Practice Quiz 2: on Chapters 3 and 5

[1] An election is run. The candidates are Paul (P), Tom (T), Sally (S), and Ann (A). There are 17 voters. Here is a tabulation of their preference lists:

# Voters	5	4	4	2	2
First place	S	P	A	T	A
Second place	P	T	S	P	P
Third place	A	S	T	A	S
Fourth place	T	A	P	S	T

(a) Determine the vote totals using plurality voting. Who is the winner?

(b) Who wins if Sally drops out of the race?

(c) Do (a) and (b) give an example of a violation of a fairness criterion? If so which one? Explain.

(d) Determine the vote totals using the Borda count. Who is the winner?

(e) Does (d) give an example of a violation of a fairness criterion? If so which one? Explain.

(f) Indicate the order of elimination using plurality with elimination voting. Who wins?

(g) Suppose we switch P and A in the last column. Who now wins using plurality with elimination voting?

(h) Does (g) give an example of a violation of a fairness criterion? If so which one? Explain.

(i) Determine the vote totals using pairwise comparison voting. Who is the winner?

[2] Consider the weighted voting system [20 | 13, 8, 7, 4].

(a) Which if any of the voters are dummies? Explain.

(b) Which if any of the voters have veto power? Explain.

(c) Which if any of the voters are dictators? Explain.

(d) What is the Banzhaf power index of each voter?

[3] A local charity is giving away a 12 pack of root beer for a donation of $20. Bobby, Mikey and Janey pool their money to make a $20 donation. Bobby contributes $8, Janey $7, and Mikey $5.
(a) How should the cans be apportioned between them if each child's apportionment is proportional to that child's contribution, assuming that Hamilton's method is used to deal with fractional parts of cans? Fill in the table below to show your answer.

Child	Standard Quota	Hamiltonian Apportionment
Bobby		
Janey		
Mikey		

(b) How should the cans be apportioned between them if each child's apportionment is proportional to that child's contribution, assuming that Jefferson's method is used to deal with fractional parts of cans? Fill in the table below to show your answer, and indicate the standard divisor D and the modified divisor d which you are using.

Standard divisor D = _____ modified divisor d = _____

Child	Standard Quota	Modified Quota	Jeffersonian Apportionment
Bobby			
Janey			
Mikey			

[4] A school district assigned 35 instructional assistants to five schools based on enrollment figures. The budget allowed for the hiring of 2 additional assistants. Consider the following apportionment numbers before and after the increase in instructional assistants. Is this an example of a paradox? If so, which paradox has occurred? Explain.

School	Original Apportionment	New Apportionment
Cascades	9	9
Seven Oaks	11	10
Riverview	6	7
Pioneer	4	5
Hamilton Creek	5	6