Information Economics, Fall 2016
Pre-lecture Problems 4

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Note 1. The deadline of submitting the pre-lecture problem is **9:20am, October 3, 2015**. 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).

1. (0 points) Recall that the manufacturer's expected profit is

$$Q(w - c) - \int_0^{(1-R)Q} RQr f(x) dx - \int_{(1-R)Q}^Q (Q - x) r f(x) dx$$

   as derived in page 22 of the slides. Differentiate this function with respect to r and R, respectively.

2. (0 points) Consider a retailer under a full-return contract with a return credit $0 < r \leq 1$, where the wholesale price is 1.

   (a) Find the optimal order quantity q^* when the random demand follows a uniform distribution between 0 and 1, the unit production cost is 0, and the unit retail price is 2.

   (b) Find the coordinating return credit r^*.

3. (10 points) Consider a retailer under a full-return contract with a return credit $0 < r \leq w$, where w is the wholesale price.

   (a) (3 points) Find the optimal order quantity q^* when the random demand follows a uniform distribution between 0 and 1, the unit production cost is c, and the unit retail price is p.

   (b) (4 points) How do c, p, w, and r affects q^*? Intuitively explain why.

   (c) (3 points) Find the coordinating return credit r.