

**Microeconomics for Management - Yossi Spiegel**

**Problem set 10**

Problem 1

The demand function for a certain product is given by  $Q = Ap^{-b}$ , where  $A > 0$  and  $b > 1$ . Suppose the product is provided by a monopolist.

- (a) Why is there a need to assume that  $b > 1$ ? Why don't we need to restrict  $A$  to be above 1?
- (b) How should the monopolist price the product relative to its marginal costs? That is, what should be the markup of the product above marginal cost?

Problem 2

A monopoly faces an inverse demand function  $P = A - Q$ . The monopoly has two plants. Plant 1 has a cost function  $C_1 = Q_1^2/2$  and plant 2 has a cost function  $C_2 = rQ_2 + kQ_2^2/2$ , where  $r < A/3$ .

- (a) Find the monopoly's profit maximizing quantity and price. How will the monopolist allocate production between the two plants?
- (b) Suppose that  $k > 1$ . Draw a figure that shows the marginal costs in the two plants. Which is higher? Given your answer, why would the monopoly wish to allocate production between the two plants rather than concentrate it in only one of the plants?
- (c) What happens when  $r > A/3$ ? Explain your answer in detail.

Problem 3

A monopoly sells its product in two separate markets. The inverse demand function in market 1 is given by  $Q_1 = 10 - P_1$  and in market 2 it is given by  $Q_2 = A - P_2$ . The monopoly's cost function is  $C = 5Q$ , where  $10 < A \leq 20$ , and  $Q$  is the monopoly's aggregate output.

- (a) Suppose the monopoly must set a uniform price in the two markets. Compute the monopoly's price. Why do we need to assume that  $A \leq 20$ ? What happens when this assumption is violated?

- (b) Suppose the monopoly can engage in third-degree price discrimination. Compute the prices that it will set in the two markets.
- (c) Compare the prices in (a) and in (b). Under what conditions does the monopoly benefit from the ability to engage in third-degree price discrimination?
- (d) Compare consumer surplus in (a) and in (b). Who benefits from third-degree price discrimination and who does not relative to the uniform price case? (Hint: consumer surplus is the area below the demand function and above the price. To figure out what consumer surplus is, draw a graph of the demand function. Then, consumer surplus is given by the area of a triangle).
- (e) Compare social welfare (the sum of consumer surplus and the monopoly's profit) in (a) and in (b). Is third-degree price discrimination welfare-enhancing or welfare-decreasing? Explain the intuition for your answer.
- (f) Now suppose that  $A = 25$ . Repeat your answers to (a), (d), and (e).
- (g) Is it a good idea in terms of public policy to ban third-degree price discrimination? Given your answers to (e) and (f) what are the conditions under which you would be more inclined to approve bans on third-degree price discrimination and under what conditions will you be more inclined to refrain from imposing such bans?