MONOPOLY

Topics - Monopoly

- What is monopoly?
- Causes of monopoly
- Nature of demand, TR, AR, MR, and their relationship
- Short-run equilibrium
- Economic effects of monopoly
- Price discrimination

A Single Price Monopolist

- A **monopolist** is a firm that is the only seller of a product without close substitutes.

- Key difference from perfectly competitive firm: A monopoly firm has **market power**, the ability to influence the market price of the product it sells.
  - A monopolist faces a negatively sloped demand curve.
  - A monopolist is the "price setter".

(ie. entire market demand)

Causes of Monopoly

- The main cause of monopolies is **barriers to entry.**

- Three sources of barriers to entry:

  1. Ownership of a key resource

     e.g. DeBeers

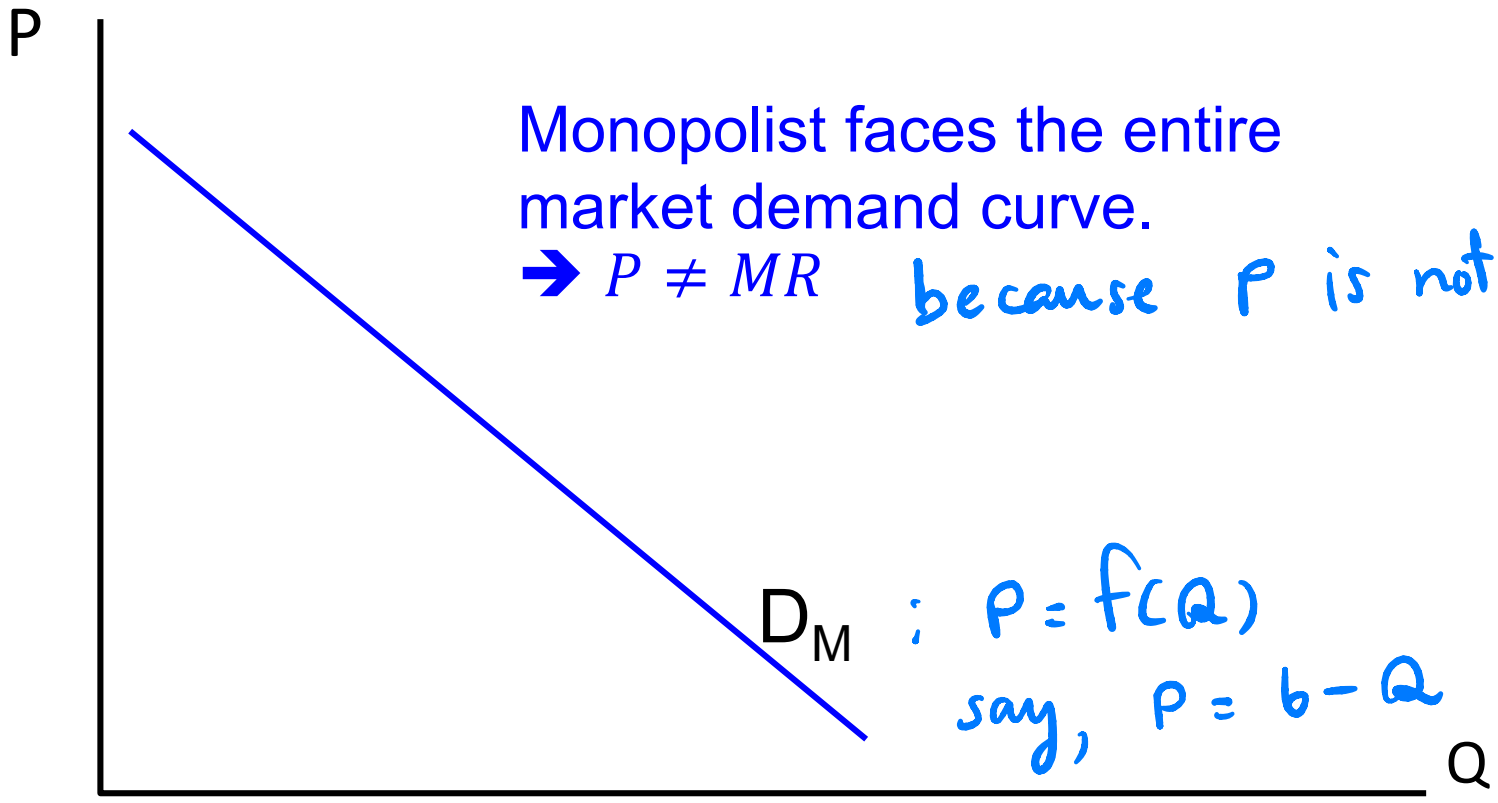
  2. Permission or exclusive right (granted by the government) to produce the good.

     e.g. patents, copyright laws

  3. Natural monopoly: A single firm can produce the entire market ***Q*** at lower *ATC* than could several firms.

     e.g. electricity, train

Nature of Demand



Monopolist faces the entire market demand curve.

