TOPIC 4: PROBABILITY (VOTING PROCEDURES)

Compute the winner of the election using each of the methods provided. Show your work.

Borda's → Total votes: $44 + 30 + 52 + 21 = 147$

Votes		44	30	52	21
1st choice	2	A	C	B	C
2nd choice	1	B	A	A	B
3rd choice	0	C	B	C	A

Majority
50% plus 1

Winner by majority ballot: $\frac{147}{2} = 73.5$ ... No one has 74 votes so there is **NO MAJORITY WINNER**

Plurality
Has 1st place votes

Winner by plurality ballot: A has 44 votes
B has 52 votes → **B wins with 52**
C has 30 + 21 = 51 votes

Borda's
Values to 1st, 2nd, 3rd

Winner by Borda's method:

A: $2(44) + 1(30 + 52) + 0(21) = 170$

B: $2(52) + 1(44 + 21) + 0(30) = 169$

C: $2(30 + 21) + 1(0) + 0(44 + 52) = 102$

→ **A wins with 170**

Condorcet's
A vs B
A vs C
B vs C

Winner by Condorcet's criterion:

A vs B: A: 44 + 30 = 74   B: 52 + 21 = 73   A wins
A vs C: A: 44 + 52 = 96   C: 30 + 21 = 51   A wins
B vs C: B: 44 + 52 = 96   C: 30 + 21 = 51   B wins

→ **A is the winner**

Elimination
Get rid of person/w/ least 1st place votes and give their votes to 2nd place.

Winner by elimination method:

A has 44   ← A has the least so they are eliminated. If you look in the box below the first place A, those people's 2nd choice was B. So B gets those 44 votes.
B has 52
C has 51

B now has 52 + 44 = 96
C has 51

→ **B wins**

TOPIC 4: PROBABILITY (VOTING PROCEDURES)

Compute the winner of the election using each of the methods provided. Show your work.

Total votes: $23+18+17+12 = 70$

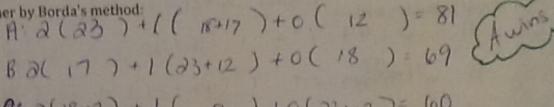| Votes		23	18	17	12
1st choice	2	A	C	B	C
2nd choice	1	B	A	A	B
3rd choice	0	C	B	C	A

majority
$50\% +1$

Winner by majority ballot: $\dfrac{70}{2} = 35 + 1 = 36$ A has 23   No majority
B has 17   winner
C has $18+12 = 30$

plurality
most 1st place
votes

Winner by plurality ballot:

C wins with 30 1st place votes.

Borda's
2 votes for
1st, 2nd, 3rd

Winner by Borda's method:
A: $2(23) + 1(18+17) + 0(12) = 81$ A wins
B: $2(17) + 1(23+12) + 0(18) = 69$
C: $2(18+12) + 1(0) + 0(23+17) = 60$

Condorcet's
versus

Winner by Condorcet's criterion: winner
A vs B: A: $23+18=41$ B: $17+12=29$ A
A vs C: A: $23+17=40$ C: $18+12=30$ A   A wins
B vs C: B: $23+17=40$ C: $18+12=30$ B

Elimination
get rid of
lowest 1st place.

Winner by elimination method:
A has 23   ← B has the lowest so
B has 17   they are eliminated.
C has 30   votes go to A because those
                         17 voted A as their
                         2nd choice.

A now has $23+17 = 40$
C still has 30   A wins