

Exam 2: Fair-division

Name: _____
MA111 2011-02-16

Part I: Perception of value

1. Three musicians, Viola Lavigne, Cello Green, and the Striped Bass are sharing three slices of cake. The following table gives the value of each slice in the eyes of the players.

	1st slice	2nd slice	3rd slice
V.L.	\$5.00	\$6.00	\$4.00
C.G.	\$8.00	\$2.50	\$4.50
S.B.	\$5.00	\$2.50	\$4.50

(a) Which slices would Viola Lavigne view as fair shares (so that she would not feel cheated if she received such a slice)?

(b) Which slices would Cello Green view as fair shares?

(c) Which slices would the Striped Bass view as fair shares?

Part II: You cut - I choose

2. Bruno likes wheat bread about twice as much as white bread. He picks up sandwiches for himself and his new lab partner, but notices he has one wheat and one white.

(a) If he lets his lab partner pick a sandwich, why might Bruno feel cheated at the end?

(b) If he cuts both the white and the wheat sandwiches exactly in half, then he could make each servings have half of each sandwich. Both servings look basically identical. Could either player reasonably feel cheated? Could either player feel they did better than expected?

(c) Bruno decides to make one serving that has only $3/4$ of the wheat, and the other serving that is other $1/4$ of the wheat and the entire white. Could Bruno feel cheated? Could his lab partner feel like Bruno is being generous?

Part III: Last diminisher

3. Benny, Boots, Dora, Isa, and Tico are going to play marbles. Before playing, they must divide the bag between them. They don't want to take the time to count out the marbles, so they use the method of Last Diminisher to quickly divide the marbles among them. Each player wants to have as many marbles as possible.

(a) Benny selects a claim. To Boots, it appears to be 33% of the bag. What should he do?

(b) On Isa's turn, the claim appears to be 20% of the bag. What should Isa do?

(c) When it is Tico's turn, it appears to Tico that the claim is 18.97234% of the bag. What should he do?

(d) In round 2, how much of the remaining bag of marbles should Benny claim?

Part IV: Sealed Bids

4. Sally and Marcy have been roommates and BFF. However, the semester is ending and they need to split up their furniture they bought together. They feel each is owed 50% of the loot, but they have different ideas of what each item is worth. They still have some cash, and so decide the method of sealed bids is appropriate. They open up the bids to reveal the following:

	Bruno				
	Mars	Velvet	Lava	Giant	String
	poster	Elvis	Lamp	Pillow	Lights
Sally	\$10	\$6	\$4	\$ 2	\$18
Marcy	\$ 2	\$9	\$6	\$10	\$ 3

(a) Which items does Marcy get?

(b) Who pays whom, and how much do they pay?

(c) How much does Marcy think her fair share is worth?

(d) How much does Marcy end up getting in her opinion?