Economics 316

Fall 2017 Martin J. Osborne

Problem Set 6

1. For the game in Figure 1, does either player have a strictly dominated action?

	L	M	R
T	$0,1$	$3,2$	$1,3$
M	$2,2$	$4,3$	$2,2$
B	$1,3$	$3,1$	$0,4$

Figure 1. The game in Problem 1.

2. Consider the example of Cournot's duopoly game considered in class. Let q_i' be an output of firm 1 with $q_1' < q^m$. Show that the value of firm 2's output for which q_1' is the optimal (profit-maximizing) output for firm 1 is $q_2 = \alpha - c - 2q_1'$.

3. For the following game,

   (a) find an action that is strictly dominated by a mixed strategy

   (b) find all the mixed strategy Nash equilibria.

	L	R
T	$1,3$	$3,3$
M	$3,1$	$1,0$
B	$0,0$	$5,2$

4. Find the set of action pairs that survive iterated elimination of strictly dominated actions in the following game.

	A	B	C	D
W	$2,0$	$0,4$	$0,2$	$1,1$
X	$2,0$	$3,3$	$2,0$	$1,1$
Y	$0,2$	$0,2$	$0,4$	$1,1$
Z	$1,0$	$1,1$	$1,1$	$2,2$

5. Is it possible for a two-player game to have a unique Nash equilibrium and for the set of action pairs that survive iterated elimination of strictly dominated actions to include an action pair in which each player's payoff is higher than it is in the Nash equilibrium?

6. Show that every Nash equilibrium of a game survives iterated elimination of strictly dominated actions.

7. Consider a variant of Hotelling's model of competition between firms considered in class in which the number of possible locations is finite and *even* (rather than odd, as in class). Assume, as in class, that the distribution of consumers is uniform and that the possible locations are equally spaced. Find the set of pairs of locations that survive iterated elimination of strictly dominated actions.

8. Give an example of a two-player strategic game in which (a) each player has finitely many actions, (b) there is a unique Nash equilibrium, and (c) in the Nash equilibrium both players' actions are weakly dominated.

9. Consider an example of Hotelling's model of electoral competition with three parties. The citizens' favorite positions lie in the interval from 0 to 2, and are uniformly distributed over this interval. Each party is restricted to choose one of the positions 0, 1, and 2, and prefers to tie with either or both of the other parties than to lose.

   Are any of the positions 0, 1, and 2 strictly dominated for a party? Are any of these positions weakly dominated? Does the game have a Nash equilibrium?

10. Consider Bertand's duopoly game. In class I argued that the price c weakly dominates any lower price and that any price greater than c at which demand is positive weakly dominates c. Is any price greater than c at which demand is positive weakly dominated?