

Statistics 101 – Homework 8

Due Wednesday, November 4, 2009

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

Reading:	October 26 – October 30	Chapter 19
	November 2 – November 6	Chapter 20
	November 9 – November 11	Chapter 21

Assignment:

1. Do the following problems from the text, *Intro Stats*, 3rd Edition. If you have an earlier edition of the text, check with someone who has the 3rd Edition to make sure you do the correct problems.
 - a) Chapter 19 – problems 1, 2, 3 a) and b), 4 a) and b), 11, 12, 17, 18, 35, and 36.
2. In an ABC News/Washington Post poll conducted between October 15 and October 18, 2009, 57% of those surveyed said they approved of the way Barack Obama is handling his job as president while 40% of those surveyed disapproved of the way he was handling his job and 3% were unsure. The poll asked 1,004 randomly selected adults in the U.S. the question: “Do you approve or disapprove of the way Barack Obama is handling his job as president?”
 - 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 approve of President Obama’s performance.
 - d) Construct a 95% confidence interval for the proportion of the entire U.S. adult population that approves of the way President Obama is handling his job?
 - e) Give an interpretation of your confidence interval in d).
3. In lab you looked at the eye color of students in a small population (250 students). Consider a much larger population (millions of people) where the population proportion of blue eyes is 0.312. In this exercise, you will look at simulating drawing samples from this population at random and investigate how different choices for the sample size and confidence level affect the confidence intervals constructed from these samples. You will use the applet on the web at

<http://statweb.calpoly.edu/chance/applets/Confsim/Confsim.html>

You can get to this URL from the course web page via the link to Confidence Interval for a Population Proportion under Computing. In the applet, the method should be Proportions – Wald. Enter 0.312 for the value of π . Note: this applet uses the Greek letter π for the population proportion.

- a) Enter the value of 10 for n (a random sample of size 10). The conf level should be 95 (a confidence level of 95%) and leave the number of Intervals at 1, then click on Sample. Does the interval displayed contain p ? Press the sample button 9 more times. Report the running total percentage for the intervals that contain p .
- b) The running total percentage in a) is a short-run result. Let's look at a slightly longer run. Click on Reset and change the Intervals box from 1 to 100, and click on Sample. What is the difference between the confidence intervals displayed in red and those displayed in green? (If you don't see any red intervals, click on Sample again.) What is the running total percentage for intervals that contain p ?
- c) Click the Sample button 9 more times. What is the running total percentage now? What should it be? Explain briefly.
- d) Is the Success/Failure condition satisfied for these values of $p=0.312$ and $n=10$? Explain briefly.
- e) Reset the applet. Enter the number 10 for n , 1 in the Intervals box and 95 for the confidence level. Click on Sample. Report the values for the lower and upper limit of this confidence interval (right click on the interval). Note: if you happen to get a value of \hat{p} that is 0 or 1, Reset the applet and Sample again. Now change the value of n to 100 and click on Sample. Report the values for the lower and upper limit of this confidence interval. How do the two intervals compare?
- f) Reset the applet. Leave that sample size at $n=100$ but put 250 in the Intervals box. Click Sample 4 times. What is the running total percentage for the intervals that contain p ? What should it be? Explain briefly.
- g) Is the Success/Failure condition satisfied for these values of $p=0.312$ and $n=100$? Explain briefly.
- h) Reset the applet. Enter the number 100 for n , 1 in the Intervals box and 95 for the conf level. Click on Sample. Note: if you happen to get a value of \hat{p} that is 0 or 1, Reset the applet and Sample again. Report the values for the lower and upper limit of this confidence interval. Now change the confidence level from 95% to 80% and click on Recalculate. Report the values for the lower and upper limit of this confidence interval. How do the two intervals compare?
- i) A narrow confidence interval is desirable. Give two things that you can do to get a narrower confidence interval. Which of these two ways do you think is better? Explain briefly.