

Statistics 101 – Homework 8

Due Wednesday, March 31, 2010

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

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| Reading: | March 22 – March 26 | Chapter 19 |
| | March 29 – April 2 | Chapter 20 |
| | April 5 – April 7 | 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 a CNN/Opinion Research Corporation poll conducted between March 19 and March 21, 2010, 402 of the 1,030 U.S. adults surveyed said they generally favor the final legislation that would make major changes in the country's health care system while 608 of those surveyed said they generally opposed the health care legislation and 20 of those surveyed were unsure. The 1,030 adults were randomly selected from all adults in the U.S. and asked the question: "As you may know, the U.S. House of Representatives and the U.S. Senate are trying to pass final legislation that would make major changes in the country's health care system. Based on what you have read or heard about that legislation, do you generally favor it or generally oppose it?"
 - a) What is the population?
 - b) What is the sample?
 - c) Give the proportion of adults in the sample who generally favor the final legislation on health care.
 - d) Construct a 95% confidence interval for the proportion of the entire U.S. adult population that generally favors the final legislation on health care.
 - 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 ways that you can get a narrower confidence interval. Which of these two ways do you think is better? Explain briefly.