

ECON 203.01 - Problem Set 5

March 30, 2026

1. The following table lists the way that 5 different voters rank five different alternatives. Is there a Condorcet winner under pairwise majority rule for this example? Explain briefly.

choices	voter#1	voter#2	voter#3	voter#4	voter#5
first choice	w	v	x	y	z
second choice	v	x	z	z	w
third choice	x	y	v	v	v
fourth choice	y	z	w	w	y
fifth choice	z	w	y	x	x

2. Answer the following questions:

a Give an example in which there is some arrangement of the alternatives such that (i) preferences are single-peaked for every voter except one ; and (ii) there is no Condorcet winner.

b "If, for a given set of voters and alternatives, there exists a Condorcet winner, then the Condorcet winner will get the highest score using the Borda count." True or false? Explain briefly.

c Give an example of a voting rule in which adding a "clone" (a new alternative which is very similar to one of the existing alternatives) could change the outcome.

3. Suppose that policies could be represented by pairs of numbers (such as the sales tax rate, and the level of carbon emissions allowed). Suppose that each of 5 voters i had a preferred policy (x_i, y_i) , and ranked policies by how far they were from her preferred policy (the further away from her preferred policy, the less she likes it). If the preferred policies of the 5 voters were $(1, 1)$, $(1, 5)$, $(3, 3)$, $(5, 1)$ and $(5, 5)$, would there be a policy which defeats all others in a pairwise vote? If so, which one? If not, why not?

4. Suppose that the social choice rule ranks y above x when the two voters' preferences are as listed in the table below. Suppose as well that the social choice rule is transitive, and obeys the Pareto principle ("unanimity") and the Independence of Irrelevant Alternatives. Show that the social choice rule must always rank y above z whenever voter#2 ranks y above z .

choices	voter#1	voter#2
first choice	x	y
second choice	z	x
third choice	y	z