

Statistics 101 – Homework 8

Due Wednesday, April 1, 2009

Homework is due on the due date in lab.

Reading: March 23 – Chapter 18 I (p. 436–443)
 March 25 – March 27 Chapter 19

Assignment:

1. The maker of M&M's says on its website that 16% of Dark Chocolate M&M's are orange. Suppose that M&M's are packaged at random. We wish to examine the sample proportion of orange Dark 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 Dark Chocolate M&M's.
 - ii) Small bags containing 50 Dark Chocolate M&M's.
 - iii) Medium bags containing 100 Dark Chocolate M&M's.
 - iv) Extra large bags containing 500 Dark Chocolate M&M's
 - b) For the extra large bags containing 500 Dark Chocolate M&M's, use the 68-95-99.7 Rule to describe how the sample proportion of orange Dark Chocolate M&M's might vary from bag to bag.
 - c) In an extra large bag of 500 Dark Chocolate M&M's there are 90 orange. Is this an unusually large number of orange? Support your answer with a probability calculation using a normal model.
2. It is believed that 44% 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 2004, 20.9% of all adults (18 years old or older) in the United States were current smokers. There were approximately 220,000,000 adults in the United States in 2004. For a random sample of 1000 U.S. adults is the 10% condition met? Explain briefly. Is the success/failure condition met? Explain briefly. Use the 68-95-99.7 Rule to describe the sampling distribution model for the proportion current smokers in a random sample of 1000 adults in the United States in 2004.
4. A seed corn distributor advertises a germination rate of 90%. What is the probability that out of 400 randomly selected corn seeds from the distributor, fewer than 340 will germinate? Verify that the appropriate conditions for computing this probability are met? Explain.