

Voting systems: Homework

Mathematics 170

due Thursday, Apr. 10

1. *Mathematics and Politics*, pg. 128, problems 3 and 4.
2. *Mathematics and Politics*, pg. 129, problem 5. To disprove any of them, you just need to find a single example where it doesn't happen.
3. *Mathematics and Politics*, pg. 130, problem 9.
4. *Mathematics and Politics*, pg. 130, problem 10. (Hint: What would happen if there were two Condorcet winners?)
5. *Mathematics and Politics*, pg. 130, problem 11. Suggestion: To prove "if and only if," you need to prove it both ways separately. Show that if a particular candidate is a Condorcet winner, then it is the social choice with sequential pairwise voting no matter what the agenda is. Then do the contrapositive of the converse: if a candidate is not a Condorcet winner, then there is some agenda which makes that candidate lose. Try to set up the agenda in this case to eliminate the candidate as early as possible.