

Due at the start of class Wed., Mar. 20th

1. The market supply curve for labor in Springfield is given by $W = 5 + Q$. The only employer in town is the nuclear plant. Its labor demand curve is $W = 10 - Q$. (W is the wage).
 - a. Make a table showing the plant's units of labor, average expenditure per unit of labor, total expenditure on labor, and marginal expenditure per unit of labor. Show average and marginal expenditure on a diagram.
 - b. What quantity of labor is hired, and at what wage? In a diagram show the reduction in producer surplus caused by monopsony.
2. There is only one hot dog vendor at Candle stick Park. During a sold-out Giants-Dodgers game, the vendor knows that the demand for hot dogs is $P = 5.5 - .0001Q$.
 - a. If the vendor's marginal cost of providing a hot dog is \$1.50, how many hot dogs will he sell, and at what price? If his fixed costs are \$500 per game, what are per-game profits?
 - b. If the vendor has only 10000 hot dogs to sell on a particular night (and the same cost structure as above), how many hot dogs will he sell, and at what price? Illustrate.
 - c. Suppose that regulators impose a hot dog price ceiling of \$3.00. Illustrate the effect of this ceiling on marginal revenue. How many hot dogs will the vendor sell with the restriction in force (assume that supply is as in part a)? Would the price ceiling bind if $MC = .05$?
3. More on the vendor: he knows that Dodgers and Giants fans have different demand curves for chocolate malts. Dodgers fans are described by: $P = 4 - .005Q$, while Giants fans are described by $P = 2.25 - .01Q$. Marginal cost is \$0.25.
 - a. The vendor instructs his employees to look at fans' baseball caps to see which team they favor (assume that all fans wear a Giants or Dodgers cap). The employees are now instructed to charge Dodger and Giants fans different prices. What price will the vendor charge each type of consumer? How many malts does he sell? What are profits?
 - b. If fans do not wear caps, what price does the vendor charge? How many does he sell? What are profits?
 - c. Are profits higher or lower when the vendor is able to price discriminate?
4. What conditions are necessary for monopolistic competition? Compare equilibrium for a monopolistically competitive firm with an equilibrium for a perfectly competitive firm. (Draw diagrams). In what important ways do the equilibria differ?

5. Two firms producing widgets share a demand curve $P = 100 - Q$, where $Q = Q_1 + Q_2$. Firms 1 and 2 have costs described by $TC = 10 + 5Q_i + 0.5Q_i^2$.
 - a. Find reaction curves for firms 1 and 2.
 - b. If collusion is impossible, what is the equilibrium of this game? What equilibrium concept are you using? Find each firm's optimal output and profit and the market price.
 - c. Suppose firm 1 can set its output first. Solve the problem again. How does your answer change? Why?

6. Be an economic theorist. Develop a Cournot-style model of "triopoly" in which firms optimally choose output quantities. The widget market has three large firms. The market demand curve for widgets is $P = 30 - Q$, where $Q = Q_1 + Q_2 + Q_3$. Firms 1, 2, and 3 have the following cost curves: $C_1(Q_1) = 5Q_1$, $C_2(Q_2) = 5Q_2$, and $C_3(Q_3) = 10Q_3$.
 - a. Find reaction curves for firms 1, 2, and 3.
 - b. What do you know about optimal Q_1 and Q_2 ? Explain?
 - c. Find Cournot triopoly equilibrium quantities Q_1 , Q_2 , and Q_3 . Find the market price for widgets.
 - d. (difficult) How would you solve this problem if $C_1(Q_1) = 3Q_1$?

7.
 - a. You manage a miniature golf club. You have equal numbers of two types of potential customers with demand curve $P = 10 - Q$ (type 1), $P = 11 - Q$ (type 2), where Q refers to rounds of golf. $MC = 5$, and there are no fixed costs. What fees do you set for use of the course to maximize profits? Do you want both types of potential customers to join?
 - b. If type 2 potential customers have the demand curve $P = 15 - Q$, what pricing strategy gives maximum profit?