

Math 1007 Summer 2025
Mathematics and Politics
Homework 3
Due Monday, July 7

Name:

- (1) Consider the simple majority method for a multi-candidate election: “Any candidate who gets a majority of the votes is a winner”. Explain why (and by what specific part of the definition) this is not a social choice function for a multi-candidate election.
- (2) Is the parity method “any candidate who gets an even number of first-place votes wins” a valid social choice function?
- (3) Do *The Mathematics of Politics* problem 2.1
- (4) Do *The Mathematics of Politics* problem 2.2
- (5) In which of these methods can a candidate with a *majority* of the first-place vote lose the election? Give an argument why they can’t, or an example of a profile where they do.
 - Plurality
 - Borda
 - Hare
 - Coombs
 - Copeland
- (6) Do *The Mathematics of Politics* problem 2.8
- (7) Do *The Mathematics of Politics* problem 2.10

Name: _____

- (8) In a *sequential agenda* method, head-to-head contests are conducted between the candidates following a fixed order. In each round, the candidate who wins advances to the next round and faces the next candidate on the agenda.

Consider the tabulated profile

7	5	6
A	B	C
B	C	A
C	A	B

- (a) What happens if the agenda starts with A facing B , and then the winner faces C ?
- (b) What happens if the agenda starts with A facing C , and then the winner faces B ?
- (c) What happens if the agenda starts with B facing C , and then the winner faces A ?
- (d) Who wins if we use the Copeland method? How is this related to the previous questions?