

Problem set 2

“due” 2/18/2010

Problem 1 The cost function for John’s shoe repair is $c(q) = 100 + 10q - q^2 + \frac{1}{3}q^3$, so that marginal cost is $c'(q) = 10 - 2q + q^2$. Shoe repair is a perfectly competitive industry.

a. Suppose the price of shoes is \$80. Solve for John’s profit-maximizing quantity of shoes repaired. What is John’s profit in this case?

b. What is John’s supply curve, relating the price of a shoe repair p to the quantity of shoes he repairs, q ?

c. Draw a picture of John’s average cost curve (hint: average cost is $\frac{c(q)}{q} = \frac{100}{q} + 10 - q + \frac{1}{3}q^2$) and his marginal cost curve. Indicate where in your picture John’s supply curve is. Also indicate the price below which John would shut down his business in the long run.

Problem 2 Each firm in a competitive market has a cost function of $c(q) = 16 + q^2$. The market demand function is $Q = 24 - p$. Determine the long-run equilibrium price, quantity per firm, market quantity, and number of firms.

Problem 3 The Albuquerque Isotopes, a minor league baseball team, have a stadium which seats 30,000 people. All seats are identical. The optimal ticket price is \$5, yet this results in an average attendance of only 20,000 people.

a. Explain how it can be profitable to have 10,000 empty seats.

b. Next week the Isotopes play the Capital City Goofballs, who have offered to buy an unlimited number of tickets at \$4 each, to be resold only in Capital City. How many tickets should be sold to Capital City to maximize the Isotopes’ profit? 10,000? More than 10,000? Explain.

c. Given your answer to b, what price should the Isotopes charge their own fans? \$4? \$5? More?

Problem 4 True/false: a monopolist will increase its output if the government institutes a binding price ceiling. Explain why. If the government wants to set a price ceiling which achieves allocative efficiency, what price should it choose? (Hint: use a graph to help answer this question).

Problem 5 There are 10 households in Lake Wobegon, Minnesota, each with a demand for electricity of $Q = 50 - P$. Lake Wobegon Electric’s (LWE) cost of producing electricity is $c(Q) = 500 + Q$.

a. If the regulators of LWE want to reach allocative efficiency, what price will they force LWE to charge? What will output be in this case? Calculate LWE’s profit with that price.

b. If regulators want to ensure that LWE doesn’t lose money, what is the lowest price they can impose? Calculate output, price, and profit. Is this outcome allocatively efficient?

c. It is suggested that each household be required to pay a fixed amount just to receive any electricity at all, and then a per-unit charge for electricity. Then LWE can break even while charging the price calculated in a. What fixed amount would each household have to pay for the plan to work?

Problem 6 A monopolist faces the demand curve $p = 24 - Q$, and has constant marginal cost of \$4. If the firm runs an advertising campaign, its demand shifts out to $p = 32 - Q$. What is the largest amount the firm would be willing to pay for this campaign?

Problem 7 An airline has two types of customers who fly a given route, tourists and business travelers. Say that tourists have demand function $p = 20 - q$, where q is the quality level for the seat in which a tourist sits, and business travelers have demand given by $p = 40 - q$. Suppose that there is a fixed number of customers who fly this route, $\frac{1}{8}$ of them business travelers, and $\frac{7}{8}$ of them tourists. For simplicity, assume that the cost of providing a given quality level on a flight is 0 for the airline, and that the cost of taking on an additional passenger is also 0.

a. Suppose the airline can only set one quality level on this route. What quality level should the airline set, and what price should it charge for a ticket?

b. Now suppose it is possible for the airline to offer both a first class section and a coach section, with different quality levels. Suppose the quality and price of a coach seat is the same as the quality and price you solved for in b. What should the price of a first class ticket be to maximize profit?

c. Now suppose the airline reduces the quality in coach by 2 units. What is the new price in coach? In first class? Show that this quality reduction increases the airline's profits.

Problem 8 John runs a car washing service with five potential customers. John has a marginal cost of \$8 per wash. The price that each customer will pay John to wash her car is listed below:

Customer	willingness to pay
Abby	\$30
Bianca	\$5
Chloe	\$20
Diana	\$15
Erin	\$25

a. Suppose that John must charge the same price to all of his customers (he is a single-price monopolist). What price does he charge and how many washes does he sell?

b. Suppose now that it is possible for John to price discriminate. Now how many washes will John sell?