

# EE211

# PRINCIPLES OF MICROECONOMICS

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Topic 8:

Market Structure

# Types of Market Structure

- **Perfect competition**
  - Many firms & (almost) identical products
  - Ex: Rice, milk, salt
- **Monopolist competition**
  - Many firms & differentiated products
  - Ex: Movies, coffee
- **Oligopoly**
  - Few firms
  - Ex: Internet providers, OPEC
- **Monopoly**
  - One firm
  - Ex: Electricity, ?

# COMPETITIVE MARKET

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# Topics – Competitive Market

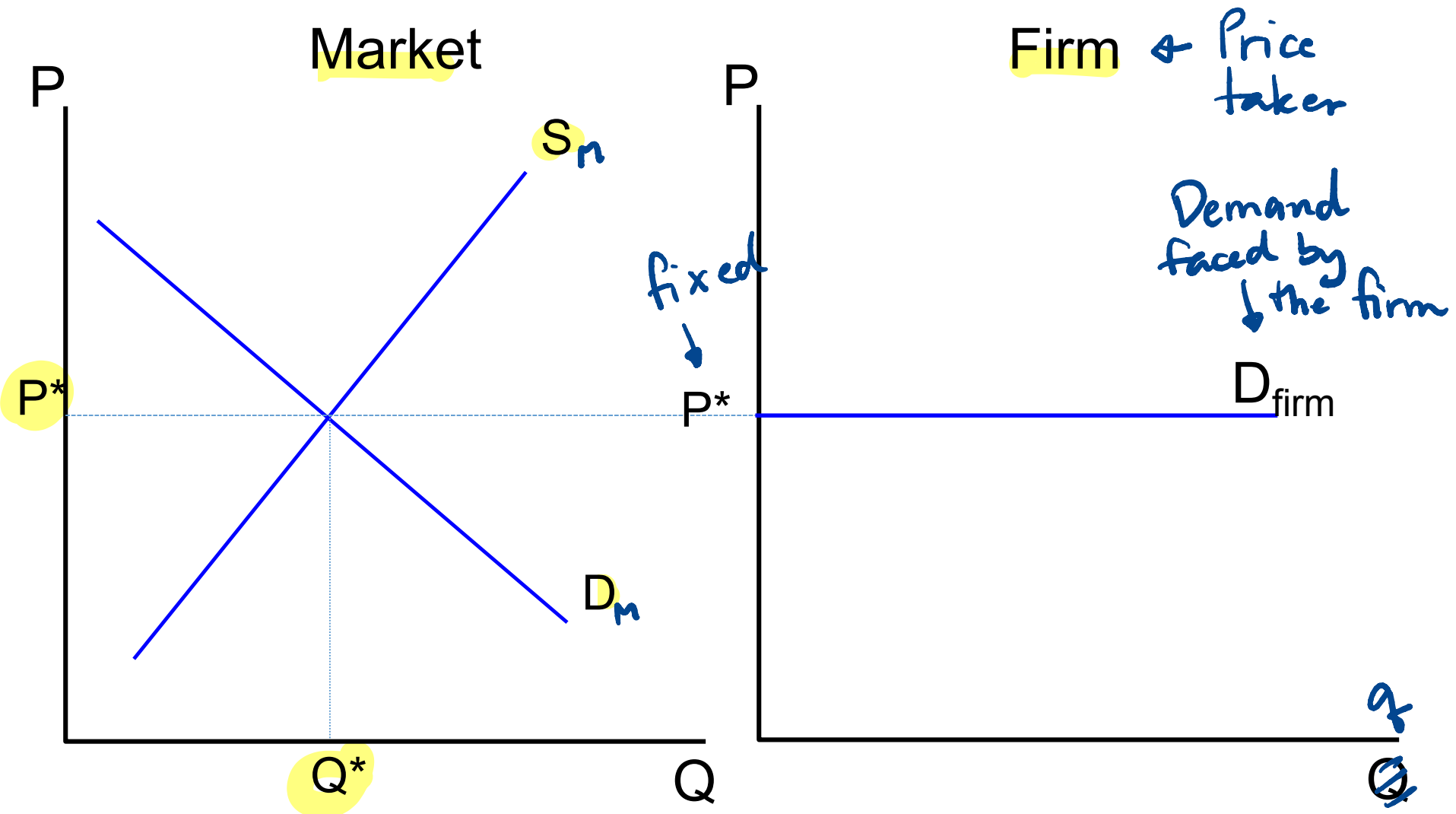
- Nature of Demand, TR, MR, and AR
- Short-run Equilibrium
- Derivation of Firm's and Market's Short-Run Supply Curves
- Long-run Equilibrium

