

This is a closed-book exam. You need to solve all 6 questions. There is space after each question you may use. If you need more space please use the rear of a page. If you draw illustrations, please use a ruler. Please write legibly.

There are 35 points obtainable in this exam. The exam consists of 9 pages.
 You have 65 minutes.

Good luck.

Name:

1. (9 points) Consider the following game.

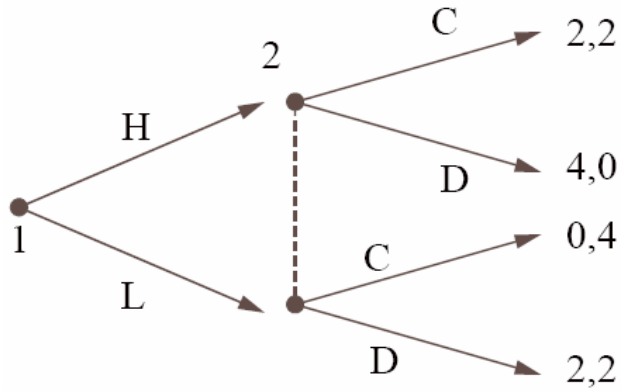
		2		
		L	C	R
1	U	6, 0	0, 5	2, 2
	M	1, 8	4, 0	8, 6
	D	3, 3	2, 6	5, 5

a) Find all dominated strategies.

b) Find all congruous sets in this game.

c) Find **all** mixed-strategy Nash equilibria. If you don't check whether a candidate for a mixed-strategy Nash equilibrium indeed forms an equilibrium, you need to explain why the candidate actually is an equilibrium.

2. (5 points) Consider the following game in extensive form:



a) Convert this game into normal form and offer a complete description of the game.

b) Is this game strictly competitive? Answer by writing down the conditions and checking each and every strategy profile. If it is strictly competitive, find the players' security strategies.

c) Find all (pure and mixed strategy) Nash equilibria.

3) (6 points) Consider the following partnership game with continuous payoff functions: Two people share a firm. The profit of this firm depends on the effort that each person expends on the job.

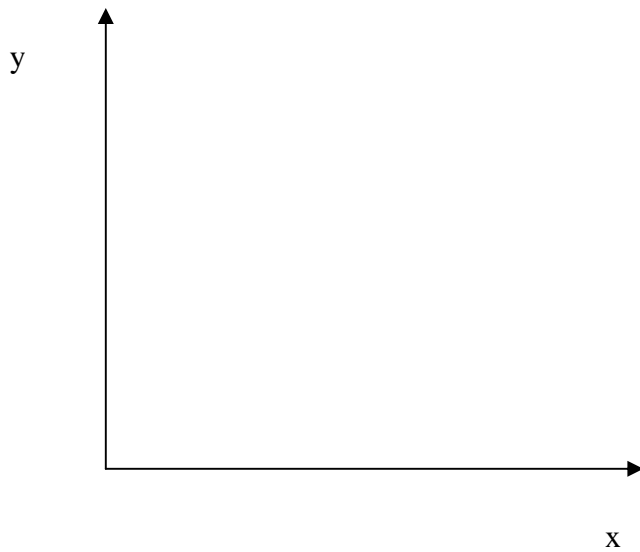
The profit is $p=4(x+y+1/2xy)$, where x is the amount of effort expended by partner 1, and y is the amount of effort expended by partner 2.

Moreover, partner 1 incurs a personal cost of expending effort which is x^2 , partner 2 has an effort cost of y^2 . We further assume that x and y have to be set between 0 and 10.

Assume that the partners cannot write a contract and simultaneously need to decide on how much effort to expend. Assume that the partners equally split the profit.

a) Offer a complete description of the game and illustrate it in extensive form.

b) Derive the best-response function for each player. Draw the two best-response functions into the following chart and label the two functions:



c) Mathematically find the Nash equilibrium. Mark it in the chart above.

d) Find the set of rationalizable strategies. Compare the result with (c).

4. (4 points) Find the set of rationalizable strategies for the following game:

		2			
		AC	AD	BC	BD
1	UE	5,4	4,4	4,5	12,2
	UF	3,7	8,7	5,8	10,6
	DE	2,10	7,6	4,6	9,5
	DF	4,4	5,9	4,10	10,9

5) (5 points) Evaluate the following payoffs for the game pictured here:

		2	
		I	O
1	IU	4,0	-1,-1
	ID	3,2	-1,-1
	OU	1,1	1,1
	OD	1,1	1,1

a) $u_1(\sigma_1, O)$ for $\sigma_1 = (\frac{1}{4}, \frac{1}{4}, \frac{1}{4}, \frac{1}{4})$

b) $u_2(\sigma_1, I)$ for $\sigma_1 = (\frac{1}{8}, \frac{1}{4}, \frac{1}{4}, \frac{3}{8})$

c) $u_2(\sigma_1, \sigma_2)$ for $\sigma_1 = (\frac{1}{8}, \frac{1}{4}, \frac{1}{4}, \frac{3}{8}), \sigma_2 = (\frac{2}{3}, \frac{1}{3})$

d) $u_1(\sigma_1, \sigma_2)$ for $\sigma_1 = (\frac{1}{4}, \frac{1}{4}, \frac{1}{4}, \frac{1}{4}), \sigma_2 = (\frac{1}{2}, \frac{1}{2})$.

6) (6 points) Find all mixed strategies of the following two games:

a)

		2	
		X	Y
1	A	8,8	0,0
	B	1,1	1,1
	C	1,1	1,1

b)

		2		
1		L	M	R
U		8,1	0,2	4,3
C		3,1	4,4	0,0
D		5,0	3,3	1,4