Worksheet 3: Voting Theory (Borda Count & Copeland's Method)

1. A different class is voting on what kind of ice cream to have. The choices are strawberry (S), chocolate (C), and vanilla (V). The students in the class ranked their ice cream choices and the following preference table was constructed.

Points	# votes	8	9	6	10
3	1st choice	S	~~V~~	S	C
2	2nd choice	~~V~~	C	C	~~V~~
1	3rd choice	C	S	~~V~~	S

tally

S	8+6 = 14
V	9
C	10

(a) How many students were in the class? $8+9+6+10 = 33$

(b) In the space above, tally the first choice votes.

(c) Is there a majority winner? No. Majority requires more than $\frac{33}{2} = 16.5$

(d) Who is the plurality winner? Strawberry with 14 votes.

(e) Who is the winner of this election using IRV? (show work below) chocolate

From above *, no majority. V is eliminated in round 1.

Round 2 tally

S	8+6 = 14
C	9+10 = 19 ← majority.

(f) Who is the winner of this election using Borda Count? (show work below) vanilla

S: $8(3) + 9(1) + 6(3) + 10(1) = 61$

24 + 9 + 18 + 10 =

V: $8(2) + 9(3) + 6(1) + 10(2) = 69$

16 + 18 + 6 + 20 =

C: $8(1) + 9(2) + 6(2) + 10(3) = 68$

8 + 18 + 12 + 30 =

Here's the preference schedule again.

# votes	8	9	6	10
1st choice	S	V	S	C
2nd choice	V	C	C	V
3rd choice	C	S	V	S

(g) Compare all the head-to-head matchups. Who wins in each matchup? Is there a Condorcet winner?

matchup	S vs V	S vs. C	V vs. C
tally	S: 8+6 = 14 V: 9+10 = 19	S: 8+6 = 14 C: 9+10 = 19	V: 8+9 = 17 C: 6+10 = 16
winner	V	C	V

Vanilla is the Condorcet winner!

(h) Who is the winner using Copeland's method?

tally points :

V	2
C	1
S	0

← Vanilla wins using Copeland's Method.

(i) This sheet has **four** different voting methods (plurality, IRV, Borda, and Copeland) for determining a winner. Make an argument for why one is the preferred method in this case. (That is, you should pick the method for which you can make a strong argument.)

There are many correct answers here. I offer a sample.

One Answer In this case, the plurality winner is not a majority. So moving to another method makes sense. With three candidates, Copeland's is really clear: Vanilla wins every one-to-one.