# Perfect Competition

Key assumptions:

1. All firms sell a *same* homogenous product.
  2. There are many buyers and sellers (i.e. firms are small relative to the size of the industry).
  3. Buyers have complete information.
  4. Free entry and exit
- Assumptions 1-3 → each firm is a "price taker".
- P is fixed.*

# Market's and Firm's Demand Curves in Competitive Market



## Firm's Objective:

$$\text{Max } \pi = TR - TC \quad (\text{ie. Profit} \\ = \text{Total revenue} \\ - \text{Total cost})$$

- $TR = P \times Q = P(Q) \times Q$

In perfectly competitive mkt,  $P = \bar{P}$ .

So,  $TR = \bar{P} \times Q$

- $TC = TC(Q)$

# TR, AR, and MR (Q = quantity of output)

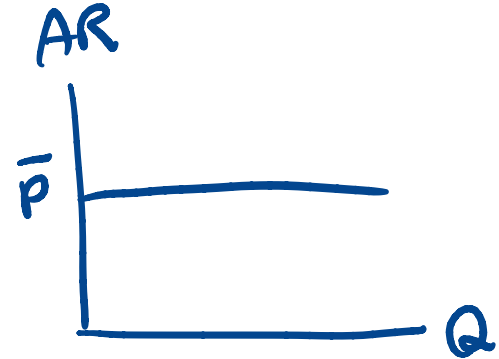
- Total Revenue:

$$TR = \bar{P} \times Q$$

( $\bar{P}$  is a constant)

- Average Revenue:

$$AR = \frac{TR}{Q} = \bar{P}$$



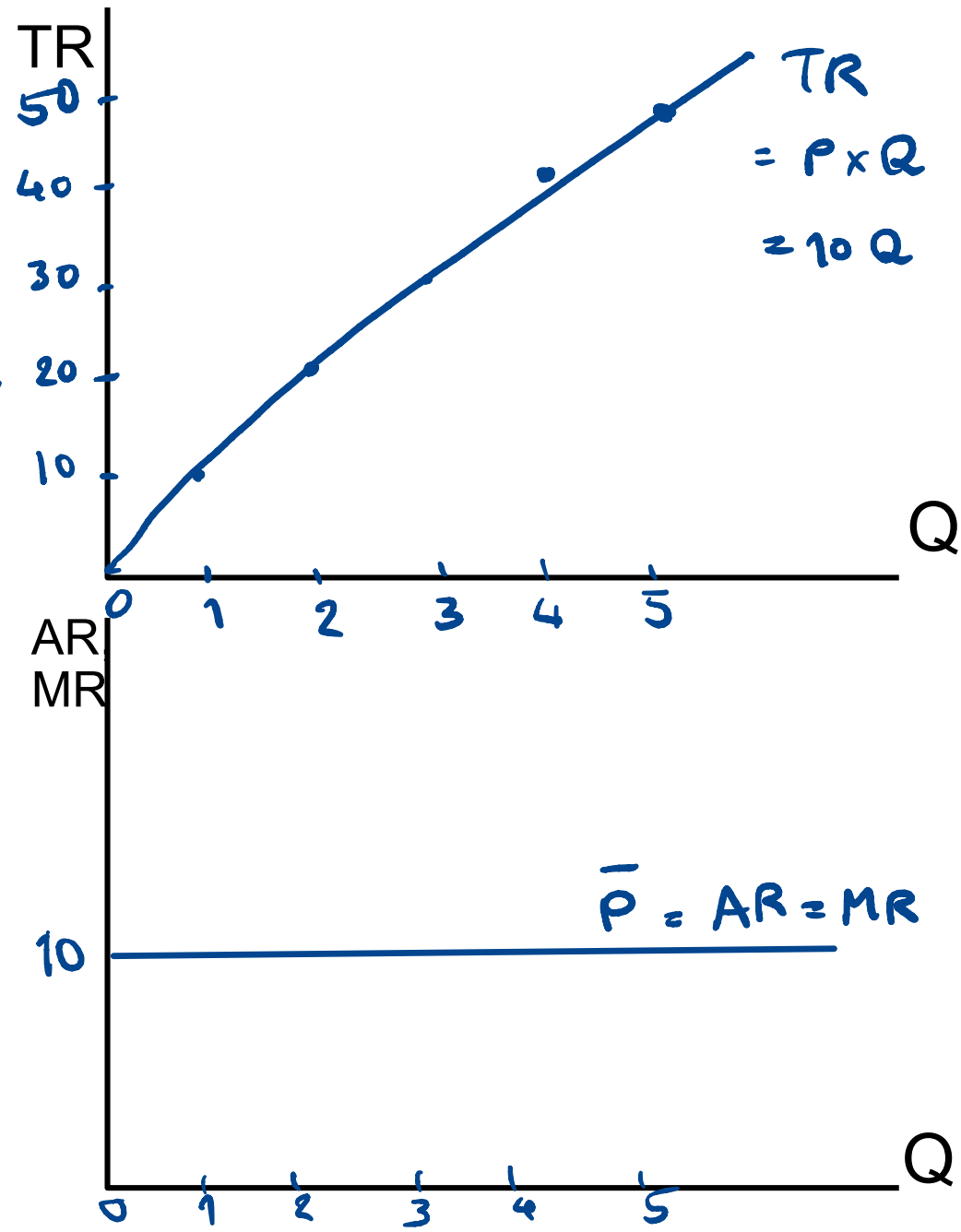
- Marginal Revenue:

