

Answer on Question #44278 – Economics – Microeconomics

The Lumins Lamp Company, a producer of old-style oil lamps, estimated the following demand function for its product: $Q = 120,000 - 10,000P$ where Q is the quantity demanded per year and P is the price per lamp. The firm's fixed costs are \$12,000 and variable costs are \$1.50 per lamp.

Solution

$Q_d = 120,000 - 10,000P$, $P_d = 12 - Q_d/10,000$, $FC = \$12,000$, $VC = \$1.50$ per lamp.

a. Write an equation for the total revenue (TR) function in terms of Q .

$$TR = P \cdot Q = (12 - Q/10,000) \cdot Q = 12Q - Q^2/10,000$$

b. Specify the marginal revenue function.

$$MR = TR' = 12 - Q/5,000$$

c. Write an equation for the total cost (TC) function in terms of Q .

$$TC = FC + VC = 12,000 + 1.5Q$$

d. Specify the marginal cost function.

$$MC = TC' = 1.5$$

e. Write an equation for total profits (π) in terms of Q . At what level of output (Q) are total profits maximized? What price will be charged? What are total profits at this output level?

$$\pi = TR - TC = 12Q - Q^2/10,000 - 12,000 - 1.5Q = -Q^2/10,000 + 10.5Q - 12,000$$

Total profits are maximized, when $MR = MC$, so:

$$12 - Q/5,000 = 1.5$$

$$Q/5,000 = 10.5$$

$$Q = 10.5 \cdot 5,000 = 52,500 \text{ units}$$

$$P = 12 - Q_d/10,000 = 12 - 52,500/10,000 = \$6.75$$

$$\pi = -52,500^2/10,000 + 10.5 \cdot 52,500 - 12,000 = \$263,625$$

f. Check your answer in Part (e) by equating the marginal revenue and marginal cost functions, determined in Parts (b) and (d), and solving for Q .

$$MR = 12 - 52,500/5,000 = 1.5, MC = 1.5.$$

g. What model of market pricing behavior has been assumed in this problem? Explain.

As $P = \$6.25$ and is higher than $MR = MC = 1.5$, this is monopolistic market or the market of monopolistic competition.