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. “P1 and P2 have veto power” means that no motion can pass without the support of both P1 and P2.

   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 P1: 1/3
   BPI for P2: 1/3
   BPI for P3: 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).

   ⟨P1, P2, P3⟩ ⟨P2, P3, P1⟩ ⟨P3, P1, P2⟩
   ⟨P1, P3, P2⟩ ⟨P2, P1, P3⟩ ⟨P3, P2, P1⟩

   SSPI for P1: 4/6
   SSPI for P2: 1/6
   SSPI for P3: 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.)