$$MR = \frac{\Delta TR}{\Delta Q} = \frac{d(TR)}{dQ} = \frac{d(\bar{P} \cdot Q)}{dQ} = \bar{P}$$

# Example:

P	× Q	= TR	AR = $\frac{TR}{Q}$	MR = $\frac{\Delta TR}{\Delta Q}$
\$10	0	\$0	\$10	\$10
\$10	1	\$10	\$10	\$10
\$10	2	\$20	\$10	\$10
\$10	3	\$30	\$10	\$10
\$10	4	\$40	\$10	\$10
\$10	5	\$50	\$10	\$10

constant



# Short-Run Decisions

- Rules for all profit-maximizing firms:

$$\frac{TR}{Q} < \frac{TVC}{Q}$$

$$P = AR < AVC$$

$$\therefore P < AVC$$

**Rule 1:** Firms should not produce at all if, for all levels of output,  $TR < TVC$  (i.e.  $P < AVC$ ).

- Firms shut down if  $P < AVC$ .

(Firms would produce only when  $P \geq AVC$ .)

**Rule 2:** If it is worthwhile for the firm to produce at all, the firm should produce the output at which  $MR = MC$ . (Why is this so?)

$$\text{(i.e. } \frac{\Delta TR}{\Delta Q} = \frac{\Delta TC}{\Delta Q} \text{)}$$

- For a firm in a perfectly competitive market, it maximizes output when  $P = MC$ .

