

Discrete Math  
 Lesson 1.3 – Borda Count Method  
 Exercise

Name \_\_\_\_\_

Period \_\_\_\_\_

The principal at Washington Elementary School is retiring and the School Board must hire a new principal. The four finalists for the job are Ms. Amaro, Mr. Burr, Mr. Castro, and Ms. Dunbar (candidates A, B, C and D respectively). After interviewing the four finalists, each of the eleven board members ranks the candidates by means of a preference ballot.

Preference Schedule for Principal School Election			
Number of Voters	6	2	3
1 <sup>st</sup> Choice	A	B	C
2 <sup>nd</sup> Choice	B	C	D
3 <sup>rd</sup> Choice	C	D	B
4 <sup>th</sup> Choice	D	A	A

- How many board members voted in this election? 1. \_\_\_\_\_
- How many first-place votes are needed for a majority? 2. \_\_\_\_\_
- Which candidate is the winner using the Plurality Method? 3. \_\_\_\_\_
- Is the winner a majority candidate? Explain your answer. \_\_\_\_\_

5. Complete the table by calculating the Borda point totals for each candidate.

Candidate	Borda Point Total
A	$4(6) + 1(2) + 1(3) =$
B	
C	
D	

- Which candidate is the winner using the Borda Count Method? 6. \_\_\_\_\_
- Based on your answers in 4 and 6 above, does the Borda Count Method violate a fairness criterion in this election? If so, which one and why?  
 \_\_\_\_\_  
 \_\_\_\_\_

8. Explain how a Condorcet candidate is determined. \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Complete the table to determine the outcome of head-to-head comparisons in the principal election.

Head-to-Head Comparison	Score	Winner
A vs. B	6 – 5	A
A vs. C		
A vs. D		
B vs. C		
B vs. D		
C vs. D		

9. Is there a Condorcet Candidate? If so, who is it?

\_\_\_\_\_

10. Based on your answers in 6 and 9 above, does the Borda Count Method violate another fairness criterion in this election? If so, which one and why?

\_\_\_\_\_

\_\_\_\_\_

11. The School Boards bylaws require the use of the Borda Count method for determining the winner of the school board election for a new principal. Under these rules, the new principal is \_\_\_\_\_. On the other hand, when we look more closely at the results of the election, we see that the **majority candidate** is \_\_\_\_\_ and the **Condorcet candidate** is \_\_\_\_\_.

12. Because of its bylaws, the School Board must appoint the Borda Count winner as the new principal. But the results have created a controversy among the board members, so they decide to review the bylaws at the next meeting to determine if they should change the voting method for future elections. If you were a board member, what voting method would you support? Give at least two reasons to support your decision.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

13. Read page 9-10 in your textbook and answer the following questions.

a. TRUE or FALSE. Violations of the majority fairness criterion and the Condorcet fairness criterion are common.

b. TRUE or FALSE. If a candidate wins the majority of 1<sup>st</sup> place votes in an election, that candidate will also win all of its head-to-head comparisons.

c. TRUE or FALSE. Experts think the Borda Count method is one of the best voting methods.

d. TRUE or FALSE. The Borda Count method is widely used in a variety of settings to include sports awards, football polls, and in the selection of corporate executives and school principals.