1. A researcher predicts that the percentage of people who do no watch TV is higher now than before the advent of the Internet. Let the $p_1$ denote the population proportion of American adults in 1975 who reported watching no TV. Let $p_2$ denote the corresponding population proportion in 2006.
   a. Set up the null and alternative hypothesis to test the researcher’s prediction.
   b. According to General Social Surveys, 57 of the 1483 subjects sampled in 1975 and 79 of the 1987 subjects sampled in 2006 reported watching no TV. Find the sampled estimates of $p_1$ and $p_2$.
   c. Show the steps of a significance test. Explain whether the results support the researcher’s claim.

2. Do women tend to spend more time on housework than men? If so, how much more? Based on data from the National Survey of Families and Households, on study (by South and G. Spitze, *American Sociological Review*, vol. 59, 1994, pp/ 327-347), reported the results in the table for the number of hours spent in housework per week.

<table>
<thead>
<tr>
<th>Gender</th>
<th>Sample Size</th>
<th>Mean</th>
<th>Standard deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Women</td>
<td>6764</td>
<td>32.6</td>
<td>18.2</td>
</tr>
<tr>
<td>Men</td>
<td>4252</td>
<td>18.1</td>
<td>12.9</td>
</tr>
</tbody>
</table>

   a. Show that this study estimated that, on average, women spend 14.5 more hours a week on housework than men.
   b. Find the standard error for comparing the means. What factor causes the standard error to be small compared to the sample standard deviation for the two groups?
   c. Find a 95% confidence interval comparing the population means for women and men. Interpret the relevance of 0 not falling in the interval.
   d. State the assumptions upon which the interval in c is based.

3. A study of seat belt use involved children who were hospitalized as a result of motor vehicle crashes. For a group of 290 children who were not wearing seat belts, the numbers of days spent in intensive care units (ICUs) have a mean of 1.39 and a standard deviation of 3.06. For a group of 123 children who were wearing seat belts, the number of days in ICU have a mean of 0.83 and a standard deviation of 1.77 (based on data from “Morbidity Among Pediatric Motor Vehicle Crash Victims: The Effectiveness of Seat Belts,” by Osberg and Di Scala, *American Journal of Public Health*, Vol. 82, No. 3). Using a 0.05 significance level, is there sufficient evidence to support the claim that the mean number of days spent in the ICU for the population of children not wearing seat belts is different from the a mean number of days spent in ICU for the population of children wearing seat belts? Based on the result, is there significant evidence in favor of seat belt use among children? (What is the p-value, Type I error?, Type II error?)