Assignment 2. Due Sept 25.

We have a population of size $N$ which is very large and can be considered to be infinite. It consist of two groups of equal size. An opinion survey is to be conducted that results in a simple yes or no answer and the proportion of "yes" in the entire population is to be determined. A sample of size $n$ is drawn and the proportion of yes among them is offered as an estimate. If in the entire population the proportion is $p = \frac{p_1 + p_2}{2}$ where $p_1, p_2$ are the proportions in the two groups, exactly how much reduction in variance is obtained by selecting a sample of size $\frac{n}{2}$ from each group (rather than selecting $n$ from the entire population)?