$$\text{(}\because MR = P\text{)}$$

# Example (Continued):

$$MR - MC = 0$$

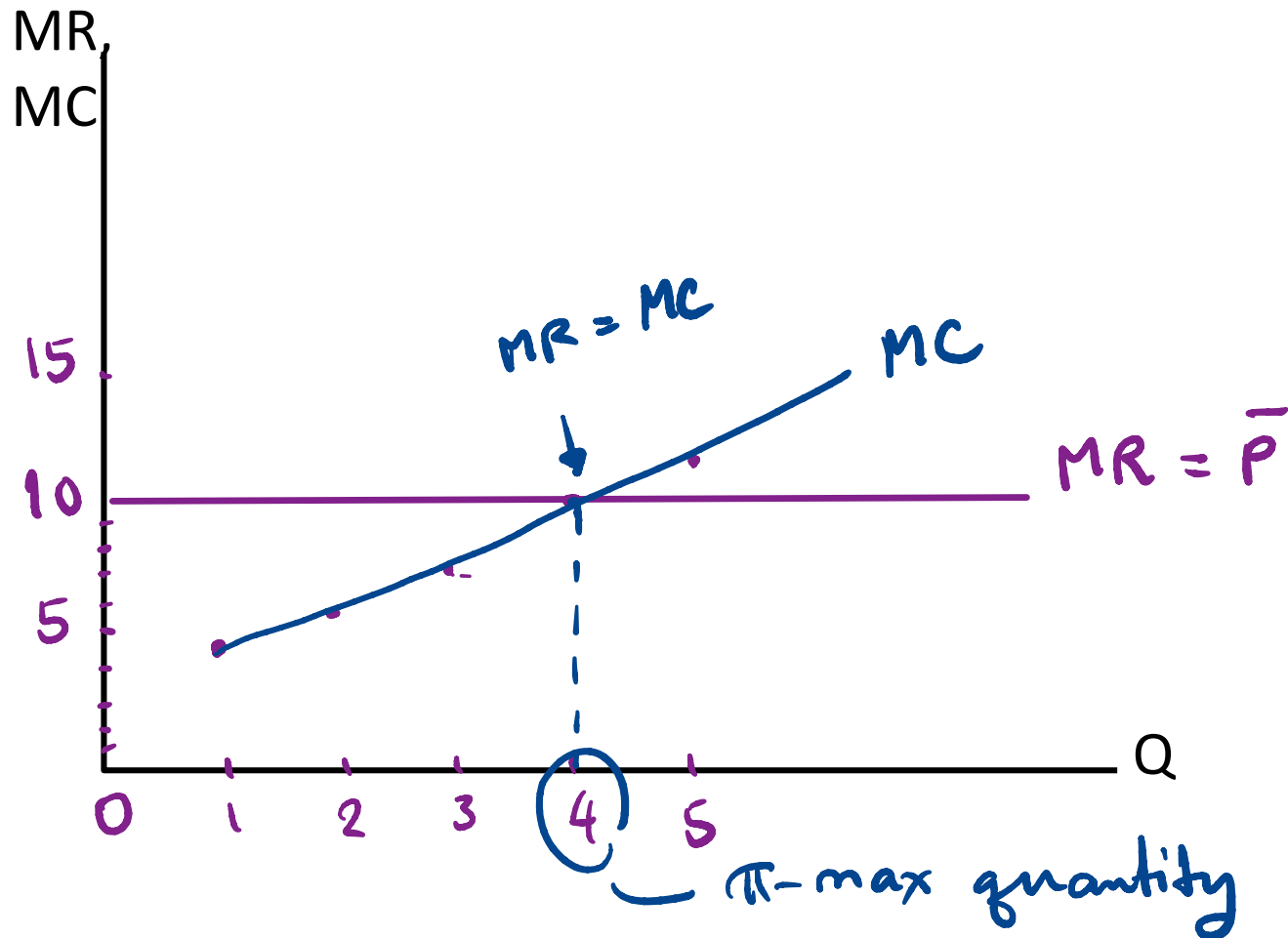
$$MR = MC$$

Given

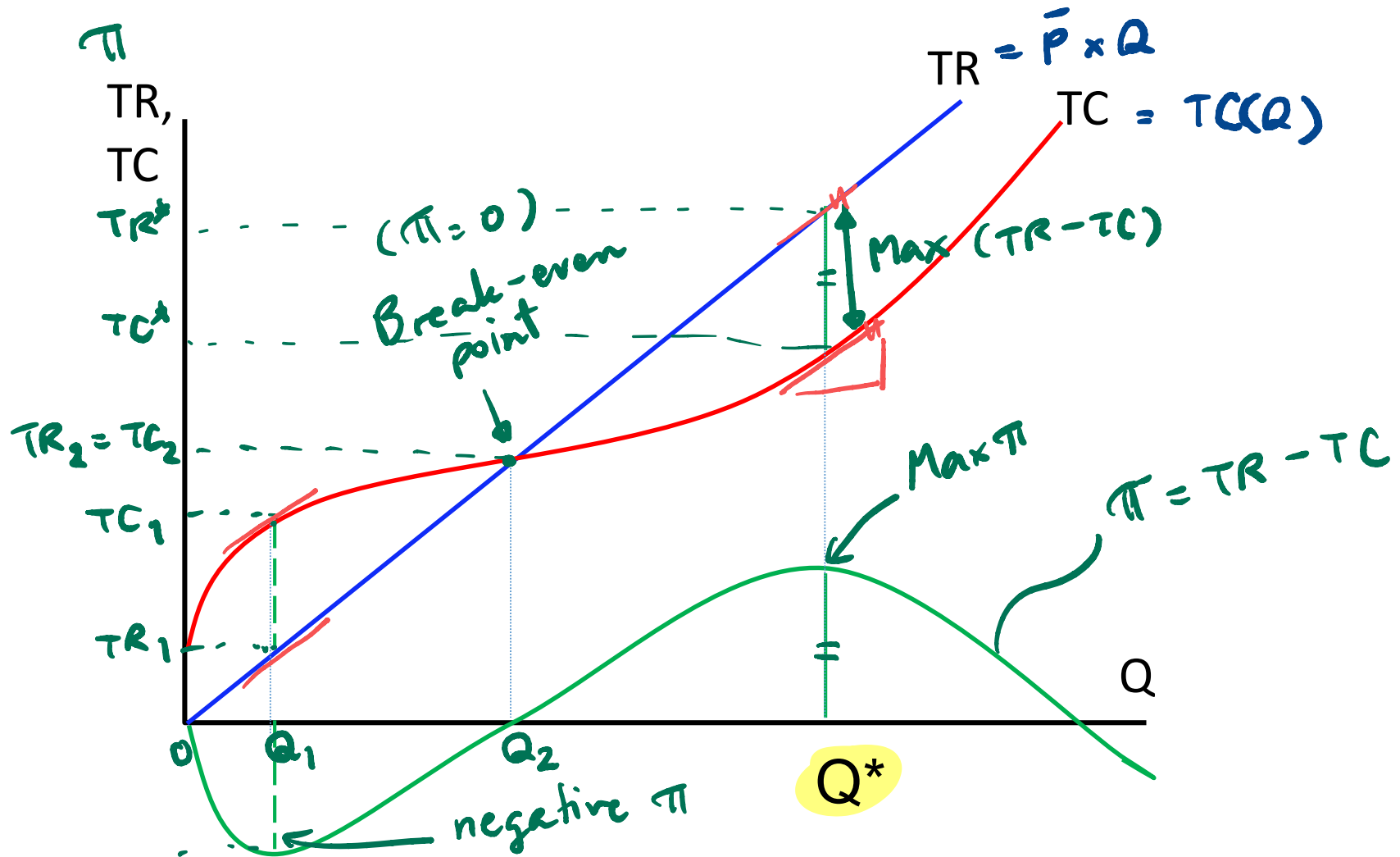
P	Q	TR	TC	Profit = TR - TC	MR = $\frac{\Delta TR}{\Delta Q}$	MC = $\frac{\Delta TC}{\Delta Q}$	MR - MC
\$10	0	0	5	-5			
\$10	1	10	9	1	10	4	6
\$10	2	20	15	5	10	6	4
\$10	3	30	23	7	10	8	2
\$10	4	40	33	7	10	10	0
\$10	5	50	45	5	10	12	-2

