Practice Quiz 1 covering Chapters 1 and 3 Name:_____

Instructions: Answer each question, and explain your answer. An answer alone is not enough for full credit. Your explanations must be clear and show how to get the answer. This is an open book quiz.

[1] (8 points) Suppose the UPC code on a certain box of cereal is 0 21000 x1061 7. What should the digit x be? Show how you determine the answer. (Remember: the UPC code is such that when you add every other digit starting with the first, triple the result and then add the remaining digits, you get an even multiple of 10.)

[2] (8 points) The Postnet bar code shown here has a single error in which either one vertical bar which should be long is short or vice versa:

|...|||...|||.|.||.....|||.|...|..|||.....||..|.||

Show how you fix the error, then express the correct zip code in ordinary characters. (Remember: the outside bars are framing bars which you ignore; also, the digit Postnet bar codes are as follows:

1: ...|| 2: ..|.| 3: ..||. 4: .|..| 5: .|.|. 6: .||.. 7: |...| 8: |..|. 9: |.|.. 0: ||...

Moreover, the digits in a valid Postnet code must sum to an even multiple of 10.)

[3] (15 points) 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	T	A	S	P	S
Second place	A	P	T	A	A
Third place	S	T	P	S	T
Fourth place	P	S	A	T	P

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

Totals: A:_____ P:_____ S:_____ T:_____ Winner:_____

(b) Assume Sally drops out of the race but that the preference list above remains otherwise the same.
State the vote totals in this situation for each candidate using plurality voting. Who is the winner now?

Totals: A:_____ P:_____ T:_____ Winner:_____

(c) Determine the vote totals using the Borda count with the original preference list given above. Who is the winner?

Totals: A:_____ P:_____ S:_____ T:_____ Winner:_____

(d) Does (c) give an example of a violation of the Majority Criterion? Circle your answer: YES NO
Explain:

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

First candidate eliminated:

Second candidate eliminated:

Third candidate eliminated:

Winner:_____

[4] (9 points) Consider the weighted voting system [13 | 12, 7, 1].
Let A, B and C be the players, where A has 12 votes, B has 7, and C has 1.
(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?