

Voting Theory in-Class Review:

Name _____

Part 1

Place	130	120	100	150
1st	P	T	T	S
2nd	R	R	R	R
3rd	S	S	P	P
4th	T	P	S	T

PRST
130 150 220
130 130 120
P1R
RNS
RT

Use the table to calculate winners for the following methods:

- Borda: RTS
- Plurality: RS
- Run Off: S
- Approval (if we assume people approve of their top 2 choices): R

Part 2: Consider the weighted voting situation in which voters A, B, C, and D have 10, 4, 4, and 3 votes respectively.

- List all of the coalitions.
A10 (AB) BC (AC) BD CD (ABC) (ABD) (ACD) (BCD) none (all)
- If you need a majority of 11 votes to pass an issue, which are the winning coalitions? Circle them above.
- Determine the power index for each voter:
A: 6 B: 2 C: 2 D: 2

Part 3: Arrow's conditions for fair voting. Which condition is broken in the following scenarios?

- In class, we looked at an example of pairwise voting being used to determine the restaurant that the foreign language clubs would eat at. Each student preferred the French restaurant over the German restaurant, yet the German restaurant won. Which of Arrow's conditions was violated?
unanimity
- The class voted for a favorite color. Ms. Stax decides to determine the winner by selecting her own preference schedule. After all, this is "Ms. Stax Land" and Ms. Stax loves blue. Which of Arrow's conditions would she be violating?
non-dictatorship
- In the 2000 election Florida was a crucial state. More voters preferred Al Gore over George W. Bush, but when Ralph Nader entered the race, it caused Bush to win the state and therefore the presidency. Which condition did this violate?
Freedom from Irrelevant Alternatives

Part 4

Number of voters	7	7	8	5
First choice	A	C	D	B
Second choice	B	B	C	A
Third choice	C	A	A	B
Fourth choice	D	D	A	C

- How many people voted in this election? 27
- What is the minimum number of votes needed for a majority? Is there a majority candidate? 14; NO
- Determine the winner using the Plurality Method. How many 1st place votes does each candidate get?
A: 7, B: 7, C: 8, D: 5
- Determine the winner using the Borda Count Method. How many points does each candidate receive?
A: 27, B: 27, C: 27, D: 27
- Determine the winner using the Sequential Run Off. Who is eliminated in the 1st round? B Who is eliminated in the second round? C Who is the overall winner? A
- Determine the winner using the Pairwise Comparisons Method Alphabetically. C Is it possible to make A the winner? NO
- Is there a Condorcet candidate? C

Part 5

Number of voters	5	3	3	5	3	2	3
First choice	A	A	C	D	D	B	B
Second choice	B	D	E	C	C	C	E
Third choice	C	B	D	B	E	B	A
Fourth choice	D	C	A	E	B	A	C
Fifth choice	E	E	B	A	E	A	D

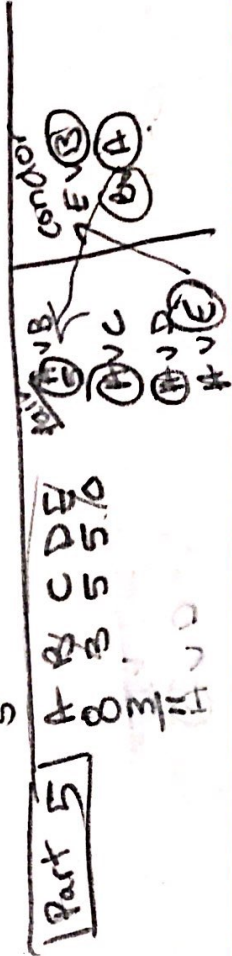
- Determine the winner using the Plurality Method. A
- Determine the winner using the Borda Count Method. A
- Determine the winner using the Sequential Run Off. A
- Determine the winner using the Pairwise Comparisons Method by alpha. E
- Is there a majority candidate? NO
- Is there a Condorcet candidate? NO

Part 4
A: 7
B: 7
C: 8
D: 5

A: 7(4) + 7(2) + 8 + 5(3) = 65
B: 21 + 21 + 16 + 20 = 78
C: 14 + 28 + 24 + 10 = 76
D: 7 + 7 + 32 + 5 = 51

Pairwise
A vs B: 7 vs 7
A vs C: 7 vs 8
A vs D: 7 vs 5
B vs C: 7 vs 8
B vs D: 7 vs 5
C vs D: 8 vs 5

Condorcet
A vs B: 7 vs 7
B vs C: 7 vs 8
C vs D: 8 vs 5



Part 5