ECO101A: Introduction to Economics

Tutorial 5

1. A firm has two factories for which costs are given by:

   Factory #1: $\boldsymbol{C_1(Q_1) = 10\,Q_1^2}$

   Factory # 2: $\boldsymbol{C_2(Q_2) = 20\,Q_2^2}$

   The firm faces the following demand curve: $\boldsymbol{P = 700 - 5Q}$

   where Q is total output, i.e. $\boldsymbol{Q = Q_1 + Q_2}$.

   a. On a diagram, draw the marginal cost curves for the two factories, the average and marginal revenue curves, and the total marginal cost curve (i.e., the marginal cost of producing $Q = Q_1 + Q_2$). Indicate the profit-maximizing output for each factory, total output, and price.
   b. Calculate the values of Q_1, Q_2, Q, and P that maximize profit.
   c. Suppose labor costs increase in Factory 1 but not in Factory 2. How should the firm adjust the following (i.e., raise, lower, or leave unchanged): Output in Factory 1? Output in Factory 2? Total output? Price?

2. Dayna's Doorstops, Inc. (DD), is a monopolist in the doorstop industry.
   Its cost is $\boldsymbol{C = 100 - 5Q + Q^2}$, and
   demand is $\boldsymbol{P = 55 - 2Q}$.

   a. What price should DD set to maximize profit? What output does the firm produce? How much profit and consumer surplus does DD generate?
   b. What would output be if DD acted like a perfect competitor and set MC = P? What profit and consumer surplus would then be generated?
   c. What is the deadweight loss from monopoly power in part (a)?
   d. Suppose the government, concerned about the high price of doorstops, sets a maximum price at $27. How does this affect price, quantity, consumer surplus, and DD's profit? What is the resulting deadweight loss?
   e. Now suppose the government sets the maximum price at $23. How does this affect price, quantity, consumer surplus, DD's profit, and deadweight loss?
   f. Finally, consider a maximum price of $12. What will this do to quantity, consumer surplus, profit, and deadweight loss?