Economics 205
UNIVERSITY OF VICTORIA
Managerial Economics
Spring 2014

Assignment #5

Solutions

Due: Wednesday, April 2, 2014 (3 pm.) (Place In the box marked **Econ 205** near the Economics main office.)

Question 1: A flag producer has been trying to determine the optimal price for its product. The weekly demand for the firm's product was estimated to be:

$$Q_D = 972 - 25P$$

where Q_D= Quantity and P =price.
Based on estimates provided by the plant, the cost function is:

$$TC=75+0.47Q$$

where TC =total cost per week and Q = output.

a) Find the optimal price and quantity of flags. ***(2 Marks)***

To find the optimal price on the basis of the MR=MC rule, the producer first should find the total revenue and marginal revenue functions based on the data.
Expressing this equation in terms of price:

$$Q_D = 972 - 25P$$
$$25P = 972 - Q_D$$
$$P = \frac{972}{25} - \frac{Q_D}{25}$$
$$P = 38.88 - 0.004Q_D$$

and substituting this into equation for total revenue, TR=P*Q, total revenue is:

$$TR = 38.88Q - 0.04Q^2$$

To find marginal revenue take the first derivative of this equation and set it equal to the firm's marginal cost.

MC = 0.47 per unit and is constant.

Solve for the quantity that satisfies the equality.

$$MR = \frac{\partial TR}{\partial Q} = 38.88 - 0.08Q$$

$$MR = MC$$

$$38.88 - .08Q = 0.47$$

$$38.41 = 0.08Q$$

$$Q = 480.125$$

$$P = 38.88 - 0.04(480.125) = 19.675$$

B) Determine weekly profit at this price. ***(2 Marks)***

Profit = TR-TC

= P*Q- [75+0.47(Q)]

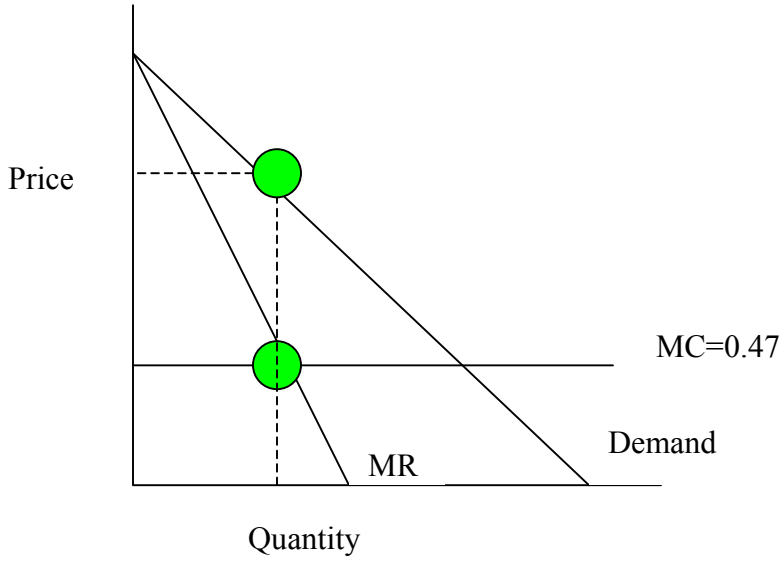
= (19.675*480.125)-[75+(0.47*480.125)]

=(9446.459) - [300.65875]

= 9145.80

C Illustrate the pricing decision with a diagram. ***(2 Marks)***

Price



<u>Question 2</u>: A firm has the following short-run demand cost schedule for a particular product:

$$Q = 72 - 8P$$

$$TC = 32 + 2Q$$

A) At what price should this firm sell its product? ***(2 Marks)***
Must first determine the quantity it should produce that will maximize its revenue:
MR=MC.
TR=P*Q

$$Q = 72 - 8P$$

Rearranging the demand function: $8P = 72 - Q$

$$P = 9 - \frac{Q}{8} = 9 - 0.125Q$$

TR= $9Q-0.125\ Q^2$

MR=9-[(0.25)Q
MC=2

9-0.25Q=2
(0.25)Q=7
Q=28
P=9-0.125(28) =5.5

b) If this is a monopolistically competitive firm, what do you think would start to happen in the long run? Explain.***(2 Marks)***

Profit is $66

AVC at this quantity: TC/Q=(88/Q)= 88/28=3.143
32/28+2=1.1428+2=3.143

Price is $5.5

Since this firm is making a profit and other firms can enter the market, new firms will enter the market and take away some of the firm's demand. The demand curve will start to shift to the left (inward).

c) Suppose in the long run, the demand shifted to Q=55-8P. What should the firm do? Explain.

(3 Marks)

$Q = 55 - 8P$

$8P = 55 - Q$

$P = 6.875 - \frac{Q}{8}$

so, total revenue is:

$TR = P \times Q = 6.875Q - \frac{1}{8}Q^2$

$MR = 6.875 - 0.25Q = 2 = MC$ at the optimal output point.

