

UNIVERSITY OF WISCONSIN  
Economics 101- Spring 2007  
Professor Brown

Problem Set 9

Due by March 28-30, 2007

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**Problem 1**

Suppose the market for tennis rackets is perfectly competitive, with each firm facing a total cost curve given by  $TC=32 + 10q + 2q^2$ . This implies each firm has a marginal cost curve given by  $MC = 10 + 4q$ .

- a. Give equations for the average total cost (ATC) curve, the average variable cost (AVC) curve, and the average fixed cost (AFC) curve
- b. Sketch ATC, AVC, AFC, and MC on one graph, with quantity on the horizontal axis.
- c. Give an example of a price at which firms would operate in the short run but shut down in the long run. Graph your price, and label it  $P_1$ .
- d. Give an example of a price at which no firm would produce anything, even in the short run. Graph this price, and label it  $P_2$ .

Now, suppose that market demand is given by  $P = 106 - 2Q$ .

- e. What will be the market price when the firms are in a perfectly competitive long-run equilibrium? Graph this price, and label it  $P_3$ .
- f. How many firms are operating in the long-run equilibrium at price  $P_3$ ?
- g. Do you think perfect competition is a reasonable model for the tennis racket market? Which assumptions of the perfect competition model do you think are satisfied/broken in the real tennis racket market?

### **Problem 2**

Jim is a private contractor producing tanks for the Department of Defense. His marginal costs are shown below for various quantities of tanks:

Output (Q)	Marginal Cost (MC)
1	15
2	10
3	5
4	6
5	14
6	20

- If Jim produces in a perfectly competitive market where the price is \$15, what is his profit-maximizing quantity of tanks?
- Suppose that, instead of choosing the optimal quantity, Jim decides to produce the quantity where average variable cost is the lowest. How many tanks would Jim produce? Show how you arrived at your answer.
- What is Jim's shut down price? (i.e. the price below which he would shut down)

### **Problem 3**

Suppose that a perfectly competitive industry consists of identical firms. The industry is currently such that the market price is less than the minimum of firms' average total cost. Which of the following is true:

- Since firms are making losses, their marginal revenues must be less than their marginal costs.
- Because firms are making losses, some firms will leave the industry which will drive up the market price
- Because firms are making profits, firms will enter the industry which will drive up the market price
- Because firms are making losses, some firms will leave the industry which will drive down the market price
- Because firms are making profits, firms will enter the industry which will drive down the market price

### **Problem 4**

You are a manager of a perfectly competitive firm that has marginal cost given by  $MC = 2q$ , where  $q$  is your firm's output. Your firm has no fixed cost. Suppose that the market price is 6. You find that your firm is currently producing 4 units of output. Which of the following must be true:

- Your firm is currently maximizing its profit.
- If your firm was to increase its output by 1 unit, its profit would increase.
- If your firm was to increase its output by 2 units, its profit would increase.
- If your firm was to decrease its output by 2 units, its profit would increase.
- If your firm was to decrease its output by 1 unit, its profit would increase.