Exam 4 Topics

Chapter 13 - Fair Division

- Describe the goal of a fair-division problem and the terms equitable, envy-free, and Pareto-optimal.
- Divide a set of items using the adjusted winner procedure.
- Divide one or more items using the Knaster Inheritance Procedure.
- Answer questions about dividing a “cake” using divide-and-choose and the Steinhaus Proportional Procedure (Lone Divider).
- Determine the winner and amount paid in Vickrey auctions.
- Determine the winner, amount paid, and progression of bidding in eBay auctions.

Chapter 14 – Apportionment

- Calculate the geometric mean of two numbers, and calculate q* for a particular quota.
- Round a number by rounding up, rounding down, rounding to the nearest integer, and rounding according to the geometric mean discussed in class.
- Explain the difference between quota and apportionment.
- Calculate the apportionment of seats in a representative body using the methods of
  - Hamilton
  - Jefferson
  - Webster
  - Hill-Huntington.
- Calculate the adjusted divisor for each of the divisor methods.
- Know which apportionment methods favor large states, which favor small states, and which are population-size neutral.
- Know the paradoxes (Alabama, New States, and Population) and which apportionment method could experience the paradoxes.
- State the quota condition and be able to tell which apportionment methods satisfy it and which do not.
Chapter 9 - Voting Methods

- Know the difference in a single vote and preference list ballot.
- Given the preference list for voters, determine the winner using:
  - Majority rule
  - Condorcet’s method
  - Plurality
  - Borda count and other rank methods
  - Hare system
  - Sequential Pairwise voting with an agenda
- Use the approval voting method to determine one or more winners in an election.
- Know what it means for a voting system to be manipulable and which systems are and are not manipulable.

- Recognize when the following fairness criteria are violated:
  - Majority Rule
  - Condorcet Criterion
  - Monotonicity Criterion
  - Independence of Irrelevant Alternatives