Economics 220, Jan 2022 **Your Name:** Dhyey Dharmendrakumar Mavani
Homework 7

1. The 1,000 citizens of a town are voting on whether to build a new public park. The overall cost of the park is C.

If the park is built,

- 400 citizens would gain a benefit of $300 from the park
- 200 citizens would gain a benefit of $500 from the park
- 400 citizens would gain a benefit of $1000 from the park

For what values of C should the park be built to maximize total surplus?

If $C < \$[400(300) + 200(500) + 400(1000)]$

$\Rightarrow \boxed{C < \$620{,}000}$

For what values of C will the park be built under majority rule, assuming the cost is shared equally among all citizens?

As long as, $C < \$500000$ we can say that under majority rule, park will be built

If cost is shared equally, then each would pay $\frac{C}{1000}$

if $\frac{C}{1000} > \$1000$, then no one would agree ⊗ $\Rightarrow$ park not built

if $\$500 < \frac{C}{1000} < \$1000$, then 400 agrees & 600 disagree, so under majority ⊗ park not built

if $\$300 < \frac{C}{1000} < \$500$, then 600 agrees & 400 disagree, so under majority ✓ park built

if $(C/1000) < \$300$ then all vote yes and park will be built ✓.

Suppose the cost is not shared equally. Specifically, suppose that the 400 citizens who would gain $1000 each are exempt from taxes (they can vote, however).

For what values of C will the park be built under majority rule, assuming the cost is shared equally among the 600 citizens in the first two groups?

The tax imposed by government would be $\frac{C}{600}$ each for the first two groups

$\Rightarrow$ 400 people would always agree as they are free-riders.

$\Rightarrow$ If $(C/600) > \$500$ then 600 people disagree, 400 agree $\Rightarrow$ ⊗

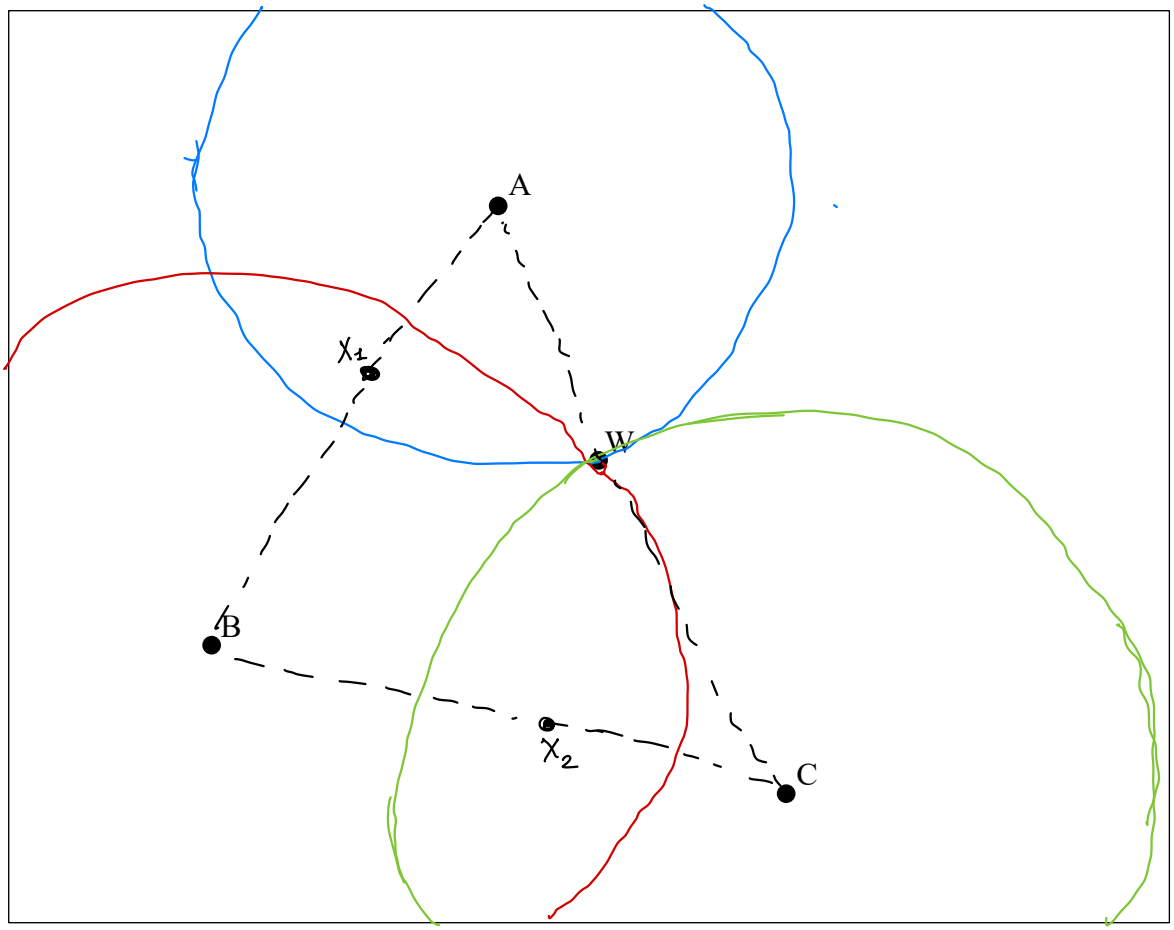
$\Rightarrow$ If $\$300 < (C/600) < \$500$ then 600 people agree, 400 disagree $\Rightarrow$ ✓

$\Rightarrow$ If $(C/600) < \$300$ then Everyone would agree, $\Rightarrow$ ✓

In the given conditions, under majority rule, park will be built if $\boxed{C < \$300{,}000}$

2. Three neighboring farms, labeled A, B and C, have decided to build a shared well; now they need to decide where to put it. The farm locations are shown on the map below. The farmowners are considering placing the well at point W, as shown.

Are there other proposed locations for the well that would be preferred to W by a majority of the farmowners? If so, indicate such a revised proposal on the map; call it X. If not, explain why not.



Is there a well site that would be a Condorcet winner? If so, indicate it on the map. If not, explain why not.

I don't think there would be a condorcet winner.

majority wins ⇐ In the case of X_1, A & B votes in favor & C votes against

majority wins ⇐ In the case of X_2, B & C votes in favor & A votes against

We can always thus find a point making 2 people better off and one worse off. This means there are multiple Condorcet cycles on the map leading to no absolute Condorcet winner.