to selling Pepsi products if a large number of its customers prefer Pepsi products. The store is planning on conducting a survey to estimate the proportion of its customers who prefer Pepsi products.

   (a) To how many customers should the store give a survey in order to ensure that the obtained estimate will be within .045 of the true proportion with 90% certainty? Do not use information from (b) below to answer this question. (10 pts.)

   (b) Suppose that the survey was conducted with 200 customers and that 87 of them indicated that they preferred Pepsi products. Construct a 95% confidence interval for the true proportion. (10 pts.)

3. *Taken form Ex. 8.20 of the textbook.* In the library on a university campus, there is a sign in the elevator that indicates a limit of 16 persons. Furthermore, there is a weight limit of 2,500 pounds. Assume that the average weight of students, faculty, and staff on campus is 150 pounds, that the standard deviation is 27 pounds, and that the distribution of weights of individuals on campus is approximately normal. A random sample of 16 persons from the campus is taken.

   (a) What are the mean and standard deviation of the sampling distribution of the sample mean weight? (10 pts.)

   (b) What average weights for a sample of 16 people will result in the total weight exceeding the weight limit of 2,500 pounds? (10 pts.)

   (c) What is the probability that the total weight of a random sample of 16 persons on the elevator will exceed the weight limit? (10 pts.)

4. The mean price of a random sample of 25 accounting textbooks was found to be \$92.30 with a standard deviation of \$7.41. Assume that the distribution of the prices is approximately normal.

   (a) Construct a 99% confidence interval for the mean price of all accounting textbooks. (10 pts.)

   (b) Conduct a test of hypotheses to determine whether the true mean price differs from \$90.00. Use $\alpha = .01$. (15 pts.)

   H_0: _____ vs. H_a: _____

   Compute the test statistic and define the rejection rule.

   Should the null hypothesis be rejected? Circle one. Yes No