Part of a usability study to assess voting machines measured the time on task (TOT) of voters casting ballots (efficiency). Specifically, the data are for the same ballot cast on two different voting machines at the same location (called a precinct). Your job will be to perform a "t" test on these data and draw conclusions about which voting machine is better.

A few background items:

* The voters (participants/users) are a homogeneous group.
* Voters were randomly assigned to the voting machines.
* Thus, the two groups of voters (one group using the DRE voting machine, and the other  using the OptiScan voting machine) have equal variances.
* We have no information to indicate that one voting machine will be better than the other.  If you need more information, use the Internet to find web sites such as http://www.graphpad.com/quickcalcs/ttest1.cfm. (Excel has a "t" test function although it may not be currently installed in your version; you would then add it in.)  The spreadsheet (also in this Course Content folder) contains the data and some intermediate statistical values for use in the "t" test.)
* Question1 – What is the null hypothesis in this usability study? (Discussed in class, but easily found on the Internet)
* Question 2 – How many degrees of freedom are in ***each*** group? (the DRE and OptiScan groups)?
* Question 3 – Which "t" test should be used – paired, unpaired/equal variance, unpaired/unequal  variance?)
* Question 4 – Should a one-tail, or two-tailed test be used, and why?
* Question 5 – What is the t value?
* Question 6 – Is the t value significant at the 0.05 level, and why?
* Question 7 – Is the t value significant at the 0.01 level, and why?
* Question 8 – Based on (1) the above analysis, and (2) the number of ballots completed (see spreadsheet), which voting machine has better usability, and why?