Math 1015: Homework #4

Question 1. Explain why dictatorship satisfies IIA.

Question 2. Please use this example election to show that plurality does not satisfy IIA:

4	3	3	2
A	B	C	D
B	A	A	E
C	C	B	C
D	D	D	A
E	E	E	B

(Show how somebody can change their vote in a certain way that has a certain effect.)

Question 3. Explain why RCV does not satisfy IIA. (You must invent an example where people change their votes in a certain way and the outcome changes.)

Question 4. Consider this election, using plurality:

2	4	3
A	B	D
C	A	A
B	D	C
D	C	B

a) Describe how the DACB voters can manipulate this election.

b) Explain why the ACBD voters cannot manipulate this election.

Question 5. Find the results of this approval election:

	3	2	2	1	1
A	X			X	X
B	X	X			X
C		X	X		
D		X	X		

Question 6. Consider this election:

3	5	2
A	B	D
C	A	A
B	D	C
D	C	B

a) Let's imagine we run this election instead using approval voting, and assume that each voter will approve of their top two choices, but disapprove of their bottom two choices.

Make a chart (like in the previous question) that summarizes the approval ballots, and find the winner using approval voting.

b) For the same election, if we do the random dictator method, say what the probability is for each candidate to win. You answer should say something like: "A wins with probability ???%, B wins with probability ???%, etc."

Question 7. Invent and describe a situation where it might be a good idea to use the random dictator method, and also a situation where it would be a bad idea to use the random dictator method.

Question 8. In the weighted system $[12 : 8, 7, 1]$, explain why the 8 & 7 have the same amount of power even though 8 is more than 7.