

STATISTICS 101 - Homework 6

Due Wednesday, March 26, 2008

Reading

- Chapter 18 (p. 406-412) & Chapter 19

Assignment

1. The maker of M&M's says on its website that 14% of Milk Chocolate M&M's are yellow. Suppose that M&Ms are packaged at random. We wish to examine the sample proportion of yellow Milk Chocolate M&M's, \hat{p} , in various sized bags.
 - (a) For each of the different sized bags, give the mean and standard deviation of the sampling distribution of \hat{p} . Also comment on whether or not the success/failure condition is met for the sampling distribution to be approximately normal.
 - i. Fun size bags containing 25 Milk Chocolate M&M's.
 - ii. Small size bags containing 50 Milk Chocolate M&M's.
 - iii. Medium size bags containing 100 Milk Chocolate M&M's.
 - iv. Extra Large size bags containing 500 Milk Chocolate M&M's.
 - (b) For the extra large bags containing 500 Milk Chocolate M&M's, use the 68-95-99.7 Rule to describe how the sample proportion of yellow Milk Chocolate M&M's might vary from bag to bag.
 - (c) In an extra large bag of 500 Milk Chocolate M&M's there are 90 yellow. In this an unusually large proportion of yellow? Explain your answer.
2. It is believed that 42% of all college students in the United States engage in binge drinking (5 or more drinks at a sitting for men, 4 or more for women). Consider a random sample of 100 college students. Verify that the success/failure condition is met. Use the 68-95-99.7 Rule to describe the sampling distribution model for the sample proportion of students who engage in binge drinking.
3. In 2002, 22.5% of all adults (18 years or older) in the United States were current smokers.
 - (a) For a random sample of 1000 U.S. adults, is the 10% condition met? Explain your answer.
 - (b) Is the success/failure condition met? Explain your answer.
 - (c) Use the 68-95-99.7 Rule to describe the sampling distribution model for the proportion of current smokers in a random sample of 1000 adults in the United States in 2002.
4. A seed corn distributor advertises a germination rate of 90% for its corn. What is the probability that out of 400 randomly selected corn seeds from the distributor, fewer than 350 will germinate? As a part of your answer, verify that the appropriate conditions for computing this probability are met.
5. In Lab #7, you took a sample of size 5 and a sample of size 10 from a population of 250 students. In this lab, the proportion of students in the population with blue eyes was 0.312. Suppose you now have a very large population (so large so that meeting the 10% condition is not a problem) with the same proportion of blue eyes in the population (0.312). What is the smallest sample size you can take from this very large population for the sampling distribution of the sample proportion of students with blue eyes to be approximately normal? Explain your answer.