

# Quiz 1A, Math of Democracy

Fall 2018, Dr. Adam Graham-Squire

Name: Key

1. Given the following preference schedule, find the winner of the election using each of the following five methods: Plurality, Top-two run-off, Instant runoff, Pairwise Comparison, and Borda Count.

You should show/explain your work/reasoning for each method.

Number of voters	14	10	8	4	1
1st choice	A	C	D	B	C
2nd choice	B	B	C	D	D
3rd choice	C	D	B	C	B
4th choice	D	A	A	A	A

2. Given the results from above, which candidate do you think should be the winner of the election? Explain your reasoning.

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- Plurality: A wins with 14 votes
  - Top-two runoff: B and D drop in first round with only 8, and 4 votes. All of their votes go to C, who wins in Round 2, 23 to 14. C wins
  - Instant runoff: B drops out with only 4 votes. Their votes go to D, who now has 12, which is more than C. ~~C~~ C drops and their votes go to D, who wins 23 to 14 over A. D wins
  - Pairwise Comp:
 

A vs B: B wins	B vs C: C wins, 19 to 18
A vs C: C wins	B vs D: B wins
A vs D: D wins	C vs D: C wins

7.5 for Methods

C wins Pairwise

3-2-1-0

Borda: A: 42

$$B: 28 + 20 + 8 + 12 + 1 = 69$$

$$C: ~~14~~ + 30 + 16 + 4 + 3 = 67$$

$$D: 10 + 24 + 8 + 2 = 44$$

or

79
106
104
81

2

B wins the Borda Count!

(2) Many answers are possible. Both C and B have strong arguments, as they were the biggest winners in Borda and Pairwise.

2.5

Since C also won the top-two runoff, I would give them the overall win.

(This is a matter of opinion, not the "correct" answer).