Stations Review
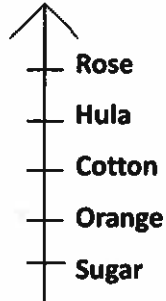# Election Theory and Fair Division

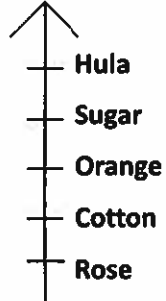# Station 1: Voting Methods Review

A university marching band has been invited to march in 5 different parades. The rankings of the band members are shown below. Determine the winner – with amount – for each method below.

Rose	Hula	Cotton
Hula	Sugar	Hula
Cotton	Orange	Sugar
Orange	Cotton	Orange
Sugar	Rose	Rose

Votes: 39   16   45

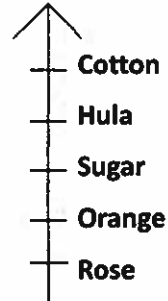**Plurality: Majority: Borda: Runoff:**

Seq. Runoff: Condorcet: Approval:
(the top 3 votes were approved)

Station 2: Coalition Review

- Voter A gets 6 votes.
- Voter B gets 5 votes.
- Voter C gets 4 votes.
- Voter D gets 2 votes.
- A winning coalition must have 10 votes.

a) How many votes would the coalition formed by voters A and C have?

b) Write down all of the winning coalitions. Use proper notation.

c) Which voters are essential in the coalition {A, B, C ; 15}? Explain.

d) What is the Power Index for each voter?

A: ___   C: ___
B: ___   D: ___

e) Are there any dictators or dummies? Explain why for each.

Estate Division Practice   Name: _____

4. Four heirs, Skyler, Flynn, Holly, and Marie divide fairly an estate consisting of four items— a car wash, a house, a car, and a watch— using the Method of Sealed Bids. The players' bids are given in the table below.
and $60,000 (sixty thousand)

   (a) **(The Bids)** Determine each player's opinion of the total value of the estate and the value that each player places on a fair share. Enter these values in rows (1) and (2) of the table.

   (b) **(The Allocation)** Determine the allocation of the items in the estate. Fill in the item(s) allocated to each player in row (3) of the table.

   (c) **(The Payments)** After the items are allocated, some players will owe the estate money and others will be owed money by the estate. Determine the amount of money each player owes or is owed and enter this in row (4) OR (5) of the table.

   (d) **(Dividing the Surplus)** After the payments are all made, there might be a surplus left in the estate. Determine each player's share of the surplus and enter it in row (6) of the table.

   (e) **(Final Settlement)** Find the net settlement (items and money) for each player and enter it in row (7) of the table.

			Skyler	Flynn	Holly	Marie
Bids		Car Wash	$800,000	$500,000	$750,000	$100,000
		House	$200,000	$120,000	$250,000	$180,000
		Car	$10,000	$9,000	$6,000	$5,000
		Watch	$1,000	$1,500	$1,200	$1100
	(1)	Total Value of Estate				
	(2)	Value of a Fair Share				
Allocation	(3)	Item(s) Allocated				
Payments	(4)	Player Owes Estate				
	(5)	Estate Owes Player				
Surplus	(6)	Share of Surplus				
Final Settlement	(7)	Final Settlement				
		Items:				
		Money (+/-):				

3

Discrete Math
Estate Division Worksheet

Name_____

1. John, Jerry, and Jill are heirs to their mother's estate that includes their family house, an automobile, a small mountain cabin, and $125,000 in cash (from investments and a life insurance policy). Use the algorithm we learned in class to fairly divide this inheritance among the three siblings.

Assume John, Jerry, and Jill have submitted the following bids on the family house, the car, and the mountain cabin.

	Family House	Car	Cabin
John	90,000	4,000	20,000
Jerry	95,000	5,000	16,000
Jill	92,000	4,000	18,000

Due to some other items distributed prior to their mother's death, John receives 40%, Jerry receives 25%, and Jill 35% of the inheritance.

	John	Jerry	Jill
Total of bids & cash			
Fair share			
Items received			
Value of item(s) received			
Initial cash received			
Share of remaining cash			
Final settlement			

2. It is common for one or more heirs to pay into an estate when this algorithm is used. However, this algorithm fails if an heir who must pay into the estate doesn't have the money to do so. If this happened in your family, what would you suggest to finish the estate division process?

3. Could this estate division algorithm of this lesson encourage insincerity by any of the heirs? Explain why or why not.