Economics 147: Bargaining Theory and Applications
Spring 2007
Midterm (March 15th)

Name: _____

You have 1 hour and 20 minutes. Good luck!!

1. Consider the following simultaneous-moves game:

	L	C	R
U	2, 1	0, 0	0, 0
M	0, 0	1, 2	0, 0
L	0, 0	0, 0	0, 0

a. Find the pure strategy Nash equilibria.

There are three pure strategy NE: $(U, L), (M, C)$ and (L, R).

b. Find the mixed strategy Nash equilibrium.

$\left(\frac{2}{3}U + \frac{2}{3}M + 0L, \frac{1}{3}L + \frac{2}{3}C + 0R\right)$

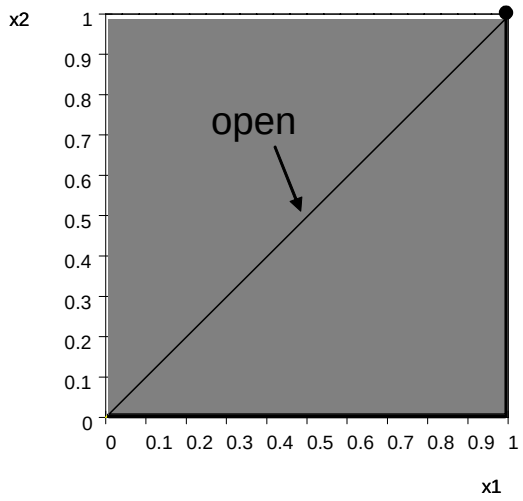
Name: _____

2. Voting Fanatics:

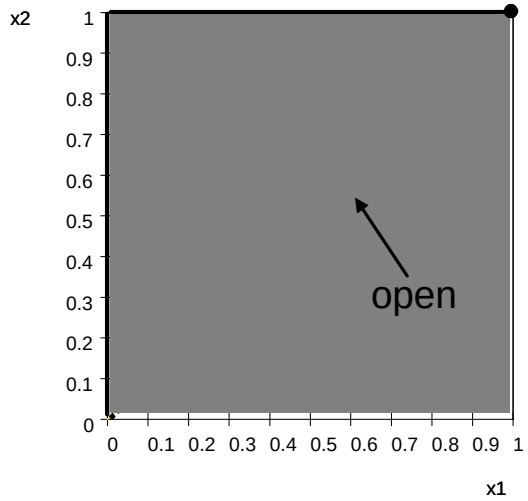
Consider the following variant of Hotelling's model of electoral competition. There are two candidates and each of the candidates must choose one platform position between 0 and 1. Denote as x_1 the position of candidate 1 and x_2 the position of candidate 2. Each citizen votes for the candidate with highest position (that is vote for candidate 1 if $x_1 > x_2$) and the citizen flips a coin if both candidate have the same position. The candidate who wins a majority of votes wins the election; if candidates obtain the same number of votes they tie. (Of course, assume that candidates prefer to win rather than loose or tie and prefer to tie rather than loose.)

a. Draw in the following graph the best responses of candidate 1 to each possible action of candidate 2.

$$BR_1(x_2) = \begin{cases} 1 \text{ if } x_2 = 1 \\ (x_2, 1] \text{ if } x_2 < 1 \end{cases}$$



b. Draw in the following graph the best responses of candidate 2 to each possible action of candidate 1. $BR_2(x_1) = \begin{cases} 1 \text{ if } x_1 = 1 \\ (x_1, 1] \text{ if } x_1 < 1 \end{cases}$



c. Find the Nash equilibrium.

(1,1)

Name: _____

3. Trading houses:

Two neighbors are deciding whether to trade houses (T) or not (N). Both neighbors must agree to trade for a trade to take place and no money is involved (just an exchange of houses). Player 2's house is equally likely to be good (G) or bad (B). Player 1's house is known to be good. Each neighbor is bored of her house and would earn an additional utility of 0.4 if moves. In addition, for both of them, the value of living in a good house is 1 while the value of a bad house is 0. The payoff matrixes for the two possible states of nature are:

	Good (1/2)			Bad (1/2)	
	T	N		T	N
T	1.4, 1.4	1, 1	T	0.4, 1.4	1, 0
N	1, 1	1, 1	N	1, 0	1, 0

b. What is the set of strategies for each neighbor?

$S_1 = \{T, N\}$. Since P2 knows the type of house she owns, then $S_2 = \{TT, TN, NT, NN\}$ where the first letter denotes the action if the house is good and the second letter refers to the action if the house is bad.

c. Find the matrix of expected payoffs (a cell in the matrix provides the expected payoffs as a function of a pair of strategies).

	TT	TN	NT	NN
T	0.9, 1.4	1.2, 0.7	0.7, 1.2	1, 0.5
N	1, 0.5	1, 0.5	1, 0.5	1, 0.5

d. Find the pure strategy BNE.

There are three Bayesian Nash equilibria, $(N, TT), (N, NT)$ and (N, NN).

Name: _____

4. Some multiple-choice and true/false questions (There were to version of this part of the exam):

4.1. Every Nash Equilibrium is Pareto efficient.

True

False ✓

4.2. Every subgame perfect equilibrium is a Nash equilibrium.

True ✓

False

4.3. In a second price private value auction it is an equilibrium to bid:

a) more than your true value.

b) less than your true value.

c) exactly your true value. ✓

d) all of the above.

e) none of the above.

4.4. In a situation of strategic interaction having more information is always better.

True

False ✓

4.5. Compare the expected revenue for the seller in the BNE of first price and second price auctions with private values with **risk neutral** bidders:

a) first price auction results in lower expected revenue than second price auction.

b) first price auction results in higher expected revenue than second price auction.

c) first price auction results in the same expected revenue than second price auction. ✓

d) depends on the number of bidders.

e) none of the above.

Name: _____

4. Some multiple-choice and true/false questions:

4.1. Every subgame perfect equilibrium is a Nash equilibrium.

True ✓

False

4.2. Every Nash Equilibrium is Pareto efficient.

True

False ✓

4.3. In a second price private value auction it is an equilibrium to bid:

a) exactly your true value. ✓

b) less than your true value.

c) more than your true value.

d) all of the above.

e) none of the above.

4.4. In a situation of strategic interaction having less information is always better.

True

False ✓

4.5. Compare the expected revenue for the seller in the BNE of first price and second price auctions with private values with **risk neutral** bidders:

a) first price auction results in the same expected revenue than second price auction. ✓

b) first price auction results in higher expected revenue than second price auction.

c) first price auction results in lower expected revenue than second price auction.

d) depends on the number of sellers.

e) none of the above.