Due Wednesday, April 14th at 4 p.m. in TA's mailbox (OGUR)

1. The ABC company has a monopoly on the production of right shoes. The XYZ company has a monopoly on the production of left shoes. For simplicity, assume that the marginal cost of producing shoes is zero, and that the demand function for shoes is given by $S = 120 - p_t$, where $S$ is the number of pairs of shoes and $p_t$ is the price of a pair of shoes. Each firm must decide whether to charge a price of $30$ or $40$ for its product.

(a) Write down the decision problem facing these firms using a payoff matrix.
(b) What would you expect to be the outcome if the two firms acted independently? (That is, what is the Nash equilibrium?)
(c) Suppose that the firms were charged with collusion, could the defense make use of the precedent established in *Theatre Enterprises*? Why or why not?
(d) Suppose the firms merge to form a monopoly and charge the monopoly price for pairs of shoes. Calculate the change in total surplus relative to the Nash equilibrium prices.

2. Price Leadership: In Problem Set #1, market demand as a function of price was given by $D(p) = 136 - p$, for $p \leq 136$. Suppose that the industry demand curve shifts out to $D(p) = 192 - p$ for $p = 192$. Then, in long-run competitive equilibrium there would be 23 firms operating their plants at the minimum AC level of 8.

(Recall that the cost function for each plant is given by $C(y) = 32 + 0.5y^2$, with $MC(y) = y$.) Suppose that "U.S. Steel" acquires 12 of these firms and their plants and behaves as a dominant firm price leader in this industry. In the *short-run*, before new firms can enter the industry or USS can close down any of its plants:

(a) What is the equation of the residual demand curve facing USS?
(b) How much output does USS sell? At what price? What is its profit?
(c) How much output do each of the remaining independent firms produce in their plants? How much profit do they earn?

Suppose that there exist only 23 suitable plant sites, so that no new firms can enter the industry.

(d) In the *long-run*, how many of its 12 plants will USS choose to keep in operation? What price and output levels will it choose?
(e) What is the Deadweight Loss associated with this market?

3. Initially, there are 3 firms serving a market whose demand curve is given by $P = 120 - Y$, where $Y = y_1 + y_2 + y_3$ is the total quantity produced. Firm 1 has a constant marginal cost of production of $c_1 = 10$. Firm 2’s marginal cost is $c_2 = 20$, and firm 3’s marginal cost is 30. The firms currently behave as Cournot triopolists.

(a) Describe the Cournot equilibrium of this industry: i.e., find the equilibrium market price and quantity, the output levels of each of the three firms, and the value of the Herfindahl Index.
(b) Firms 2 and 3 propose to merge. Determine whether or not this merger would be challenged under the DOJ Merger Guidelines.
(c) As a representative of consumers, would you oppose or approve this merger? Explain. (HINT: This requires you to determine the post merger Cournot equilibrium. Ask yourself how a manager of the merged firm would divide its output between the two plants.)
(d) What would be your opinion if you were interested in maximizing consumers’ plus producers’ surplus? Explain.