Problem 1.

(a) Graphically represent a single price monopolist (with U-shaped ATC) earning a profit. Clearly show profits, quantity produced, and any deadweight loss.

(b) Graphically illustrate a natural monopoly in the long-run earning a profit. Clearly show profits, quantity produced, and any deadweight loss.

Problem 2. Consider the market for scooters. Suppose it is a (single-price) monopolistic market. The market demand for scooters is given by the equation \( P_D(Q) = 200 - Q \). The firm faces costs given by the total cost function \( TC(Q) = 2Q^2 + 50Q + 10 \) and marginal cost function \( MC(Q) = 4Q + 50 \).

(a) What will be this firms profit maximizing quantity?

(b) What profit does this firm earn?

(c) Calculate the deadweight loss generated by this monopoly.

Now suppose this monopolist is a perfect price discriminator.

(d) What will be this firms profit maximizing quantity?

(e) What profit does this firm earn?

(f) Calculate the deadweight loss generated by this monopoly.
Problem 3. Consider the following scenario. There are two countries (Country A, Country B). Each country can make two decisions: "fight" or "not fight." If both countries "fight," they both lose resources (they both get a payoff of -10). If one country "fights" and the other does "not fight," the "not fighting” country loses more resources (payoff of -20) the ”fighting” country loses fewer resources (payoff of -5). If both countries chose to ”not fight” they both gain resources (they both get a payoff of 10).

(a) This is a game. Clearly state:
   1. The players
   2. The strategies
   3. Create the payoff matrix that corresponds with the game described above.
      Put Country A on the left and Country B on the top.

(b) Find ALL of the Nash Equilibria for this game. Justify your answer.