Statistics 104 – Homework 10

Due Friday, April 13, 2012

Homework is due on the due date at the end of the lab.

Reading: April 3 – April 10 Sections 8.1, 8.2, 8.4, 9.1 and 9.2

Assignment:

1. Complete the following problems from the text: 8.7, 8.13, 8.23, 9.1, 9.2, 9.9, and 9.10.

2. In a Marist Poll conducted between March 20th and 22nd, 2012 a random sample of self-identified sports fans from across the U.S. were asked the question: “Which comes closest to your view: top college athletes who play for their college teams should get a scholarship to college and get paid a salary; should only get a scholarship; should not get a scholarship and should not be paid a salary?” Of the 620 sports fans contacted 167 said a scholarship and a salary, 422 said only a scholarship, and 31 said neither.

   a) What is the population? Be specific.
   b) What is the sample? Be specific.
   c) Are the conditions met for constructing a confidence interval for a population proportion based on this sample? Support your answer.
   d) Construct a 95% confidence interval for the population proportion of who would answer that top college athletes should get only a scholarship.
   e) How would an 80% confidence interval compare to the one you constructed in d? You should comment on the centers of the intervals and the widths of the intervals. Note: You do not need to construct an 80% confidence interval to answer this question.

3. A random sample of 400 students is selected from the 28,000 students at a large Midwestern university. The students were asked “Over the past weekend did you consume alcoholic beverages?” 154 students answered no.

   a) What is the population? Be specific.
   b) What is the sample? Be specific.
   c) Construct a 90% confidence interval for the population proportion who did not consume alcoholic beverages over the past weekend.
   d) Based on your confidence interval in c) would you conclude that 40% of all students at the university did not consume alcoholic beverages over the past weekend? Explain briefly.
   e) The margin of error for the confidence interval is fairly large. How large a sample would you have to take so that with 90% confidence the margin of error would be 0.02?
4. We wish to see if the sample data given in problem 3 is consistent with the statement that 32.5% of college students report that they have not consumed alcohol recently.

   a) Set up a null and alternative hypothesis for the proportion of all students at the large Midwestern University who have not used alcohol recently. Hint: You should use a two-sided alternative.
   b) Check the conditions necessary to conduct a test of hypothesis.
   c) Compute the value of the test statistic and convert this to a P-value.
   d) Use the P-value to make a decision whether or not to reject the null hypothesis.
   e) State a conclusion, within the context of the problem.

5. A large manufacturer that sells consumer products on-line wishes to publicize its customer satisfaction in an advertisement. Specifically, it wants to state that over 90% of the manufacturer’s customers would tell a friend to buy a product from the manufacturer. The manufacturer selects a random sample of 1,000 customers from its database of over 2 million customers, contacts them via email and asks them the question “Would you tell a friend to buy a product from us?” 922 say yes and 78 say no.

   a) What is the population? Be specific and include the size of the population.
   b) What is the sample? Be specific and include the size of the sample.
   c) Give a null and alternative hypothesis for the proportion of all customers who would tell a friend to buy a product from the manufacturer.
   d) Verify that the conditions are satisfied.
   e) Compute the value of the test statistic and convert this to a P-value.
   f) Use the P-value to make a decision whether or not to reject the null hypothesis.
   g) State a conclusion, within the context of the problem, which addresses whether or not it is appropriate for the manufacturer to make the claim of over 90% satisfaction in its advertisement.