

Topic 8 Part 2

Monopoly (Chapter 11)

Multi-Plant Monopoly

Suppose the monopolist has two plants: one plant has marginal cost $MC_1(Q)$ and the other has marginal cost $MC_2(Q)$.

The problem here is how a monopolist would allocate production across the plants under its management.

Whenever the marginal costs of the two plants are not equal, the firm can increase profits by reallocating production towards the lower marginal cost plant and away from the higher marginal cost plant.

Thus, if $MC_2 > MC_1$, more output should be produced at Plant 1.

Multi-Plant Marginal Costs Curve

Question: How much should the monopolist produce in total?

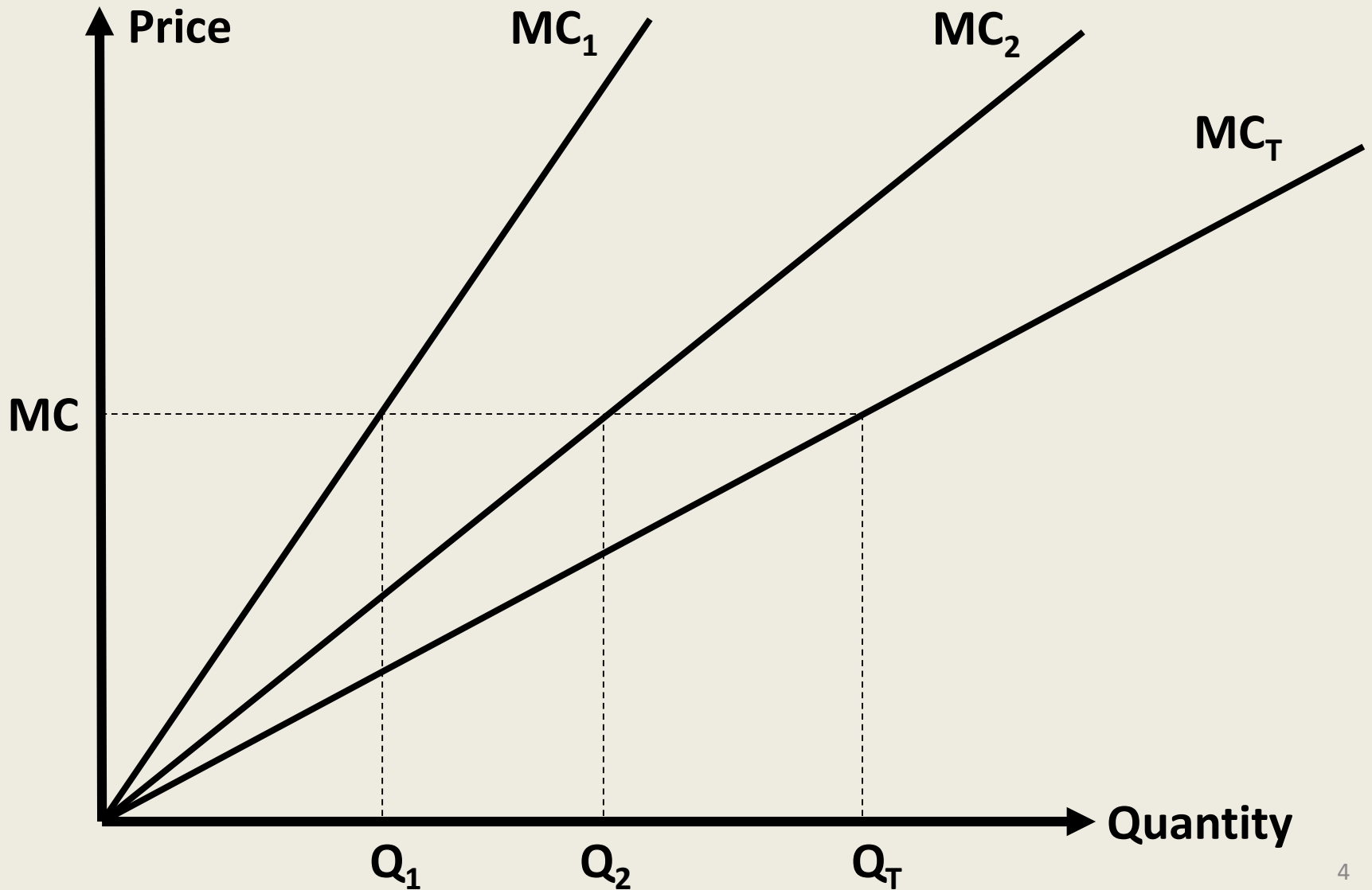
Definition: The **Multi-Plant Marginal Cost Curve (MC_T)** is the horizontal sum of the marginal cost curves of the individual plants (i.e. this curve shows the total output that can be produced at every level of marginal cost.)

