Game theory homework 2

1. Solve the game with matrix
$$\begin{bmatrix} -1 & -3 \\ -2 & 2 \end{bmatrix},$$
that is, find the value and an optimal (mixed) strategy for both players.

2. Solve the game with matrix
$$\begin{bmatrix} 0 & 2 \\ t & 1 \end{bmatrix},$$
for an arbitrary real number t. (Don't forget to check for a saddle point!) Draw the graph of $v(t)$, the value of the game, as a function of t, for $-\infty < t < \infty$.

3. Reduce by dominance to 2×2 games and solve.

   (a)
$$\begin{bmatrix} 5 & 4 & 1 & 0 \\ 4 & 3 & 2 & -1 \\ 0 & -1 & 4 & 3 \\ 1 & -2 & 1 & 2 \end{bmatrix}.$$

   (b)
$$\begin{bmatrix} 10 & 0 & 7 & 1 \\ 2 & 6 & 4 & 7 \\ 6 & 3 & 3 & 5 \end{bmatrix}.$$

4. Player II is moving an important item in one of three cars, labeled 1, 2, and 3. Player I will drop a bomb on one of the cars of his choosing. He has no chance of destroying the item if he bombs the wrong car. If he chooses the right car, then his probability of destroying the item depends on that car. The probabilities for cars 1, 2, and 3 are equal to $3/4$, $1/4$ and $1/2$, respectively.

   Write the 3×3 payoff matrix and find optimal winnng strategies for each of the players.