Stat 311 Homework 6

This assignment requires the ice cream, birthweight, and cholesterol data sets provided with the assignment. See the data description documents for the ice cream and birthweight data sets for keys to coded variables and applicable units.

- Problems 1 and 2 use the ice cream data set. Problems 3 and 4 use the birthweight data set, problem 5 uses the cholesterol data set and problem 6 does not require a data set.
- **Use the _T_ distribution for all problems involving means, even if the sample size is large. Use `t.test` for any problems with raw data. Use `tsum.test` if you only have summary data. Do NOT use `z.test` or `zsum.test`.**
- Make sure to interpret all confidence intervals <u>in the context of the problem</u>.
- Be sure to add $conf.int at the end of function calls so that only CI output is shown.
- You will need to install the BSDA library before you start. You need this library for problem 6.

Ice Cream Data Set

1. Find and interpret the 95% confidence interval for the population mean puzzle score. (2 points)

2. Find and interpret the 99% CI for the difference in population mean video scores for students that prefer chocolate and strawberry ice creams. Assume the population variances are not equal. (2 points)

3. Do you agree or disagree with the variance assumption made in Problem 2? Support your answer with some numbers as part of your explanation. (2 points) **[OKAY TO OMIT since not covered until Lesson 7]**

Birthweight Data Set

4. Find and interpret the 95% confidence interval for the population proportion of smokers in the birthweight data set. Assume large sample conditions are met. (2 points)

5. Find and interpret the 90% confidence interval for the difference in the population proportion of low birthweight babies of non-smokers and smokers. Assume large sample conditions are met. (2 points)

6. Are the large sample conditions met for the estimation in Problems 4 and 5? Explain. (1 point)

Cholesterol Data Set

7. This problem was modified from <u>here</u>. This study used a cross-over trial experiment to investigate whether eating oat bran lowered serum cholesterol levels. Twelve individuals were randomly assigned a diet that included either oat bran or corn flakes. After two weeks on the initial diet, serum cholesterol (mmol/L) was measured and then participants were "crossed-over" to the other diet. After two-weeks on the second diet, cholesterol levels were measured again.

   Find and interpret the 95% confidence interval for the population difference in mean serum cholesterol for people eating oat bran and those eating cornflakes. (2 points) **[OKAY TO OMIT since not covered until Lesson 7]**

No Data Set

8. In clinical experiments involving distinct groups of independent samples, it is important that the groups be similar in the important ways that affect the experiment. In an experiment designed to assess the effectiveness of paroxetine for treating bipolar depression, subjects were measured using the Hamilton depression scale with the summary results given below (based on data from a "Double-Blind, Placebo-Controlled Comparison of Imipramine and Paroxetine in the Treatment of Bipolar Depression," by Nemeroff et al., *American Journal of Psychiatry*, Vol. 158, No. 6). [lower scores generally indicate lower depression]

	n	$\bar{x}$	s
Treatment	25	22.5	3.77
Placebo	18	25.2	3.85

Find and interpret the 95% confidence interval for the population difference in mean Hamilton depression scale scores for the treatment and placebo groups. Assume equal population variances. (2 points)