

HOMEWORK 9
STA 321, Basic Statistical Theory I
Spring Semester, 2014

Due: April 10th, 2014

1. Find t-scores to form 99% confidence intervals with 5, 15, and 25 observations, as well as 95% and 99% confidence intervals for $df=20$. Compare to the z-scores for the same situation.

2. Analyze data from a study that compares therapies for anorexia. For 17 girls who received family therapy, the changes in weight during the study were:

11, 11, 6, 9, 14, -3, 0, 7, 22, -5, -4, 13, 13, 9, 4, 6, 11.

(a) Create a 90% confidence interval for the population mean change in weight.

(b) Conduct a hypothesis test to see whether the data provides evidence that girls undergoing therapy gain weight.

3. Chocolate Chips. The Nabisco company announced in 1998 that every 18-ounce bag of their Chips Ahoy cookies contained at least 1000 chocolate chips. Dedicated Air Force Academy students counted the number of chips in 16 bags, resulting in the following data (Chance, 1999). 1219, 1214, 1087, 1200, 1419, 1121, 1325, 1345, 1244, 1258, 1356, 1132, 1191, 1270, 1295, 1135.

(a) Describe this situation by a statistical model and formulate appropriate null and alternative hypotheses (e.g., is this quantitative or qualitative data, should the hypothesis be formulated in terms of p or μ , is the alternative one-sided or two-sided?)

(b) Answer the research question formulated in (a) using a hypothesis test ($\alpha = 0.05$) and a 95% confidence interval.

(c) What would be the minimal sample size n necessary to keep the type II error probability below 5% when the true population average number of chips per bag is 1100?