Answer:

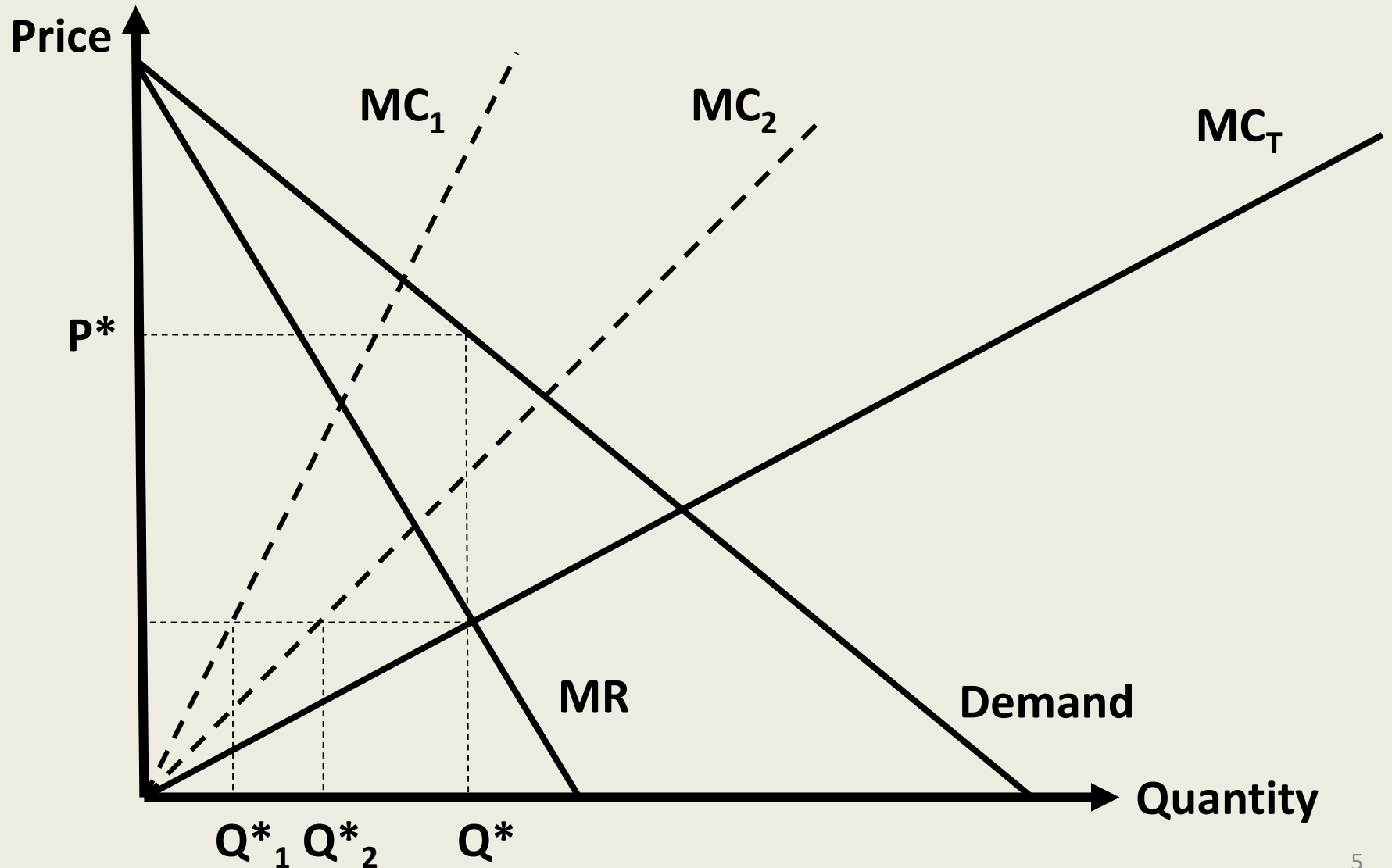
The monopolist produces where $MR = MC_T$. This will give the profit-maximizing quantity Q^* .

The output production between two plants is determined by $MR(Q^*) = MC_1(Q_1^*) = MC_2(Q_2^*)$ with $Q_1^* + Q_2^* = Q^*$.

