B.E. International Program
Faculty of Economics
Thammasat University

EE311 Microeconomics Theory, Semester 1/2019

Homework Assignment #5 | Due date: Friday 8 November 2019
(in-class submission, before lecture begins!)

Instruction:

1) Attempt all questions.
2) You may study and discuss in group but you have to write up your solutions independently and by handwriting only. Copying and/or Plagiarism is considered as a serious crime in academic arena and it will not be tolerated. If detected, all parties involved receive 'zero.'
3) If you have any questions, please feel free to email me at pwrasai@econ.tu.ac.th

Monopoly (CH 11)

1. Algebraically show that the marginal revenue for a monopolist is less than the market price for positive quantities of output. Also, explain WHY.

10. Suppose that Intel has a monopoly in the market for microprocessors in Brazil. During the year 2005, it faces a market demand curve given by P = 9 – Q, where Q is millions of microprocessors sold per year. Suppose you know nothing about Intel's costs of production. Assuming that Intel acts as a profit-maximizing monopolist, would it ever sell 7 million microprocessors in Brazil in 2005?
(**Hint**: Find MR at Q = 7, and then interpret its value in order to answer the question.)

14. Suppose a monopolist has a constant marginal cost MC = £50 and faces a demand curve P = 100 – Q/2 (which can be rewritten as Q = 200 – 2P).
(a) Find the profit-maximizing price and quantity using the monopoly midpoint rule.
(b) Find the profit-maximizing price and quantity by equating MR to MC.

Caution
You can use the midpoint rule **ONLY IF the Marginal Cost is constant.**

16. A monopolist serves a market in which the demand is P = 120 – 2Q. It has a fixed cost of 300. Its marginal cost is 10 for the first 15 units (MC = 10 when 0 < Q < 15). If it wants to produce more than 15 units, it must pay overtime wages to its workers, and its marginal cost is then 20. What is the maximum amount of profit the firm can earn?
(**Hint**: When MR = MC = 10, is it true that 0 < Q < 15?)

18. Suppose a monopolist has an inverse demand function given by $P = 100Q^{(-1/2)}$. What is the monopolist's optimal mark-up of price above marginal cost?
(**Hint**: Find (P – MC)/P.)

Interpretation of IEPR

For example, if (P – MC)/P = ¼ = 25%, this means that the optimal PERCENTAGE mark-up of price over marginal cost is ¼ or 25%.

19. The marginal cost of preparing a large latte in a specialty coffee house is $1. The firm's market research reveals that the elasticity of demand for its large lattes is constant, with a value of about –1.3. If the firm wants to maximize profit from the sale of large lattes, about what price should the firm charge?

20. Imagine that Gillette has a monopoly in the market for razor blades in Mexico. The market demand curve for blades in Mexico is P = 968 – 20Q, where P is the price of blades in cents and Q is annual demand for blades expressed in millions. Gillette has two plants in which it can produce blades for the Mexican market: one in Los Angeles and one in Mexico City. In its L.A. plant, Gillette can produce any quantity of blades it wants at a marginal cost of 8 cents per blade. Letting Q_1 and MC_1 denote the output and marginal cost at the L.A. plant, we have $MC_1(Q_1) = 8$. The Mexican plant has a marginal cost function given by $MC_2(Q_2) = 1 + 0.5Q_2$.
(a) Find Gillette's profit-maximizing price and quantity of output for the Mexican market overall. How will Gillette allocate production between its Mexican plant and its U.S. plant?
(**Hint**: Find TOTAL MC of the multi-plant monopolist and then set $MC_{Total} = MR$)

21. Market demand is P = 64 – (Q/7). A multi-plant monopolist operates three plants, with marginal cost functions:

$$MC_1(Q_1) = 4Q_1$$
$$MC_2(Q_2) = 2 + 2Q_2$$
$$MC_3(Q_3) = 6 + Q_3$$

(a) Find the monopolist's profit-maximizing price and output at each plant.
(b) How would your answer to part (a) change if $MC_2(Q_2) = 4$?
(**Hint**: When $MC_2(Q_2) = 4$, should the monopolist produce in Plant 3?)

25. Suppose that a monopolist's market demand is given by $P = 100 - 2Q$ and that marginal cost is given by $MC = Q/2$.
(a) Calculate the profit-maximizing monopoly price and quantity.
(b) Calculate the price and quantity that arise under perfect competition with a supply curve $P = Q/2$.
(c) Compare consumer and producer surplus under monopoly versus marginal cost pricing. What is the deadweight loss due to monopoly?

"It is the time you have wasted for your rose that makes your rose so important."
— **Antoine de Saint-Exupéry,** The Little Prince