1. Find all the Nash equilibria of the following games:

(a) \[
\begin{array}{c|cc}
& L & R \\
\hline
U & 3,1 & 4,2 \\
D & 5,2 & 2,3 \\
\end{array}
\]

(b) \[
\begin{array}{c|cc}
& L & R \\
\hline
U & 0,0 & 0,0 \\
D & 0,0 & 1,1 \\
\end{array}
\]

(c) \[
\begin{array}{c|ccc}
& L & M & R \\
\hline
U & 2,9 & 5,5 & 6,2 \\
S & 6,4 & 9,2 & 5,3 \\
D & 4,3 & 2,7 & 7,1 \\
\end{array}
\]

(d) \[
\begin{array}{c|ccc}
& L & M & R \\
\hline
U & 5,3 & 7,2 & 2,1 \\
S & 1,2 & 6,3 & 1,4 \\
D & 4,2 & 6,4 & 3,5 \\
\end{array}
\]

2. Find the set of outcomes that survive the iterated elimination of (both strictly and weakly) dominated strategies in the games in Question 1.

3. Consider the following game:

\[
\begin{array}{c|ccc}
& L & C & R \\
\hline
T & 4,a & b,2 & 3,1 \\
M & 3,5 & 2,c & 2,3 \\
B & d,3 & 3,4 & 4,2 \\
\end{array}
\]

(a) Provide values for \(a, b, c, d\) such that the game has a strictly dominant strategy equilibrium.

(b) Provide values for \(a, b, c, d\) such that there is no strictly dominant strategy but each player has a strictly dominated strategy.

(c) Let \(a = 3\). Provide values for \(b, c, d\) such that iterated elimination of strictly dominated strategies leads to a unique outcome.

4. Bruce, Colleen, and David are all getting together at Bruce’s house on Friday evening to play their favorite game, Monopoly. They all love to eat sushi while they play. They all know from previous experience that two orders of sushi are just the right amount to satisfy their hunger. If they wind up with less than two orders, they all end up going hungry and don’t enjoy the evening. More than two orders would be a waste, because they can’t manage to eat a third order and the extra sushi goes bad. Their favorite restaurant, Fishes in the Raw, packages its sushi in such large containers that each individual person can feasibly purchase at most one order of sushi. Fishes in the Raw offers takeout, but unfortunately does not deliver. Suppose that each player enjoys $20 worth of utility from having enough sushi to eat on Friday evening, and $0 from not having enough to eat. The cost to each player of picking up an order of sushi is $10. Unfortunately, the players have forgotten to communicate about who should be buying sushi this Friday, and none of the players has a cell phone, so they must each make independent decisions of whether to buy \((B)\) or not \((N)\) an order of sushi.

(a) Write down the strategic form of the game.

(b) Find all the Nash equilibria.

5. Roxanne, Sara, and Ted all love to eat cookies, but there is only one left in the package. No one wants to split the cookie, so Sara proposes the following procedure. On the count of three, each of them will show one or two fingers, they’ll add them up, and then divide the sum by 3. If the remainder is zero, Roxanne gets the cookie, if the remainder is 1 Sara gets it, and if it is 2 Ted gets it. Each of them prefers to have a cookie to no cookie.

(a) Write down the strategic form of the game.

(b) Find all the Nash equilibria.