

Statistics 101 – Homework 9

Due Wednesday, April 8, 2009

Homework is due on the due date in lab..

Reading: March 30 – April 6 Chapters 20, 21
 April 8 Chapter 18 II

Assignment:

1. Many people are superstitious about the number 13. Friday the 13th occurred in February and March of 2009 and will occur in November of this year. But does triskaidekaphobia (fear of the number 13) have economic implications for large high-rise hotels? A *USA Today*/Gallup poll conducted February 9-11, 2007 asked 1,006 randomly selected people 18 years old and older in telephone interviews “Suppose you checked into a hotel and were given a room on the thirteenth floor. Would this bother you or not?” 87% of the survey respondents answered they would not be bothered while 13% answered that they would be bothered.
 - a) What is the population? Be specific.
 - b) What is the sample? Be specific.
 - c) Are the conditions for constructing a confidence interval for the population proportion satisfied? Support your answer by verifying the appropriate conditions.
 - d) Construct a 95% confidence interval for the population proportion of people 18 years and older who would be bothered by being given a room on the thirteenth floor.
 - e) How would a 90% 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 a 90% confidence interval to answer this question.

2. In a *Gallup* Poll conducted March 6-9, 2008 1,012 adults nationwide were asked, **“With which one of these statements about the environment and the economy do you most agree? Protection of the environment should be given priority, even at the risk of curbing economic growth. OR, Economic growth should be given priority, even if the environment suffers to some extent.”** 49% of those surveyed thought the environment should be given priority. 42% of those surveyed thought the economy should be given priority, 5% of those surveyed thought they should get equal priority and 3% were unsure.
 - a) What is the population?
 - b) What is the sample?
 - c) Give the number, not a proportion or a percentage, of adults in the sample who thought the environment should be given priority.
 - d) Construct a 98% confidence interval for the proportion of the population who think the environment should be given priority.
 - e) Give an interpretation of your confidence interval in d).
 - f) Based on your interval in d) is the proportion of the population who think the environment should be given priority 55%? Explain briefly.

3. A large accounting firm recently selected 100 individuals to participate in a management-training program. Of these, 75 were males and 25 were females. The company claims that it selected the 100 individuals at random from a pool of eligible employees that consisted of 800 females and 1200 males. Does the sample agree with the company's claim or do females make up a significantly smaller proportion of those selected for the training program than the proportion of eligible females? To answer this question you should:
 - a) Indicate what the population is.
 - b) Indicate what the sample is.
 - c) Set up a null hypothesis that the population proportion of eligible employees that are female is 40% against an alternative that the population proportion is less than 40%.
 - d) Verify that the 10% condition and success/failure conditions are satisfied.
 - e) Calculate the value of the test statistic and use Table Z to find 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 the company's claim.

4. 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?
 - b) What is 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 10% condition and success/failure condition 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.

5. The following question was asked as part of a standardized statistics test given to over 50,000 introductory statistics students.

True or False: The P-value is the probability that the null hypothesis is true.

For a random sample of 400 students who took the test, 176 answered true and 224 answered false. Are students guessing at the answer or not? You should support your answer in two ways.

- a) By testing an appropriate hypothesis. Be sure to include all the steps and say how the test of hypothesis supports your answer.
- b) By constructing a 95% confidence interval. Be sure to include all the steps and say how the confidence interval supports your answer.