
 Name:

1. Please sign your name after the following statement.
I understand that this is a take home test and, while I may consult my own notes, worksheets, homework and textbook, I will not discuss my work with other students or seek assistance from any other sources.

2. The details of presidential debates are often the subject of intense negotiations. Consider, for example the 1996 presidential election between Clinton and Dole. Here were the issues in deciding the debate schedule. Clinton wanted to allow Ross Perot to participate in the debate. He reasoned that a boost in Perot's exposure would draw voters from Dole. Dole was quite adamant against including Perot. Clinton wanted to have two debates, but Dole wanted three – with the last being close to the Nov 5th election day. Dole wanted to give more chances for voters to learn about his policies, Clinton wanted to keep his incumbent advantage. The third issue was the length of the debates. Clinton was much younger than Dole and was a well known debater. He wanted to have two hour debates, while Dole wanted shorter one hour debates. The final issue was the format of the debates. Clinton wanted to have at least one town hall style debate, but Dole was less comfortable with this type of debating. Below are the list of the issues and the point allocations their negotiation teams might have given to each issue.

<i>Issues</i>	<i>Clinton</i>	<i>Dole</i>
Inclusion/exclusion of Perot	40	50
Number	20	16
Length	20	18
Format	20	16

Use the adjusted winner procedure to see which of these issues each candidate wins. Suggest a way of dividing the one issue that needs to be divided.

3. The following terms are often used in association with a fair division. Explain what each of these terms means and for each term give one example of a division that satisfies the criteria another example that does not.
 - (a) proportional
 - (b) envy free
 - (c) equitable
 - (d) Pareto optimal

4. Three towns, Riverside, Sunnyvale, and Twinpeaks have no local paper. Local newspapers would be projected to get a circulation of 40,000, 30,000 and 20,000. Two newspaper chains, the *Times* and the *Post*, are thinking about starting local papers in these towns. Each chain will choose one town in which to open a paper. If they both happen to choose the same town, the *Times* will get 60% of the circulation and the *Post* will get 40%.
- Construct a payoff matrix based on the circulation the papers would obtain. Give the *Times* the rows and the *Post* the columns.
 - Sketch the movement diagram and identify any Nash equilibria.
 - Sketch the payoff polygon and on the polygon identify all the Pareto optimal outcomes (pure and mixed).
 - Find the prudential strategies and security levels for both papers. What would happen if they both played their prudential strategies?
 - Plot the status quo on the payoff polygon. Shade the negotiation set.
 - The Nash bargaining solution is a mixed strategy with payoffs (39,31). Show that this is a better outcome than either of the two pure Pareto optimal outcomes, according to the Nash bargaining scheme.
 - Find the right coordinated mixed strategy corresponding to the Nash bargaining solution. How would you suggest the papers implement this mixed strategy?
5. Every Sunday night Marty's Ice Cream Parlor sells "Kitchen Sink Sundaes" (KiSS) for \$6.00 each. A KiSS consists of a mixture of 12 scoops of whatever flavor Marty wants to get rid of. The customer has no choice. Three friends, Abe, Babe, and Caleb, decide to share one. Abe says he can eat half of it and pays \$3.00, while Babe and Caleb pay \$1.50 each. Abe divides the sundae into four bowls (P,Q,R and T) and says he'd be happy with any two.
- If Babe values the sundaes in the bowls (P,Q,R,T) as worth (\$2.00, \$1.75,\$1.25,\$1.00) and Caleb values the sundaes in the bowls (P,Q,R,T) as worth (\$1.00, \$1.75,\$1.25,\$2.00), suggest a method for fair division. Is this division envy free? Explain your answer.
 - If both Babe and Caleb have exactly the same tastes and value the sundaes in the bowls (P,Q,R,T) as worth (\$2.80, \$1.40,\$1.00,\$0.80), suggest a method for fair division. Is this division envy free. Explain your answer.
6. An island is divided between 7 people ($P_1, P_2, P_3, P_4, P_5, P_6, P_7$) by the last diminished method. They play in the order given. At the end of round one P_3 gets a piece, and at the end of round three P_7 gets a piece. There are no diminishers during rounds two, four, or five.
- Which player gets the piece at the end of round two?
 - Which player cuts at the beginning of round three?
 - Which player gets the piece in round four?
 - Which player is the chooser in the final round?

7. **Bonus:**

There are 50 bonus points available on this test. The bonus points are awarded as follows: If n people request bonus points they each will get $\frac{50}{n}$ bonus points, rounded to the nearest whole number. If you would like some bonus points indicate this clearly below.