In an experiment reported in *Newsweek* magazine, 164 pregnant, HIV-positive women were randomly assigned to receive AZT during pregnancy and 160 pregnant, HIV-positive women were randomly assigned to a control group which received a placebo (“sugar” pill). Of those in the AZT group, 13 had babies who were HIV-positive, compared to 40 HIV-positive babies in the placebo group.

Let $p_z$ denote the proportion of all potential AZT-takers who would have HIV-positive babies and let $p_s$ denote the proportion of all potential placebo-takers who would have HIV-positive babies.

1. Perform a hypothesis test to investigate whether AZT reduces the proportion of HIV-positive babies born to HIV-positive mothers.

2. Find a 95% confidence interval for estimating the difference in population proportions $p_z - p_s$. (If you have a TI-83/84 calculator, use the 2-PropZInt feature, located in the STAT TESTS menu, to find the confidence interval for estimating $p_z - p_s$).

3. Write a one-sentence description of what this interval says about the difference in population proportions. In particular, comment on the meaning of whether the interval includes zero, contains only negative values, or contains only positive values. (Please be sure that your comments relate to this context of HIV-positive babies).
4. Find a 98% confidence interval for estimating $p_2 - p_s$. Record the interval below and indicate how it differs from the interval you found in part (2). Does the interval include zero?

5. NIMBY. A recent Gallup Poll randomly split a sample of 1003 randomly selected U.S. adults into two groups.

$n_1 = 502$ of the respondents were asked,
“Overall, do you strongly favor, somewhat favor, somewhat oppose, or strongly oppose the use of nuclear energy as one of the ways to provide electricity for the U.S.?”

266 were either “somewhat” or “strongly” in favor.

The other $n_2 = 501$ respondents were asked,
“Overall, do you strongly favor, somewhat favor, somewhat oppose, or strongly oppose the construction of a nuclear energy plant in your area as one of the ways to provide electricity for the U.S.?”

200 were either “somewhat” or “strongly” in favor.

How large is the difference between the proportion of U.S. adults who think nuclear energy is a good idea and the proportion who would be willing to have a nuclear power plant in their area?

Construct and interpret a 95% confidence interval for $p_1 - p_2$ where $p_1 =$ the proportion of U.S. adults that think nuclear energy is a good idea, $p_2 =$ the proportion of U.S. adults that would be willing to have a nuclear power plant in their area.

$n_1 = \quad x_1 = \quad \hat{p}_1 = \quad n_2 = \quad x_2 = \quad \hat{p}_2 =$

$(\hat{p}_1 - \hat{p}_2) \pm 1.96 \sqrt{\frac{\hat{p}_1(1-\hat{p}_1)}{n_1} + \frac{\hat{p}_2(1-\hat{p}_2)}{n_2}}$