score:____ / 10

Name: <u>Solutions</u>

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

- 1. (4 points) Consider the weighted voting system [20:8,7,2,2,2,1]
 - (a) Identify the dictators, if any. Explain your reasoning.

None. No weight is 20 or more.

(b) Identify any players with veto power, if any. Explain your reasoning.

Both players 1 and 2 have veto power. This is because 7+2+2+1=14<20 and 8+2+2+2+1=15<20.

- (c) Identify any dummies, if any. Explain your reasoning. None. In the coalition P1, P2, P3, P4, P6, all players are critical. And Py could be Swapped with P5.
- 2. (2 points) Consider the weighted voting system [10:6,4,3,2,2,1], (a) Does $\{P_1,P_5,P_6\}$ form a winning coalition? Explain.
 - No. It's not a winning coalition. It's weight is 6+2+1=9<10.
 - (b) It is a fact that $\{P_1, P_2, P_4, P_5\}$ forms a winning coalition. <u>Underline</u> the players that are **critical** to the coalition, and write/provide a computation that supports this.

- 3. (4 points) For the weighted voting system [60 : 40, 30, 20, 10], the winning coalitions are listed below. The critical players are underlined.
 - (a) Using this information, determine the Banzaf Power Distribution.

winning coalitions		1 times	
		Acritical	BPI
$P_1 P_2$	• P ₁	5	$\frac{5}{12} = 41.7\%$
$\underline{P_1} \underline{P_3}$	• P ₂	3	³ / ₁₂ = 25%
$\underline{P_1} P_2 P_3$	• P ₃	3	$\frac{3}{12} = 25\%$
$\frac{P_1}{P_1} \frac{P_2}{P_4} P_4$	• P4	1	$\frac{1}{12} = 8.3\%$
$P_2 P_3 P_4$	total	12	100%
$P_1P_2 P_3 P_4$			

(b) Does this power distribution seem fair given the weighted voting system described above? Explain.

I doubt Player 2 thinks it's fair. The have 50% more Weight than Player 3 but the same BPI.