ECNS 204 – Microeconomics
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Homework 5
Due Tuesday, April 9

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1. Assume there are two companies (WW East and WW West) that produce broomsticks for the entire broomstick market. The market demand and supply for broomsticks is

$$\text{Demand:} \quad P = 50 - (2 * Q_d)$$
$$\text{Supply:} \quad P = 2 + (0.4 * Q_s)$$

where P is the price of a broomstick and Q is the quantity of broomsticks demanded. In equilibrium, $Q_s = Q_d$. Assume this market is perfectly competitive.

   a. Compute the market equilibrium price and quantity.

To find this equilibrium, we set Demand equal to Supply to solve for Q.

$$\mathbf{50 - 2Q = 2 + 0.4Q}$$
$$\mathbf{48 = 2.4Q}$$
$$\boxed{\boldsymbol{Q = 20}}$$

Then substitute Q into the Demand curve to find the associated P.

$$\boldsymbol{P = 50 - 2(20) = 50 - 40}$$
$$\boxed{\boldsymbol{P = 10}}$$

   b. Compute the profit-maximizing output level assuming the two firms have the following MC curves

WW East: $MC_E = q + 2$
WW West: $MC_w = \frac{2}{3} * q + 2$

Each firm is a price-taker in a perfectly competitive industry. Thus, prices are set equal to MC in order to determine the profit-maximizing quantity for each firm.

WW East: $\mathbf{10 = q_E + 2} \quad \rightarrow \quad \mathbf{q_E = 8}$

WW West: $\mathbf{10 = \frac{2}{3} q_W + 2} \quad \rightarrow \quad \mathbf{q_E = 12}$

Now assume that the two companies consider merging to form Witch Way. This merger would effectively provide Witch Way with monopoly power. The MC curve for Witch Way is the same as the market supply curve shown above. As a new employee at the Department of Justice, you are asked to evaluate the economic impacts of this merger. The questions below are related to this analysis

c. Determine the profit-maximizing output and price given that the marginal revenue curve facing Witch Way is as follows

$$MR = 50 - 4 * Q$$

The monopolist sets output at the point where MC=MR, such that

$$\mathbf{2 + (0.4Q) = 50 - 4Q}$$

$$\mathbf{4.4Q = 48}$$

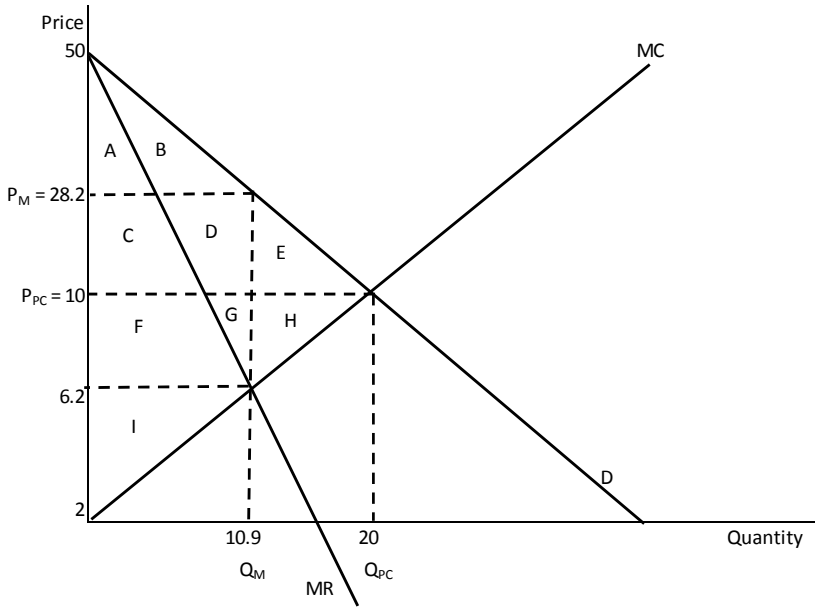
$$\boxed{\boldsymbol{Q = 10.9}}$$

Then the monopolist is able to charge the highest price consumers are willing to pay for the given amount, which corresponds with the demand curve. This point can be found by plugging in the given Q.

$$\boldsymbol{P = 50 - 2(10.9) = 50 - 21.8}$$

$$\boxed{\boldsymbol{P = 28.2}}$$

d. Graphically show the impact of this merger on consumer surplus, producer surplus, and deadweight loss, relative to when the market was initially perfectly competitive.



Pre-merger: <u>CS</u> = A + B + C+ D + E; <u>PS</u> = F + G + H + I; <u>DWL</u> = 0

Post-merger: <u>CS</u> = A + B; <u>PS</u> = C + D + F + G + I; <u>DWL</u> = E + H

e. Determine the changes to consumer surplus, producer surplus, and deadweight loss. *Your answer should include numbers.*

Pre-merger: ***CS = 0.5*20*40 = 400***
PS = 0.5*20*8 = 80
DWL = 0

Post-merger: ***CS = 0.5*10.9*21.2 = 115.54***
PS = 10.9*((26.2+22)/2) = 10.9*24.1 = 262.69
DWL = 0.5*22*9.1 = 100.1

f. Does social welfare increase or decrease after the merger? Justify your answer.

Social welfare decreases with the entry of deadweight loss. The sum of PS and CS decreases.

Executives from WW East and WW West meet in private and decide that if you decide to reject their merger that they will collude and jointly act as a monopolist. More specifically, they determine that they will jointly limit production and charge the price determined in part (c).

g. Explain the incentives that each firm has to undercut their competitor in order to increase profits.

Each firm has the incentive to undercut their competitor by lowering price and capturing a larger portion of the entire market in an effort to increase profits.