Math 111 - Game Theory Homework Problems 2

In all of these problems, player R is the player who picks the rows of the pay-off matrix, and player C is the player who picks the column. You may assume R desires positive pay-offs while C desires negatives.

1. Is the game with pay-off matrix shown below strictly determined? Why or why not?

$$\begin{bmatrix} 1 & 3 & -2 \\ 5 & -4 & -1 \end{bmatrix}$$

2. Find the value of the strictly determined matrix game below. Is it fair?

$$\begin{bmatrix} 1 & 0 & 5 & -1 & 4 \\ 2 & -3 & -1 & -3 & 2 \\ 1 & 2 & 6 & 0 & 3 \end{bmatrix}$$

3. Suppose we play a finger matching game. We both (simultaneously) show either one or two fingers. If we are showing the same number of fingers, then you must pay me one dollar for each finger shown. If we are showing different numbers of fingers, then I must pay you a dollar for each finger shown.

   (a) What is the pay-off matrix for this game?

   (b) Explain why this game is not strictly determined.

   (c) Use the formulas

$$p = \frac{d-c}{a+d-b-c}$$

$$q = \frac{d-b}{a+d-b-c}$$

   to find the optimal strategies for each player. Describe those strategies in words.

   (d) What is the value of the game? Is this game fair?

4. In the game of "Chicken", each player can either drive straight or swerve. Is this game a zero-sum game? Explain your answer.