IVY TECH STATE COLLEGE
ECN 101 ECONOMICS FUNDAMENTALS
Fall 2006

Homework_03: Answer Key

Chapter_05

3. You've been hired by an unprofitable firm to determine whether it should shut down its unprofitable operation. The firm currently uses 70 workers to produce 300 units of output per day. The daily wage (per worker) is $100, and the price of the firm's output is $30. The cost of other variable inputs is $500 per day. Although you don't know the firm's fixed cost, you know that it is high enough that the firm's total costs exceed its total revenue. Should the firm continue to operate at a loss?
If the firm continues to operate its facility, its total revenue will be $9,000 = $30 times 300 units of output. This is the benefit of operating the facility. The cost of operating the facility is the variable cost, which equals the sum of labor costs ($7,000 = the $100 wage times 700 workers) and the cost of other variable inputs ($500). Total revenue exceeds variable cost, so it is sensible to continue operating the facility in the short run, even though it is losing money.

4. Consider the choices facing an unprofitable (and perfectly competitive) firm. The firm currently produces 100 units per day at a price of $22. The firm's total cost is $3,000 per day, and its variable cost is $2,500 per day. At the current output level, the marginal cost of production is $45.
    a. Evaluate the following statement from the firm's accountant: "Given our current production level, our variable cost ($2,500) exceeds our total revenue ($2,200). We should shut down our production facility. Illustrate your answer with a graph showing the standard short-run cost curves and the revenue curve of a perfectly competitive firm.
    > **The marginal cost ($45) exceeds the marginal revenue (price=$22), so the firm is not maximizing its profit: the firm is producing too much output. At the profit-maximizing output, the total revenue may exceed variable cost. We cannot decide whether the firm should be shut down until we know the average variable cost at the profit-maximizing quantity. However, if TR < VC at the profit-maximizing point, the accountant is correct, and the firm should shut down.**
    b. Illustrate your answer with a graph showing short-run cost curves and the revenue curve of a perfectly competitive firm.
    > **The marginal revenue curve is horizontal at a price of $22. Marginal revenue must equal marginal cost at an output of less than 100 units. At 100 units, SATC and SAVC exceed $22, but both will be lower at the appropriate level of output.**

7. Consider the following data on the relationship between the price of gasoline (in real terms, adjusted for inflation) and the quantity of gasoline sold per day in the City of Ceteris Paribus.

Year	Price	Gallons per Day
1995	1.00	50,000
1996	1.10	53,000

If possible, draw the industry supply curve and compute the price elasticity of supply.

We can only use this information to draw the supply curve and compute the price elasticity of supply if we know that all determinants of supply, such as production costs and number of firms, were held constant over this time period.

Chapter_06

4. Consider the Slappers, a hockey team that plays in an arena with 8,000 seats. The only cost associated with staging a hockey game is a fixed cost of $6,000: the team incurs this regardless of how many people attend a game. The demand curve for hockey tickets has a slope of [$1/1,000]: each $1 increase in price decreases the number of tickets sold by 1,000. For example, here are some combinations of price and quantity:

Price	$4	$5	$6	$7
Quantity	8,000	7,000	6,000	5,000

The owner's objective is to maximize the profit per hockey game (total revenue less the $6,000 fixed cost). (a) What price will maximize profit? (b) If the owner picks the price that maximizes profit, how many seats in the arena will be empty? (c) Is it rational to leave some seats empty?

Marginal cost is zero. Thus, the goal is to maximize revenue. This occurs at the point where MR is equal to zero, which is at a price of $6 and a quantity of 6,000 seats. There will be 2,000 empty seats, but this is rational since profits would actually be lower if all seats were sold at a price of $4.

6. Consider a natural monopolist. Here is some data on prices and quantities.

Price	$20	$19	$18	$17	$16
Quantity	100	120	140	160	180
MR	**$15**	**$13**	**$11**	**$9**	**$7**

a. Complete the table: for each quantity, use the formula for marginal revenue to compute the marginal revenue.
b. Draw the monopolist's demand curve and its marginal-revenue curve.
c. Suppose the firm's long-run marginal cost is $9. How much output should the firm produce?
   First, notice that the slope of the demand curve is .05. The firm will produce 160 units at a price of $17.

8. Consider a monopolist who owns a natural spring that produces water that, according to nearby residents, has a unique taste and healing properties. The monopolist has a fixed cost of installing plumbing to tap the water, but no marginal cost. The demand curve for spring water is linear. Depict graphically the monopolist's choice of a price and quantity. At the profit-maximizing quantity, what is the price elasticity of demand? If the spring were owned by the government, what price would it charge?

The monopolist will produce at the point where marginal revenue equals marginal cost. Because MC = 0, this is the point at which the MR curve intersects the horizontal axis. Price is then found at the corresponding point on the demand curve. Since this must be the midpoint of the demand curve (since MR = 0), elasticity is –1. The government would charge a price equal to average cost.