

### Problem Set 3

1. Why is there a social cost to monopoly power? If the gain to producers from monopoly power could be redistributed to consumers, would the social cost of monopoly power be eliminated? Explain briefly.
2. A monopolistic firm faces the following average revenue (demand) curve:  $P = 100 - 0.01Q$  where  $Q$  is weekly production and  $P$  is price, measured in cents per unit. The firm's cost function is given by  $C = 50Q + 30000$ .
  - A) What is the level of production, price, and total profit per week?
  - B) The government decides to levy a tax of 10 cents per unit on this product. What will the new level of production, price, and profit be as a result?
3. A monopolistic firm has two factories, for which costs are given by:  
Factory #1:  $C_1(Q_1) = 10Q_1^2$   
Factory #2:  $C_2(Q_2) = 20Q_2^2$   
The firm faces the following demand curve:  $P = 700 - 5Q$ , where  $Q$  is total output ( $Q = Q_1 + Q_2$ ).
  - A) Calculate the values of  $Q_1$ ,  $Q_2$ ,  $Q$ , and  $P$  that maximize profits. Also draw a diagram to illustrate the optimal choices of this firm.
  - B) Suppose labor costs increase in Factory 1 but not in Factory 2. How should the firm adjust  $Q_1$ ,  $Q_2$ ,  $Q$ , and  $P$ ?
4. A monopolist has a cost function of  $c(y) = cy$  so that its marginal costs are constant at \$ $c$  per unit. The monopolist is operating at an output level where the absolute value of price elasticity is 3. The government imposes a quantity tax of \$6 per unit of output.
  - (a) If the monopolist is facing linear demand curve, how much does the price rise?
  - (b) If the monopolist has constant elasticity, how much does the price rise?
5. Suppose that a monopoly can produce any level of output it wishes at a constant marginal cost \$5 per unit. Assume that the monopoly sells its goods in two different markets that are separated by some distance. The demand curve in the first market is given by  $Q_1 = 55 - P_1$ , and the demand curve in the second market is given by  $Q_2 = 70 - 2P_2$ .
  - 1) If the monopolist can maintain the separation between the two markets, what level of output should be produced in each market, and what price will prevail in each market? What are total profits in this situation?
  - 2) How would your answer change if it only costs demanders \$5 to transport goods between the two markets? What would be the monopolist's new profits in this situation?
  - 3) How would your answer change if transportation costs were zero and the firm was forced to follow a single-price policy?

Intermediate Microeconomics  
Fall 2010

- 4) Suppose the firm could adopt a linear two-part tariff under which marginal prices must be equal in the two markets but lump-sum entry fees might vary. What pricing policy should the firm follow?
6. A monopoly supplies its products in two segmented markets. The first market's demand is  $Q_1 = 10 - P_1$ , and the second is  $Q_2 = A - P_2$ . The firm's cost function is  $C = 5Q$ , where  $10 < A \leq 20$ , and  $Q$  is the output.
- a) Suppose the monopoly has to set the same price in these two markets, what is it? Why should we assume that  $A \leq 20$ ? What if this condition does not hold?
- b) Suppose the monopoly is able to implement the third-degree discrimination. Derive the profit-maximizing prices in the two markets.