Week in Review # 11

1. (a)

$$\begin{array}{c} \\ \text{Red 2} \\ \text{Black 10} \end{array} \begin{array}{ccc} \text{Red 6} & \text{Black 7} & \text{Black 8} \end{array} \\ \left[\begin{array}{ccc} 4 & -2 & -2 \\ -6 & 3 & 2 \end{array} \right]$$

 (b) Row 1

 (c) Column 3

2. (a) option 1: R-1 and C-4
     option 2: R-3 and C-1

 (b) R-3 and C-4

3. (a) yes it is strictly determined.
     optimal strategy:
     row player: row 2
     column player: column 2
     value of the game = 4

 (b) not strictly determined.

 (c) yes it is strictly determined.
     optimal strategy:
     row player: row 2 or row 4
     column player: column 2
     value of the game = 2

4. $A = \begin{array}{c} \\ \text{red 2} \\ \text{black 10} \end{array} \begin{array}{ccc} \text{Red 6} & \text{Black 7} & \text{Black 8} \end{array} \\ \left[\begin{array}{ccc} 4 & -2 & -2 \\ -6 & 3 & 2 \end{array} \right]$

 (a) $Q = \left[\begin{array}{c} 0.25 \\ 0.30 \\ 0.45 \end{array} \right]$

 compute the expected value for each of these strategies.
 $P_1 = \left[\begin{array}{cc} 0.5 & 0.5 \end{array} \right]$, $E = P_1 A Q = -0.1$

 $P_2 = \left[\begin{array}{cc} 0.6 & 0.4 \end{array} \right]$, $E = P_2 A Q = -0.18$

 $P_3 = \left[\begin{array}{cc} 0.35 & 0.75 \end{array} \right]$, $E = P_2 A Q = 0.05$

 The best for John is P_3 since this expected value is the largest.

 (b) $0.05 * 1,000 = 50$

5. (a) nothing can be elimated.

 (b) $\left[\begin{array}{cc} 8 & -1 \\ -3 & 0 \end{array} \right]$

 (c) $\left[\begin{array}{c} -5 \\ 0 \end{array} \right]$

6. (a) $P = \left[\begin{array}{cc} \dfrac{3}{16} & \dfrac{13}{16} \end{array} \right]$ $\qquad Q = \left[\begin{array}{c} \dfrac{14}{16} \\ \dfrac{2}{16} \end{array} \right]$

 value $= \dfrac{54}{16}$

 (b) reduce to $\left[\begin{array}{cc} 5 & 2 \\ -2 & 7 \end{array} \right]$

 $P = \left[\begin{array}{ccc} \dfrac{3}{4} & 0 & \dfrac{1}{4} \end{array} \right]$

 $Q = \left[\begin{array}{c} \dfrac{5}{12} \\ \dfrac{7}{12} \end{array} \right]$

 value $= \dfrac{39}{12}$

 (c) saddle point in row 1 column 1.

 $P = \left[\begin{array}{ccc} 1 & 0 & 0 \end{array} \right]$ $\qquad Q = \left[\begin{array}{c} 1 \\ 0 \\ 0 \\ 0 \end{array} \right]$

 value $= 1$

 (d) reduce to $\left[\begin{array}{cc} -2 & 4 \\ 1 & -3 \end{array} \right]$

 $P = \left[\begin{array}{ccc} 0 & 0.4 & 0.6 \end{array} \right]$

 $Q = \left[\begin{array}{c} 0 \\ 0.7 \\ 0.3 \\ 0 \end{array} \right]$

 value $= -0.2$