

Answer on Question #63242, 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.

- Write an equation for the total revenue (TR) function in terms of Q .
- Specify the marginal revenue function.
- Write an equation for the total cost (TC) function in terms of Q .
- Specify the marginal cost function.
- 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?
- Check your answers in Part (e) by equating the marginal revenue and marginal cost functions, determined in Parts (b) and (d), and solving for Q .
- What model of market pricing behavior has been assumed in this problem?

Answer:

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

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

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

d. $MC = TC' = 1.5$

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

Total profits are maximized, when

$$MR = MC,$$

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

$$Q/5,000 = 10.5$$

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

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

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

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

g. $P = \$6.25$ and is higher than $MR = MC = 1.5$

This is monopolistic market.