Name: _____ score:_____ / 10

There are 10 points possible on this quiz. No aids (book, notes, etc.) are permitted. You may use a non-programmable calculator. **Show all work and supporting calculations for full credit. Explain how you get your answers.**

1. (6 points) The student government is holding elections for president. There are four candidates (A,B,C and D for convenience). The preference schedule is below.

number of voters	80	90	60	130	40
1st choice	A	B	B	D	C
2nd choice	D	A	D	C	A
3rd choice	B	C	C	A	B
4th choice	C	D	A	B	D

For each of the following, provide supporting calculations.

(a) How many voters voted in this election? 400

(b) How many voters are needed for a majority? $\frac{400}{2} + 1 = 201$

(c) How many votes are needed for a plurality? $\frac{400}{4} + 1 = 101$

(d) Find a winner under the plurality method. Show some work. B

A: 80
B: 90 + 60 = 150
C: 40
D: 130

(e) Did the winner under the plurality method also win a majority? No

(f) Do you think the plurality winner in part (d) represents the will of the voters? Explain why or why not in a sentence. "Yes" and "No" are both acceptable answers so long as you provide some reason(s) to support your answer.

2. (4 points) Below is the same preference schedule.

number of voters	80	90	60	130	40
1st choice	A	B	B	D	C
2nd choice	D	A	D	C	A
3rd choice	B	C	C	A	B
4th choice	C	D	A	B	D

(a) In a one-to-one comparison, who is preferred, candidate A or candidate B? (You must show your calculation.)

A: 80 + 130 + 40 = 250

B: 90 + 60 = 150

Candidate A is preferred.

(b) Explain why candidate B cannot be the Condorcet winner.

B loses in a one-to-one comparison with A, so B cannot win every one-to-one comparison.

(c) Determine if there is a Condorcet winner. If so, who is it? Otherwise, explain why not. The results of each one-on-one comparison (excpet A vs B) are provided below.

matchup	A vs C	A vs D	B vs C	B vs D	C vs D
tally	A: 170 C: 230	A: 210 D: 190	B: 230 C: 170	B: 190 D: 210	C: 130 D: 270
winner	C	A	B	D	D

There is no Condorcet winner.

A loses to C

B loses to D

C loses to B

A loses to C

So every candidate loses at least one comparison.