Investigation 5: Close Friends? (assigned on Tues Jan 24, due on Fri Jan 27)
You may work with in a group of as many as three students on this assignment, handing in one report with all names, provided that you all contribute to the work. You must submit a word-processed report, with computer output integrated into your report as appropriate.

One of the questions asked of a random sample of adult Americans on the 2004 General Social Survey was:

From time to time, most people discuss important matters with other people. Looking back over the last six months - who are the people with whom you discussed matters important to you? Just tell me their first names or initials. The interviewer then recorded how many names each person gave, with the person’s gender.

a) Does this study involve random sampling, random assignment, both, or neither? Explain briefly.

b) State the appropriate null and alternative hypotheses (in symbols) for testing whether American men and women differ with regard to average number of close friends.

The survey responses are displayed in the following graphs, and summary statistics are provided in the table below:

<table>
<thead>
<tr>
<th></th>
<th>Sample size</th>
<th>Sample mean</th>
<th>Sample SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Men</td>
<td>654</td>
<td>1.86</td>
<td>1.78</td>
</tr>
<tr>
<td>Women</td>
<td>813</td>
<td>2.09</td>
<td>1.76</td>
</tr>
</tbody>
</table>

c) Comment on what the histograms reveal about the shapes of the distributions.

d) Conduct a two-sample *t*-test of the hypotheses from a). Show how to calculate the test statistic by hand. Report the test statistic and p-value. (Feel free to use Minitab or the Theory-Based Inference applet.) State your test decision at the .05 significance level, and summarize your conclusion.
e) Produce a 95% confidence interval for the difference in population means (for the number of close friends) between men and women. Show how to calculate the confidence interval by hand. Also write a sentence or two interpreting what the interval reveals.

f) Are the technical conditions for the two-sample \( t \)-test satisfied here? Explain.

g) Now conduct a \( z \)-test of whether these sample data suggest that the proportion of Americans who say they have zero close friends differs between men and women. Report the hypotheses, test statistic, and p-value. State your test decision at the .05 significance level, and summarize your conclusion.