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

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

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
$$MR = 50 - 4 * Q$$

   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.
   e. Determine the changes to consumer surplus, producer surplus, and deadweight loss. *Your answer should include numbers.*
   f. Does social welfare increase or decrease after the merger? Justify your answer.

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.