

14.01 Fall 2010
Problem Set 7

1. (20 points) For each of the following statements, please indicate whether they are TRUE, FALSE, or UNCERTAIN. No credit will be given without an explanation as to why your claim is true.
 - (a) (5 points) If a monopsonist faces a perfectly elastic supply curve, there will be no deadweight loss relative to the competitive outcome.
 - (b) (5 points) It is economically more efficient to have a monopolist that discriminates perfectly than a monopolist that sets a single price.
 - (c) (5 points) In a Cournot duopoly market, the two firms agree to produce half of the monopoly output level for that market and split the resulting profit. Since the monopoly profit is the highest profit that can be obtained, the two firms will always stick to that agreement even if it's not legally (or in any other way) binding.
 - (d) (5 points) A firm is a monopolist in the market for good X. The government has perfect information about the marginal and average cost curves of this firm and also has perfect information about the demand curve for good X. Claim: The economy will reach an efficient outcome if the government sets a price ceiling that makes the price equal to the marginal cost, evaluated at the quantity where the marginal cost intersects the demand curve.
2. Problem removed due to copyright restrictions. This content is presented in audio form in the Solution Video for Problem Set 7, Problem 2.
3. (20 points) A monopoly faces market demand $Q = 30 - P$ and has a cost function $C(Q) = \frac{1}{2}Q^2$.
 - (a) (5 points) Find the profit maximizing price and quantity and the resulting profit to the monopoly.
 - (b) (5 points) What is the socially optimal price? Calculate the deadweight loss (DWL) due to the monopolist behavior of this firm. Calculate consumer surplus (CS) and producer surplus (PS). Show CS, PS, and DWL on the diagram.
 - (c) (5 points) Assume that the government puts a price ceiling on the monopolist at $P = 18$. How much output will the monopolist produce? What will be the profit of the monopolist? Calculate CS, PS, and DWL. Why is the deadweight loss different now?
 - (d) (5 points) Assume that the government put a price ceiling on the monopolist in order to maximize the total (i.e. consumer plus producer) surplus. What price ceiling should it choose? How much output will the monopolist produce at this price ceiling? What will the profit of the monopolist be? What is the DWL?

Problem 3 courtesy of William Wheaton. Used with permission.

4. (15 points) Suppose an industry has a duopoly structure. Duopolist 1 has a cost function given by:

$$c_1(y_1) = (y_1)^2 \text{ for } y_1 \geq 0$$

Duopolist 2 has a cost function given by:

$$c_2(y_2) = 12y_2 \text{ for } y_2 \geq 0$$

Denoting total output produced in the industry by $y = (y_1 + y_2)$, the inverse demand function for the good produced in the industry is given by:

$$p = 100 - y$$

- (a) (5 points) Find the reaction function of each duopolist.
- (b) (5 points) Using (a), obtain the output levels that will be produced in a Cournot-Nash equilibrium, and the price level in such an equilibrium.
- (c) (5 points) Illustrate your solution in (b) above in a suitable diagram.

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