

Aubrey, Ben, Charlie, Derek, and Emily are running for class president. Use the following preference schedules to determine the winner as indicated.

# of votes	20	22	12	9
First Choice	A	B	E	D
Second Choice	C	D	C	E
Third Choice	D	C	D	C
Fourth Choice	E	A	A	A
Fifth Choice	B	E	B	B

- Determine the winner using a 5-4-3-2-1 Borda count.
- Determine the plurality winner.
- Determine the runoff winner.
- Determine the sequential runoff winner.
- Determine the Condorcet winner, if there is one.
- Suppose that this election is conducted by the approval method and all the voters decide to approve of the first three choices on the preference schedule. Determine the approval winner.
- Your class is ranking soda and someone suggests that the names of the sodas be placed in a hat and the group ranking be determined by drawing them from the hat. Which of Arrow's conditions does this method violate?
- Consider a situation in which voters A, B, and C have 1, 3, and 2 votes respectively and 4 votes are needed to pass an issue.
 - List all winning coalitions and their vote totals.
 - Find the power index of each voter.
- Four people have divided a cake into four portions that each considers fair, and then a fifth person arrives. Select one of the methods that you have studied and describe how it could be used to divide the four existing portions so that each of the five people receives a fair share in their opinion.
- Sam and Madeline want to divide a cake so that Sam feels that she gets two-fifths of it and Madeline feels that she gets three-fifths. How can this be done?

11. Anne, Beth, and Jay are heirs to an estate that includes a computer, a used car, a stereo, and \$6,000. The will states that Anne is to receive 25%, Beth receives 35%, and Jay receives 40%. Each heir has submitted bids for the items in the estate as summarized in the following table.

	Anne	Beth	Jay
Computer	\$1,800	\$1,500	\$1,650
Car	\$2,600	\$2,400	\$2,000
Stereo	\$1,000	\$800	\$1,200

Determine the properties that each person receives and the final amount of cash that he or she receives or pays.

	Anne	Beth	Jay
Total of Bids & Cash			
Fair Share			
Items Received			
Values of Items Received			
Initial Cash Received			
Share of Remaining Cash			
Final Settlement			

12. States A, B, C, and D have populations of 647, 247, 106, and 360 respectively. There are 85 seats to be apportioned among them.

- What is the ideal ratio?
- What is the tentative apportionment by the methods of Hamilton, Jefferson, Webster, Hill-Huntington?
(Fill in the chart below).

Tentative Apportionment

Final Apportionment

State Population	Quota	Hamilton	Jefferson	Webster	Geometric Mean	Hill-Huntington	Hamilton	Jefferson	Webster	Hill-Huntington
A 647										
B 247										
C 106										
D 360										
Total Seats Awarded										

c. Find the Jefferson Adjusted Ratios for each state, if needed.

A: _____ B: _____ C: _____ D: _____

d. Find the Webster Adjusted Ratios for each state.

A: _____ B: _____ C: _____ D: _____

e. Find the Huntington Hill Hamilton Adjusted Ratios for each state.

A: _____ B: _____ C: _____ D: _____

f. State the final apportionment for each state in the table above.