ECON2103 Microeconomics

Chapter 8 Exercises

1. Suppose you are the manager of a watchmaking firm operating in a competitive market. Your cost of production is given by $C = 200 + 2q^2$, where q is the level of output and C is total cost. (The marginal cost of production is $4q$; the fixed cost is \$200.)
    a. If the price of watches is \$100, how many watches should you produce to maximize profit?
    b. What will the profit level be?
    c. At what minimum price will the firm produce a positive output?

2. Suppose that a competitive firm's marginal cost of producing output q is given by $MC(q) = 3 + 2q$. Assume that the market price of the firm's product is \$9.
    a. What level of output will the firm produce?
    b. What is the firm's producer surplus?
    c. Suppose that the average variable cost of the firm is given by $AVC(q) = 3 + q$. Suppose that the firm's fixed costs are known to be \$3. Will the firm be earning a positive, negative, or zero profit in the short run?

3. A competitive firm has the following short-run cost function:

$$\boldsymbol{C(q) = q^3 - 8q^2 + 30q + 5.}$$

    a. Find *MC*, *AC*, and *AVC* and sketch them on a graph.
    b. At what range of prices will the firm supply zero output?
    c. Identify the firm's supply curve on your graph.
    d. At what price would the firm supply exactly 6 units of output?

4. Suppose you are given the following information about a particular industry:

$$Q^D = 6500 - 100P \quad \text{Market demand}$$

$$Q^S = 1200P \quad \text{Market supply}$$

$$C(q) = 722 + \frac{q^2}{200} \quad \text{Firm total cost function}$$

$$MC(q) = \frac{2q}{200} \quad \text{Firm marginal cost function.}$$

Assume that all firms are identical, and that the market is characterized by perfect competition.

a. Find the equilibrium price, the equilibrium quantity, the output supplied by the firm, and the profit of each firm.
b. Would you expect to see entry into or exit from the industry in the long run? Explain. What effect will entry or exit have on market equilibrium?
c. What is the lowest price at which each firm would sell its output in the long run? Is profit positive, negative, or zero at this price? Explain.
d. What is the lowest price at which each firm would sell its output in the short run? Is profit positive, negative, or zero at this price? Explain.

5. Consider a city that has a number of hot dog stands operating throughout the downtown area. Suppose that each vendor has a marginal cost of $1.50 per hot dog sold and no fixed cost. Suppose the maximum number of hot dogs that any one vendor can sell is 100 per day.

   a. If the price of a hot dog is $2, how may hot dogs does each vendor want to sell?
   b. If the industry is perfectly competitive, will the price remain at $2 for a hot dog? If not, what will the price be?
   c. If each vendor sells exactly 100 hot dogs a day and the demand for hot dogs from vendors in the city is $Q = 4400 - 1200P$, how many vendors are there?
   d. Suppose the city decides to regulate hot dog vendors by issuing permits. If the city issues only 20 permits and if each vendor continues to sell 100 hot dogs a day, what price will a hot dog sell for?
   e. Suppose the city decides to sell the permits. What is the highest price a vendor would pay for a permit?