MATH 180 HOMEWORK

DUE THURSDAY, OCTOBER 4 AT THE BEGINNING OF CLASS

(1) Find the optimal mixed strategies for each player and the value of the game.

		Player I	
		H	T
Player II	H	5	-3
	T	-3	1

(2) Not every two-person zero-sum game with a saddlepoint can be solved using successive elimination of dominated strategies. Find an example of such a game by giving a payoff matrix where each player has 3 strategies (so the matrix is 3×3).

(3) A businessman has the choice of either not cheating on his income tax or cheating and making \$1000 if not audited. If caught cheating, he will pay a fine of \$2000 in addition to the \$1000 he already owes. He feels good if he does not cheat and is not audited (worth \$100). If he does not cheat and is audited, he evaluates this outcome as −\$100 for the lost day. Viewing the game as a two-person zero-sum game between the businessman and the tax agency, what are the optimal mixed strategies for each player and the value of the game.

(4) You play to manufacture a new product for sale next year, and you can decide to make either a small quantity, in anticipation of a poor economy and few sales, or a large quantity, hoping for brisk sales. Your expected profits are indicated in the following table.

		Economy	
		poor	good
Quantity	small	\$500,000	\$300,000
	large	\$100,000	\$900,000

If you want to avoid risk and believe that the economy is playing an optimal mixed strategy against you in a two-person zero-sum game, then what is your optimal mixed strategy and the resulting value? Discuss some alternative ways to go about making your decision.

(5) Find the optimal mixed strategy for the row player and the value of the game.

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