

HOMEWORK 6
STA 321, Basic Statistical Theory I
Spring Semester, 2014

Due: March 13th, 2014

- 1** For a 95%-confidence interval for a proportion, show why the following two rules of thumb are justified.
 - (a) The margin of error B is approximately $B = 1/\sqrt{n}$.
 - (b) The minimal sample size n necessary for precision B is approximately $n = 1/B^2$.Hint: Construct a confidence interval for $\hat{p} = 0.5$, and explain how its margin of error compares to confidence intervals based on other values of \hat{p} .

- 2** In a congressional election, 55% of the electorate prefers candidate A. If you take a random sample of 200 voters, what is the probability that candidate A will get less than half the vote? That is, what is the probability that you will project the wrong candidate as the winner?

- 3** Suppose a local Best Buy store surveys the merchandise remaining in stock at the end of the month. A sample of 50 items was randomly selected. The mean value of the sampled items was found to equal \$542.50 with a sample standard deviation of \$120.56.
 - (a) Describe the population mean. What is the sample mean estimating?
 - (b) Construct a 95% confidence interval for the population mean. Interpret.
 - (c) Construct a 90% confidence interval for the population mean. Interpret.

- 4** According to a survey performed by a real estate institute at USC, the sample mean rent in 2003 was \$1,300 for Los Angeles County and \$1,260 in Orange County. Assume the survey sampled 250 rents in each county. Also assume the standard deviation in rents was \$350 in Los Angeles County and \$450 in Orange County.
 - (a) Calculate a 95% confidence interval for the population mean rent for Los Angeles. Interpret.
 - (b) Calculate a 95% confidence interval for the population mean rent for Orange County. Interpret.
 - (c) Is there a good chance that the population mean rent in Orange County is higher than that in Los Angeles County? Explain.