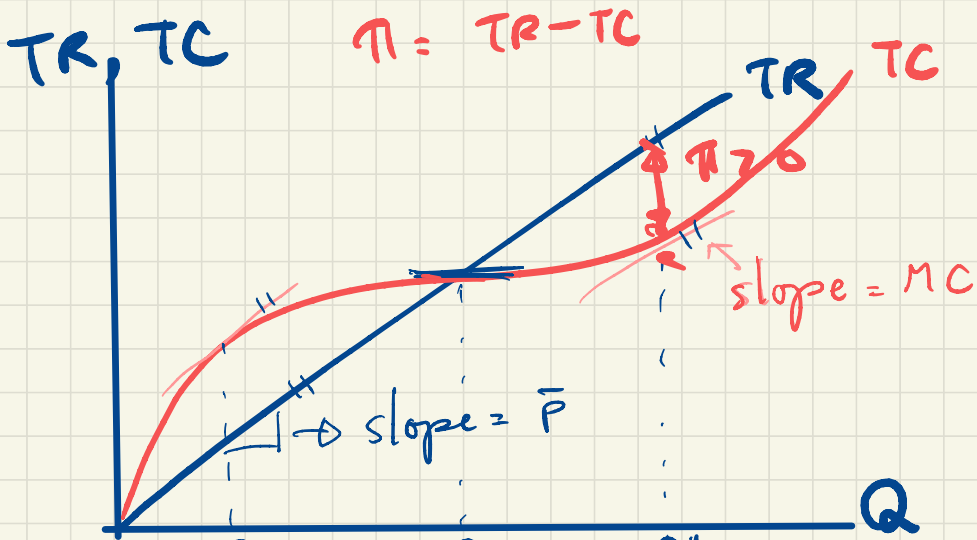
$\bar{P}$

# Graph (from the previous example)



# Profit Maximization Using TR&TC

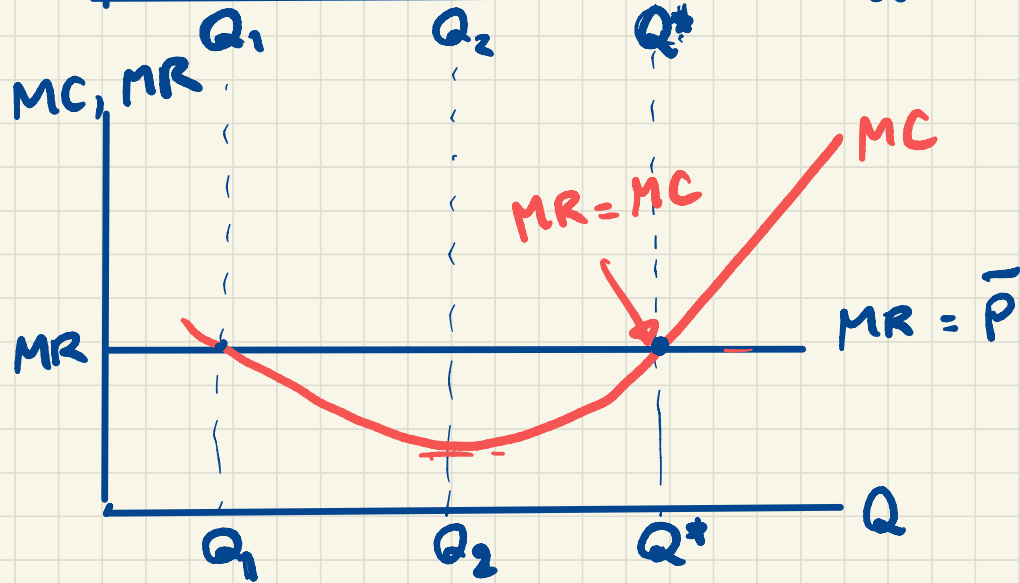




$$TR = \bar{P} \times Q$$

$$MR = \frac{\Delta TR}{\Delta Q} = \bar{P}$$

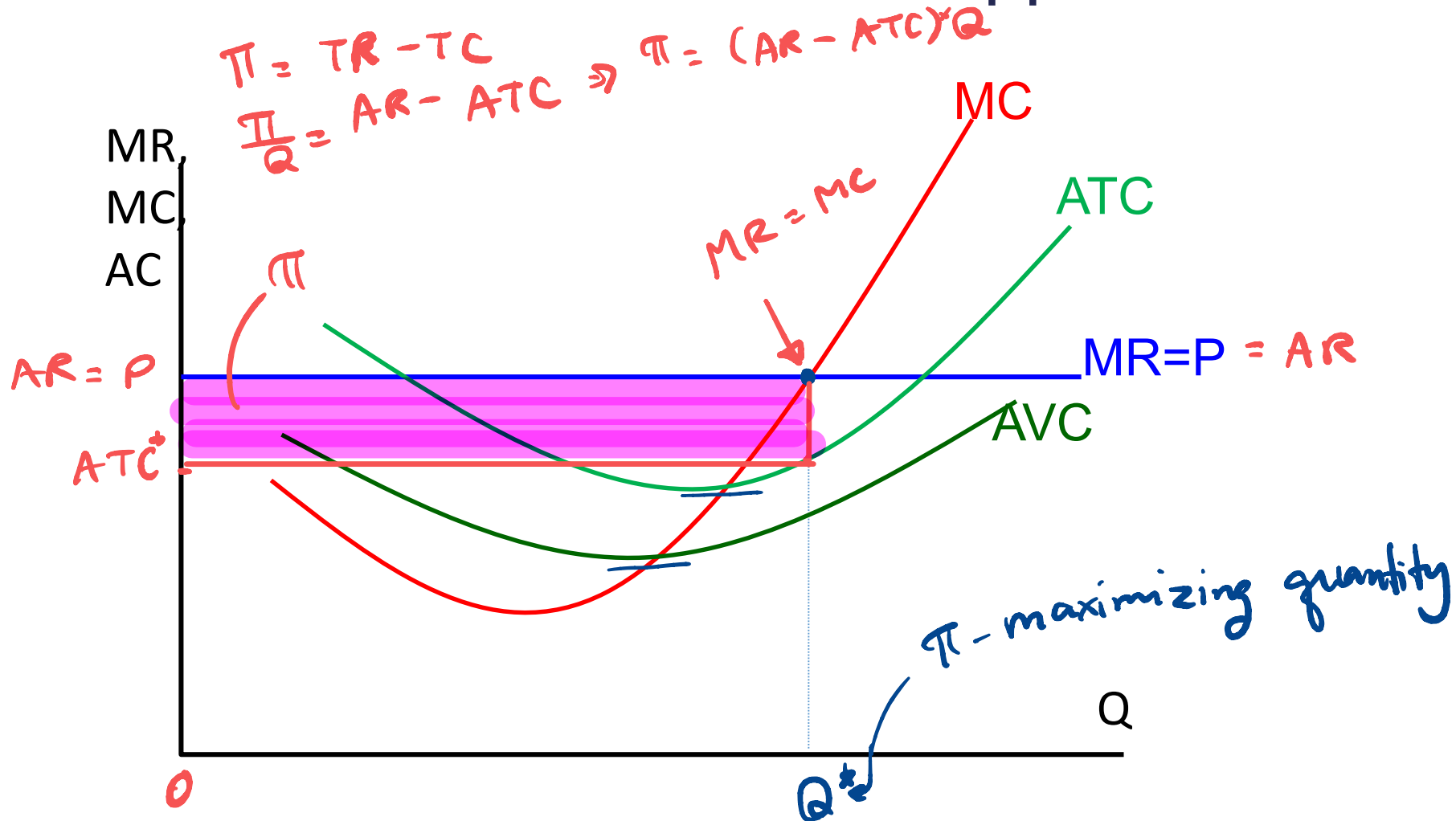
$$MC = \frac{\Delta TC}{\Delta Q}$$



MR = MC  
at  $Q_1$  &  $Q^*$   
But  
at  $Q_1$ ,  $\pi < 0$ .

$\pi$  - max  
output is  $Q^*$

# Profit Maximization: MR-MC Approach



Proof that firm maximizes its profit when  
MR = MC using calculus. (Not required)

Objective :  $\text{Max}_Q \Pi = TR - TC = P \times Q - C(Q)$

• First-order necessary condition:

$$\frac{d\Pi}{dQ} = 0 \Leftrightarrow \frac{d[TR(Q)]}{dQ} - \frac{d[C(Q)]}{dQ} = 0$$

$$\Leftrightarrow MR(Q) - MC(Q) = 0$$

$$\Leftrightarrow MR(Q) = MC(Q)$$

In perfectly competitive market,  $P$  is fixed.

So,  $TR(Q) = \bar{P} \times Q \rightarrow MR(Q) = \bar{P}$ .

Thus,  $\Pi$ -maximizing quantity ( $Q^*$ ) is such that  $MR(Q^*) = \bar{P} = MC(Q^*)$ .

• Note ; second-order condition for maximization:

$$\frac{d^2\Pi}{dQ^2} < 0 \Leftrightarrow \frac{d(MR(Q))}{dQ} < \frac{d(MC(Q))}{dQ}$$