Math 17: Exercise Set 2 – Posted 9/10

1. Consider the weighted voting system $[q : 10, 8, 6, 4, 2]$. Find the values of q such that:
   (a) the voting system is in **gridlock**.
   (b) the voting system leads to **anarchy**.
   (c) the voting system requires a **unanimous vote** (support of all players).
2. List the player(s) that have veto power in each of the following weighted voting systems:
   (a) $[12 : 9, 3, 1, 1]$
   (b) $[12 : 9, 1, 1, 1]$
   (c) $[10 : 9, 1, 1, 1]$
   (d) $[16 : 6, 6, 5, 3]$
3. Consider the weighted voting system $[10 : 7, 5, 3]$.
   (a) Determine the Banzhaf power distribution of this voting system.
   (b) Determine the Shapley-Shubik power distribution of this voting system.
4. Consider the weighted voting system $[6 : 5, 2, 1]$.
   (a) Determine the Banzhaf power distribution of this voting system.
   (b) Determine the Shapley-Shubik power distribution of this voting system.
5. Two weighted voting systems are *equivalent* if they have the same number of players and exactly the same winning coalitions. Show that the weighted voting systems $[8 : 5, 3, 2]$ and $[2 : 1, 1, 0]$ are equivalent.