Problem set 4
"due" 11/4/2009

Problem 1 The demand curve a monopoly faces is $P = 100 - Q$. The firm's cost curve is $c(Q) = 10 + 5Q$ (so $mc = 5$). What is the firm's profit-maximizing quantity and price? What is the firm's profit? What is the value of consumer surplus and deadweight loss? What is this monopolist's Lerner index?

Problem 2 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 3 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 maximizes total surplus, what price should it choose? (Hint: use a graph to help answer this question).

Problem 6 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 make sure that there is no deadweight loss in this market, what price will they force LWE to charge? What will output be in this case? Calculate consumer surplus and 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, consumer surplus, and profit. Is there any deadweight loss?

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 5 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 6 The demand function for a monopolist's product is given by $p = 43 - 2q$. The monopolist has a constant marginal cost of $3.

a. Find the monopolist's profit-maximizing price and quantity. What is his profit?

b. Suppose the monopolist is able to perfectly price discriminate. What quantity will he sell, and what will his profit be?

Problem 7 The Grand Theater is a movie house in a medium-sized college town. On any given night, if the theater is open, it must pay $500 in fixed costs (paying electricity, ushers, etc) regardless of how many

people come to the theater. If the theater is closed, its costs are 0. There are two groups of people who come to the Grand Theater, students and non-students. Students have demand function $q_s = 220 - 40p_s$ while non-students have demand function $q_n = 140 - 20p_n$.

a. Suppose that the theater cannot tell students apart from non-students. What price will it charge? How many students will come? How many non-students? What will the profits of the Grand Theater be?

b. Now suppose that the cashier can accurately tell students from non-students by asking students to show their student IDs. Students cannot resell their tickets to non-students after purchase. Will the Grand charge students and non-students different prices? What will these prices be? What will be the Grand's profits?

c. Finally, suppose that the Grand Theater can only hold 150 people. If the theater is able to charge separate prices to students and non-students, what prices will it charge, and how many students and non-students will come?

Problem 8 Your firm produces 2 products, each at 0 marginal cost. You face four types of customers, each comprising 25% of your total customers (say you have N total customers). The groups have the following willingness to pay for your product:

customer	good 1	good 2
A	$25	$100
B	$40	$80
C	$80	$40
D	$100	$25

a. Compare selling these two products separately to bundling them and selling them together for one price. Which leads to a higher profit?

b. Now consider the possibility that you sell these goods both bundled and unbundled (that is, you set three prices, one for good 1 alone, one for good 2 alone, and one for the bundle of good 1 and good 2). Would doing this improve upon the outcome of part a? Explain.

c. Now suppose that the production of each good entails a marginal cost of $30. How does this information change your answers to a and b above? Is it better to sell the goods unbundled, bundled, or both bundled and separately?

Problem 9 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.