**Chapter 1**

An election at school is being held to determine the next senior class president. The preference schedule is provided below.

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| |  |  |  |  |  | | --- | --- | --- | --- | --- | | Number of Voters | 20 | 22 | 12 | 9 | | 1st Choice | D | C | B | A | | 2nd Choice | E | A | C | D | | 3rd Choice | A | B | E | B | | 4th Choice | B | D | A | C | | 5th Choice | C | E | D | E | | |
| 1. | Determine the winner using the Plurality Method. |
| 2. | Determine the Borda Count winner. |
| 3. | Determine the winner using the Plurality with Elimination Method. |
| 4. | Complete the table. Determine the winner using the Pairwise Comparison Method.   |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | |  | A | B | C | D | E | Points | | A | X |  |  |  |  |  | | B |  | X |  |  |  |  | | C |  |  | X |  |  |  | | D |  |  |  | X |  |  | | E |  |  |  |  | X |  | |
| 5. | If E is eliminated, what is the new preference schedule?   |  |  |  |  |  | | --- | --- | --- | --- | --- | | Number of Voters | 0000 | 0000 | 0000 | 0000 | | 1st Choice |  |  |  |  | | 2nd Choice |  |  |  |  | | 3rd Choice |  |  |  |  | | 4th Choice |  |  |  |  | |

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| 6. | Define the majority criterion. |
| 7. | Define the Condorcet criterion. |
| 8. | Define the monotonocity criterion. |
| 9. | Define the independence of irrelevant alternatives criterion. |
| **Chapter 2**  Weighted Voting System: [24: 18, 13, 7] | |
| 10. | List all the Banzhaf coalitions. Circle the winning coalitions. |
| 11. | Determine the Banzhaf power distribution in percent.   |  |  |  |  | | --- | --- | --- | --- | |  | P1 =00 | P2 =00 | P3 =00 | |  |  |  |  | |  |  |  |  | |  |  |  |  | |  |  |  |  | |  |  |  |  | |  |  |  |  | | Power Distribution |  |  |  | |
| 12. | Determine the Shapley-Shubik power distribution in percent.   |  |  |  |  | | --- | --- | --- | --- | |  | P1 =00 | P2 =00 | P3 =00 | |  |  |  |  | |  |  |  |  | |  |  |  |  | |  |  |  |  | |  |  |  |  | |  |  |  |  | | Power Distribution |  |  |  | |
| 13. | Which weighted voting system will produce i) a dictator, ii) a dummy, iii) a player with veto power? Select all that apply.  a) [10: 15, 7, 2] b) [16: 15, 7, 2] c) [21: 15, 7, 2] d) [23: 15, 7, 2] |
| **Chapter 3** | |
| Abraham, Benjamin, and Caleb are sharing a round half vanilla-half chocolate cake. The following table gives the value of each slice in the eyes of each of the players.   |  |  |  |  | | --- | --- | --- | --- | |  | Abraham | Benjamin | Caleb | | Vanilla | 15 | 20 | 18 | | Chocolate | 19 | 23 | 26 | | |
| 14. | Determine the fair share of each player. |
| 15. | Using the lone-divider method, how would Abraham cuts up the cake into three equal fair shares? |
| 16. | Following problem #15, what would be each person’s bid? |

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| 17. | If Abraham, Benjamin, and Caleb bid as shown in the table, what are the possible fair divisions?   |  |  |  |  | | --- | --- | --- | --- | |  | Abraham | Benjamin | Caleb | | Bids | s1, s2 | s1, s3 | s2, s3 | |
| 18. | Using the lone-chooser method, if Abraham divides first, how would he divide the cake? |
| 19. | Following problem #18, if Benjamin were to divide next, which share would he choose? |
| 20. | Using the last diminisher method, where the order of play is Abraham, Benjamin, and Caleb, and Abraham starts with 180° of vanilla; who would diminish at the end of Round 1? |
| 21. | Following problem #20, what would the fair shares be for the two remaining players in Round 2? |

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| 22. | Using the method of sealed bids, what is the first settlement (without surplus) given the table below?   |  |  |  |  | | --- | --- | --- | --- | |  | Abraham | Benjamin | Caleb | | Blue Ray player | 80 | 90 | 95 | | MP3 player | 70 | 75 | 100 | | Cell Phone | 35 | 60 | 55 | | Fair Share |  |  |  | |
| 23. | Following problem #22, what is the total surplus (before each person receives part)? What is the final settlement? |
| 24. | Using the method of markers, what is the initial allocation (without surplus) given the information below? |
| **Chapter 4** | |
| The convenience store down the street is under new management. The manager is making the work schedule for the 20 employees.   |  |  |  |  | | --- | --- | --- | --- | | Shift | Morning | Afternoon | Night | | Number of Customers | 200 | 320 | 275 | | |
| 25. | Apportion the shifts using the Webster Method. |

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| 26. | Using the Webster Method, what is the initial standard quota for the afternoon shift? What does this represent? |
| 27. | Using the Hamilton Method, we get the following standard quotas in the table. What is the apportionment?   |  |  |  |  | | --- | --- | --- | --- | | Shift | Morning | Afternoon | Night | | Standard Quota | 5.03 | 8.05 | 6.92 | |
| 28. | Using the Jefferson’s Method, what are the initial modified quotas? What should be adjusted?   |  |  |  |  | | --- | --- | --- | --- | | Shift | Morning | Afternoon | Night | | Quota |  |  |  | |
| 29. | Using the Adam’s Method, what are the initial modified quotas? What should be adjusted?   |  |  |  |  | | --- | --- | --- | --- | | Shift | Morning | Afternoon | Night | | Quota |  |  |  | |
| 30. | Given the following table, what is the total number of customers if there are 25 employees? Round to the nearest whole number.   |  |  |  |  | | --- | --- | --- | --- | | Shift | Morning | Afternoon | Night | | Standard Quota | 10.23 | 15.29 | 4.54 | |