**PROBLEM SET #4: FIRM OBJECTIVES, PRODUCTION COSTS**

**A. Profit Maximization**

1. (a) Suppose that the firm’s demand curve for its product is flat at P=6. What is total revenue (TR), average revenue (AR) and marginal revenue (MR) as a function of the quantity of output Q. Graph each of these on a diagram with output on the horizontal axis.

(b) Suppose that the firm’s demand curve for its product is \( Q = 20 - 2P \). Calculate total revenue (TR), average revenue (AR) and marginal revenue (MR) for \( Q = 0, 1, 2 \ldots \) etc. Graph each of these on a diagram with output on the horizontal axis.

(c) Show that in (a) if the firm chooses Q so that MR = SMC, then it will set P = SMC.

(d) Show that in (b) if the firm chooses Q so that MR = SMC, then it will set Q at a point where \( P > SMC \). Show that this decision is inefficient.

2. In a perfectly competitive industry, firms set output such that P = SMC. Using this criterion analyze whether the following industries are perfectly competitive or not:

   (a) College Economics 1 texts.
   (b) Auto dealerships.
   (c) The US airline industry.
   (d) The movie theater market.
   (e) Long distance telephone service providers.
   (f) Restaurants.

**B. Firm and Industry Costs**

3. Suppose that McDonald’s produces hamburgers at a constant LMC of $2 each. Plot the LAC and LTC as a function of output on a diagram with output on the horizontal axis.

4. Suppose that Ford produces a particular model of auto only with a fixed investment of $1 b. in research and development. Once this investment is undertaken they can produce vehicles at a constant marginal cost of $10,000 each. Graph the LTC and LAC curves.