

Answer on question #60225-Economics - Microeconomics

Given the following information:

$$P = 20 - 2Q$$

$$MC = AC = 4$$

- Determine the profit-maximizing output and price charged by a monopolist.
- Determine the competitive price and output.

Solution

- The monopolist will maximize profits where its marginal revenue is equal to marginal cost (MR=MC)

The marginal revenue (MR) is the change in total revenue (TR) that results from selling 1 more unit of output (Q).

The total revenue is calculated as output price (P) multiplied by the quantity (Q).

$$TR = P * Q$$

Plug demand function to total revenue formula:

$$TR = (20 - 2Q)Q = 20Q - 2Q^2$$

The formula of marginal revenue will be derivative from total revenue function:

$$MR = dTR/dq$$

$$MR = 20 - 4Q$$

From equilibrium MR and MC find profit-maximizing outputs and price

$$20 - 4Q = 4$$

$$Q^* = 4$$

The profit-maximizing outputs Q^* plug to demand function $P(q)$:

$$P^* = 20 - 2 * 4 = 12$$

b)

The competitive price and outputs will be when average revenue is equal average cost (AR=AC)

The average revenue will be derivative from total revenue function:

$$AR = TR/Q$$

$$AR = (20Q - 2Q^2)/Q = 20 - 2Q$$

$$20 - 2Q = 4$$

$$Q_c = 8$$

Plug competitive outputs Q_c to demand function:

$$P(Q_c) = 20 - 2 * 8 = 4$$

Answer

a) $Q^* = 4$, $P^* = 12$ for profit-maximizing on monopolist market

b) $Q_c = 8$, $P_c = 4$ for competitive market

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