Solving: $6.875 - 2 = 0.25Q$

$4.875 = 0.25Q$

$Q = 19.5$

$P = 6.875 - \frac{Q}{8} = 6.875 - 2.4375 = \$4.4375$

Firm should drop its price to $4.44 and quantity produced to 19.5 units. This is the best it can do. The firm is making a profit .

Question 3: (10 Marks)

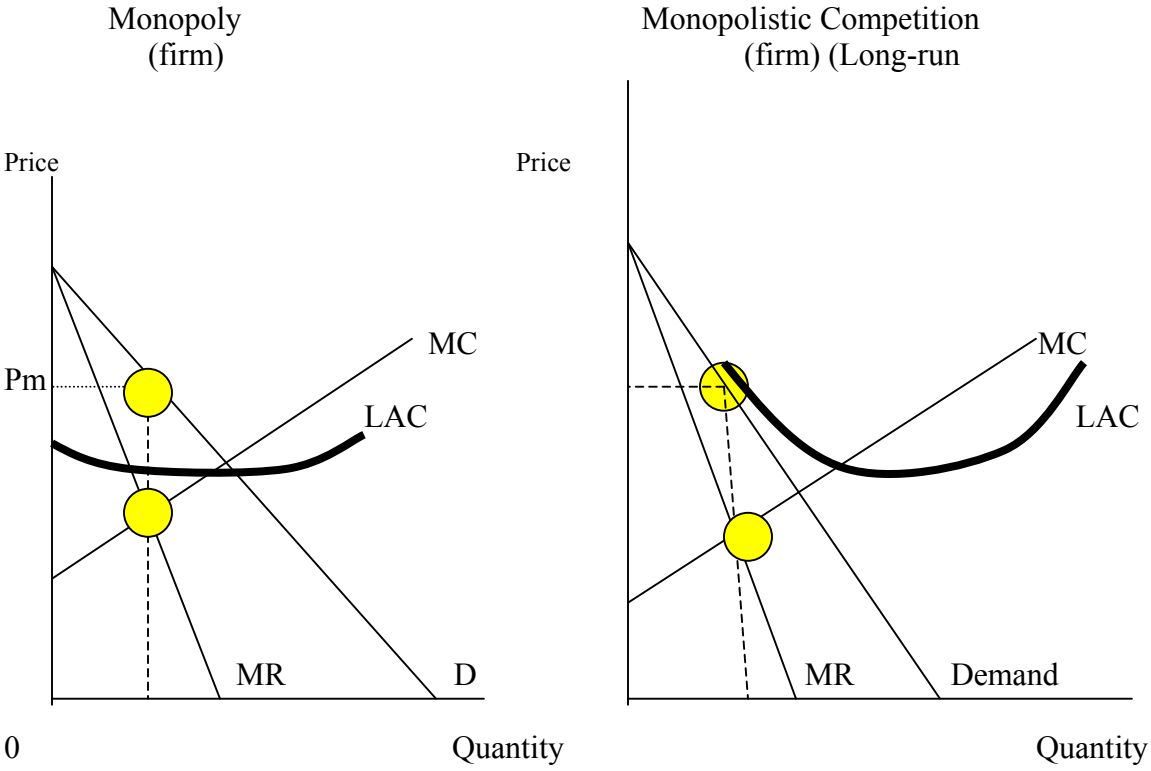
Compare and contrast the firm's individual demand, marginal revenue and marginal cost functions within the monopolistic market structure and the monopolistically competitive market structure. Describe the defining characteristics of each market structure. Use diagrams to illustrate.

Monopoly Market structure:

● Price is determined by the demand function for the product.
The firm in this market structure will produce an output where MR=MC.
There is only one firm in the market. So, the firm has power to set price.
●Each firm produces a unique product, and there are no close substitutes.
●Demand and MR are downward sloping curves.
●In the long run, profit is not zero; the firm will not necessarily operate at the minimum of LAC.
●There are barriers to entry.

Monopolistic Competition:
●Price is determined by the firms demand curve. These firms are price makers.
●Each firm produces a different but similar product. Product differentiation is the defining characteristic of this market structure.
●The firm is aware of its rivals, however there are so many firms in the industry, they do not worry about retaliation or concern themselves with other firms' actions.
●The quantity produced is determined by the intersection of MR=MC for the firm.
●Price is determined along the demand curve at that quantity.

●In the long run, profit will be zero.
●The firm will not operate necessarily at minimum LAC. Consumers are willing to pay more for choice of products.



Note: Price in each market is not meant to be the same.

Question 4: (2 marks) Explain what motivates research and development undertaken in the oligopolistic market structure.

●More R&D may occur in oligopoly markets due to mutual interdependence. Each oligopolist knows that an innovation by a rival will most probably reduce the firm's market share.

●Oligopolists may engage in "defensive" innovation to protect their market share.

●Also, oligopolists are more likely to be large enough to support facilities necessary for successful R&D.