STAT 614 HOMEWORK 6 CONFIDENCE INTERVALS (Chapter 5)

1) When a 2016 research study asked whether there is solid evidence of global warming, 87% of the liberals said yes whereas 25% of the conservatives said yes. For conservatives if n = 400, find an interpret a 99% confidence interval. (Use and show R code to produce the confidence interval)

2) When a survey asked whether the government should impose strict laws to discourage people from smoking, a 95% confidence interval for the population proportion responding *yes* was ( .85, .89). Would a 99% confidence interval be wider or, shorter? Why ?

3) A sample of 15 Calculus test scores has a mean of 77 and a standard deviation of 5. As demonstrated in the notes, use a step by step approach to obtain a 99% confidence interval for the mean of the population. SHOW ALL OF YOUR WORK (Do not use R for this problem)

4) Data was analyzed from a study that compared therapies for anorexia. For 17 girls who received the 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) Verify that y(bar) = 7.29, s=7.18, and se = 1.74 (you may use and show R code to verify these results or you may produce the results using a direct non-software approach)

b) To use the t-distribution, **explain** why df = 16 and for a 95% confidence interval and why you would obtain a t score of 2.120

c) Verify that the 95% confidence interval for the population mean change in weight µ for this therapy is (3.6 , 11.0). (you may use and show R code to verify this confidence interval or you may produce the results using a direct non-software approach)

Interpret your interval

5) Based on responses of 1467 subjects in General Social Surveys, a 95% confidence interval for the mean number of close friends equals (6.8, 8.0). Which of the following interpretations is (are) correct?

a) We can be 95% confident that y(bar) is between 6.8 and 8.0.

b) We can be 95% confident that µ is between 6.8 and 8.0.

c) Ninety five percent of the values of y = number of close friends(for the sample) are between 6.8 and 8.0.

d) If random samples of size 1467 were repeatedly selected, then 95% of the time y(bar) would fall between 6.8 and 8.0.

e) If random samples of size 1467 were repeatedly selected, then 95% of the time µ would fall between 6.8 and 8.0.

In chapter 5 of your text book, the following formula is given to find the random sample size *n* ;

n = δ2(z/M)2

where z =1.96 for a confidence level of .95

Refer to your textbook for instructions on how to use this formula and study the examples that your book provides for finding the sample size n.

Solve the following problem

6) An estimate is needed of the mean acreage of farms in Region X. The estimate should be within 100 acres with probability .95. A preliminary study suggests that 400 acres is a reasonable guess for the standard deviation of the farm size.

a) How large a sample of farms is required?

b) A random sample is selected of the size found in part a. The sample has a standard deviation of 800 acres, rather than 400. What is the margin of error for a 95% confidence interval for the mean farm size?