Multi-Plant Marginal Costs Curve



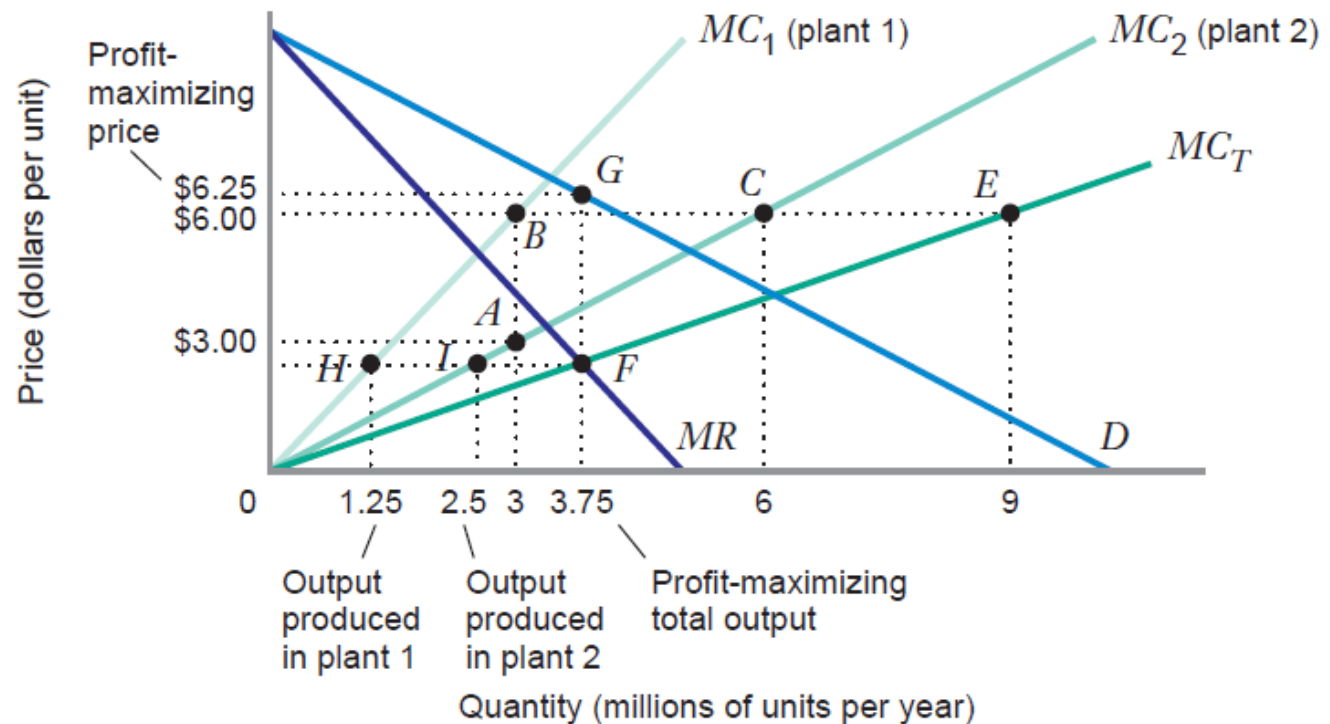
Multi-Plant Monopolistic Maximization



Multi-Plant Monopolistic Maximization

FIGURE 11.14 Profit Maximization by a Multiplant Monopolist

The monopolist's multiplant marginal cost curve MC_T is the horizontal sum of the individual plant's marginal cost curves MC_1 and MC_2 . The monopolist's optimal total output of 3.75 million units per year occurs at $MR = MC_T$, where the optimal price is \$6.25 per unit. Plant 1 produces 1.25 million units of the total output, and plant 2 produces 2.5 million units.



Multi-Plant Monopolistic Maximization

LEARNING-BY-DOING EXERCISE 11.6

Determining the Optimal Output, Price, and Division of Production for a Multiplant Monopolist



Suppose a monopolist faces a demand curve given by $P = 120 - 3Q$. The monopolist has two plants. The first has a marginal cost curve given by $MC_1 = 10 + 20Q_1$, and the second plant's marginal cost curve is given by $MC_2 = 60 + 5Q_2$.

Problem

- (a) Find the monopolist's optimal total quantity and price.
- (b) Find the optimal division of the monopolist's quantity between its two plants.

HINT: To find MC_T , you must first invert $MC(Q)$ to $Q(MC)$.

Cartel

Definition: A **cartel** is a group of firms that collusively determine the price and output in a market, e.g. OPEC countries controlling oil price and production.

In other words, a **cartel acts as a single monopoly firm** that maximizes total industry profit.

The problem of optimally allocating output across cartel members is identical to the monopolist's problem of allocating output across individual plants.

A cartel does not necessarily divide up market shares equally among members: **firms with higher marginal cost produce less.**