

# Information Economics, Fall 2016

## Pre-lecture Problems 2

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**Note 1.** The deadline of submitting the pre-lecture problem is *9:20am, September 19, 2016*. Please submit a hard copy of your work to the instructor in class. Late submissions will not be accepted. Each student must submit her/his individual work. Submit **ONLY** the problem that counts for grades.

**Note 2.** Please make your answer as clear (i.e., easy to read) as possible. We reserve the right to take away points when the correctness cannot be easily determined (e.g., when the writing is messy and cannot be easily understood).

- (0 points) Find all the pure-strategy Nash equilibria in the following static game:

		Player 2		
		L   C   R		
Player 1	T	2, 4   3, 7   5, 3		
	M	4, 5   2, 0   2, 5		
	B	3, 5   2, 4   6, 6		

- (0 points) Consider the following dynamic game between two players. In stage 1, player 1 chooses a number  $y \in \{-2, -1, 0, 1, 2\}$ . If player 1 chooses an odd number, player 2 chooses a number  $x \in [\frac{1}{2}, 1]$ ; otherwise, player 2 chooses a number  $x \in [-1, -\frac{1}{2}]$ . In any case, player 2's payoff is  $xy$ , and player 1's payoff is  $2 - xy$ . Find the equilibrium behaviors and payoffs of the two players.
- (10 points) Recall the supply chain pricing problem discussed in the videos. Still assume that  $A = B = 1$  and  $C = 0$ . Suppose there are three firms in the supply chain, a manufacturer, a wholesaler, and a retailer. The manufacturer first charges the wholesaler a unit price  $w_1$ , the wholesaler then charges the retailer a unit price  $w_2$ , and lastly the retailer charges consumers a unit retail price  $r$ . Find the equilibrium outcome. Prove or disprove that  $w_1^* < w_2^* < r^*$ , where  $w_1^*$ ,  $w_2^*$ , and  $r^*$  are the equilibrium prices charged by the manufacturer, wholesaler, and retailer. Give economic interpretations to support your mathematical conclusions.