Spring '05/MAT 117/Worksheet 1 **Name:** Solution *Show all your work.*

1. (20pts) A football team needs to select a captain from among four players: Steel, Griffin, Pollard and Driggs. Their preference rankings are as follows:

Number of voters:	12	5	8	1	10	3	2
Steel	1	1	2	3	4	2	2
Griffin	2	3	1	1	1	4	4
Pollard	3	2	3	4	2	1	3
Driggs	4	4	4	2	3	3	1

a) Who wins the vote in a plurality election?
b) Who wins the vote in a plurality election, followed by a runoff of the first two finishers?
c) Who is the Condercet winner, if any?
d) Who is the winner using Borda's method? Perform the check on the sum of Borda points.
e) In the Borda election, could the five voters who ranked Griffin last achieve a preferable outcome by voting strategically, assuming all the other members voted as shown?

a) Steel 17
Griffin 19 wins
Pollard 3
Driggs 2

b) Steel 17+3+2 = 22 wins
Griffin 19 = 19

c) Steel 22 w
Griffin 19

Steel 17+8+1 = 26 w
Pollard 10+3+2 = 15

Steel 17+8+3 = 28 w
Driggs 1+10+2 = 13

Griffin 12+19 = 31 w
Pollard 5+3+2 = 10

Griffin 12+5+19 = 36 w
Driggs 3+2 = 5

Pollard 12+5+8+10+3 = 38 w
Driggs 1+2 = 3

Steel is the Condercet winner

d)
Steel $4\cdot17+3\cdot13+2\cdot1+1\cdot10 = 119$
Griffin $4\cdot19+3\cdot12+2\cdot5+1\cdot5 = 127$
Pollard $4\cdot3+3\cdot15+2\cdot22+1\cdot1 = 102$
Driggs $4\cdot2+3\cdot1+2\cdot13+1\cdot25 = 62$
410

41 voters,
10 pts per ballot, $41\cdot10 = 410$

		Pts from the 5 voters	
S	119	-9-6	104 + 20 = 124
G	127	-3-2	122 + 5 = 127
P	102	-12-4	86 +
D	62	-6-8	48 +

↑
Pts if they vote Steel 1st, Griffin 4th

Even if the 5 voters voted Steel 1st, Steel would not have enough to catch up to Griffin,