Project 2 **Math 222**
Chi-Squared Tests **Due Friday, Feb 12**

1. The American National Election Studies (ANES) is the leading academically run national survey of voters in the United States and is conducted before and after every presidential election. SDA (Survey Documentation and Analysis) is a set of programs that allows you to analyze survey data and includes the ANES survey as part of its archive. Go to the website `sda.berkeley.edu/` and click on Archive. Go the the 2012 ANES survey. At the left side of the page are many sets of variables that were recorded. Under PRE-ELECTION QUESTIONS, choose the section Liberal vs. Conservative Self-designation and select the variable `LIBCPRE_SELF-REP`. Use this as your column variable. Also under PRE-ELECTION QUESTIONS find the `TRUSTGOV_CORRPT-PRE` variable under the Trust in Government and People section. Use this as your row variable. Set the weight option to No Weight, and then click Run the Table.

   Copy and paste the data from the table into R, and carry out an analysis to see if there is a statistically significant association between self-reported political views and trust in government officials. Be sure the include the details of any statistical tests and use appropriate graphs and charts to analyze and interpret the data.

2. The General Social Survey (GSS) asked this question: "Have you attended religious services in the last week?" The responses for individuals with at least a high school degree are contained in the file services.csv.
   (a) Is there an association between religious attendance and education level? Describe the nature of the association and its strength. Clearly state your hypotheses and conclusions.
   (b) Remove the column for people whose highest degree was high school. Repeat the test for association between religious attendance and education. Do you still get the same results? Explain.
   (c) Combine all three columns of data from the last part, and compare individuals whose highest degree was high school with individuals who have completed a degree beyond high school. Estimate the size of the difference in religious attendance between these two groups.
   (d) Write a short summary explaining the overall relationship between religious attendance and education level.

3. According to Benford's law, numbers that begin with a first (leftmost) non-zero digit of 1 or 2 are more common than those that begin with an 8 or 9. In fact, for numbers that are spread evenly over several orders of magnitude, Benford's law predicts the following distribution of leading digits:

Leading Digit	1	2	3	4	5	6	7	8	9
Expected Proportion	0.301	0.176	0.125	0.097	0.079	0.067	0.058	0.051	0.046

   Do the populations of the counties and cities of Virginia follow Benford's law? Use a chi-squared goodness of fit test. You can find the populations at

   `http://quickfacts.census.gov/qfd/states/51000lk.html`

   Look under Population Estimates for Estimates for all counties.