

Name:

Section:

MATH 1001, Weighted Voting Quiz, Spring, 2003

Remember, there will be little or no partial credit given on questions in this quiz.

TRUE/FALSE (2 points each) Answer the following questions about weighted voting systems by writing a T or F in the blank.

\_\_\_ 1. If everybody but Player 1 is a dummy, then Player 1 must be a dictator.

TRUE: a dummy has no power, so if everybody but Player 1 is a dummy, it means Player 1 has all the power, i.e. Player 1 is a dictator.

\_\_\_\_\_ 2. " $P_1$  and  $P_2$  have veto power" means that no motion can pass without the support of both  $P_1$  and  $P_2$ .

TRUE: this is the definition of "veto power."

\_\_\_\_\_ 3. In the system [5: 2, 2, 1], Player 1 has twice as much power as Player 3.

FALSE: In this system a unanimous vote is required to reach the quota. That means everybody has equal power (with *any* interpretation of power).

4. (3 points) In the system [10: 4, 4, 2], find the Banzhaf Power Index for each player. (You shouldn't have to list a lot of coalitions to answer this question.)

Again, a unanimous vote is required, so everybody has the same amount of power.

BPI for  $P_1$ : \_\_\_\_\_1/3\_\_\_\_\_

BPI for  $P_2$ : \_\_\_\_\_1/3\_\_\_\_\_

BPI for  $P_3$ : \_\_\_\_\_1/3\_\_\_\_\_

5. (3 points) Find the Shapley-Shubik Power index for each player in the weighted voting system [6: 4, 2, 2]. To save you time, I wrote down all the sequential coalitions. (On a test I might not do this for you).

$\langle P_1, P_2, P_3 \rangle$      $\langle P_2, P_3, P_1 \rangle$      $\langle P_3, P_1, P_2 \rangle$

$\langle P_1, P_3, P_2 \rangle$      $\langle P_2, P_1, P_3 \rangle$      $\langle P_3, P_2, P_1 \rangle$

SSPI for  $P_1$ : \_\_\_\_\_4/6\_\_\_\_\_

SSPI for  $P_2$ : \_\_\_\_\_1/6\_\_\_\_\_

SSPI for  $P_3$ : \_\_\_\_\_1/6\_\_\_\_\_

6. (The "reward for attending lecture" problem - 3 Points) If you wanted as much power as possible (in terms of voting power on the city council), would you rather be the mayor of Minneapolis or St. Paul?

We showed in class that the mayor of Minneapolis has twice the voting power as the mayor of St. Paul. (It doesn't have anything to do with the fact that more people live in Minneapolis.)