

ECO220Y: Homework, Lecture 9

Readings: Chapter 10

Exercises: 1, 3, 5, 7-8, 20-21

Problems:

- (1) A sample of 100 voters finds that 54 prefer Alice while 46 prefer Mad Hatter (Alice and Mad Hatter are running for governor of Wonderland). What is the probability of finding this strong preference for Alice if, in fact:
 - (a) 50 percent of all voters prefer Mad Hatter?
 - (b) 55 percent of all voters prefer Mad Hatter?
 - (c) 60 percent of all voters prefer Mad Hatter?

- (2) Charlie Hustle is a professional baseball player. Each time at bat, he has a .3 probability of getting a hit and a .7 probability of making an out. Batting averages are calculated by dividing the number of hits by the number of times at bat. A person who gets 50 hits in 200 times at bat is batting .250 and is said to be hitting "two-fifty". Assume that Charlie Hustle has 500 times at bat each baseball season. What are the probabilities that he will have a batting average of
 - (a) at least .300 next season?
 - (b) at least .325 next season?
 - (c) at least .350 next season?
 - (d) at least .400 next season?
 - (e) at least .325 over the next five seasons?

- (3) A government agency wants to estimate the number of fish in the lake. They catch 100 fish, tag them, and put them back in the lake. A short while later, they catch another 100 fish and find that 10 have been tagged. Think of this second batch as a random sample of all the fish in the lake. Based on this sample, what is your estimate of the fraction of the fish in the lake that are tagged? Because you know that 100 fish are tagged, what is your estimate of the total number of fish in the lake?

- (4) The life of a Rolling Rock tire is normally distributed with a mean of 30,000 miles and a standard deviation of 5,000 miles. What are the probabilities that
 - (a) A tire will last more than 30,000 miles?
 - (b) A tire will last more than 40,000 miles?
 - (c) The average life of four tires will be more than 30,000 miles?
 - (d) The average life of four tires will be more than 40,000 miles?

- (5) The 50,000 students at Enormous University have an average age of 18.8 years with a standard deviation of 1.7 years. The 25 students on an entertainment committee are selected at random from the student body. What is the probability that the average age of these 25 students will be under 18 years? Assume that age is normally distributed.