➔ $P \neq MR$ because P is not constant.

D_M : $P = f(Q)$

say, $P = b - Q$

TR, AR, MR

- Suppose the demand curve in the market is given by:

$P = 6 - Q.$ = P(Q)

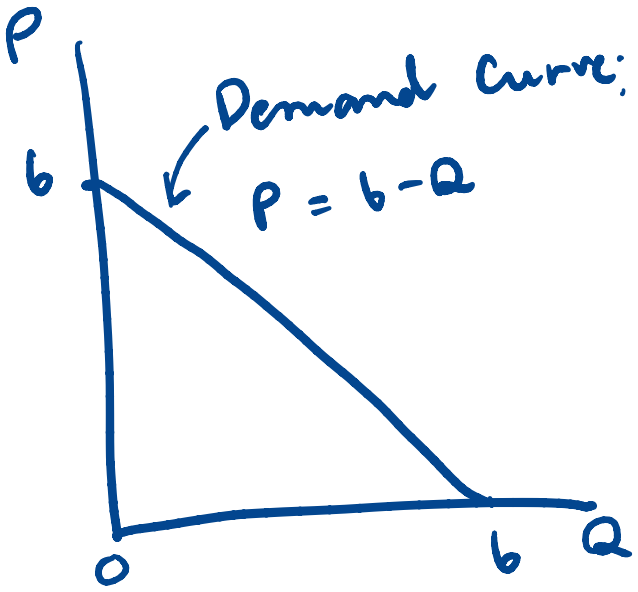
P(Q)

- $TR = P \times Q = (6 - Q)Q = 6Q - Q^2$

- $AR = \frac{TR}{Q} = \frac{6Q - Q^2}{Q} = 6 - Q = P(Q)$

- $MR = \frac{\Delta TR}{\Delta Q} = \frac{d(6Q - Q^2)}{dQ} = 6 - 2Q$

$\neq$ AR

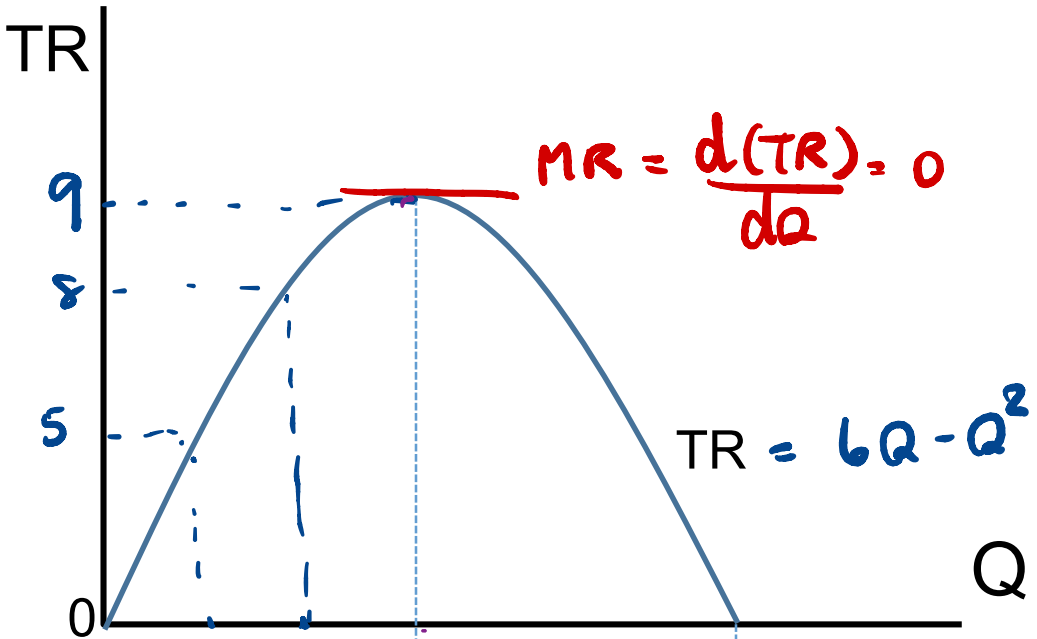


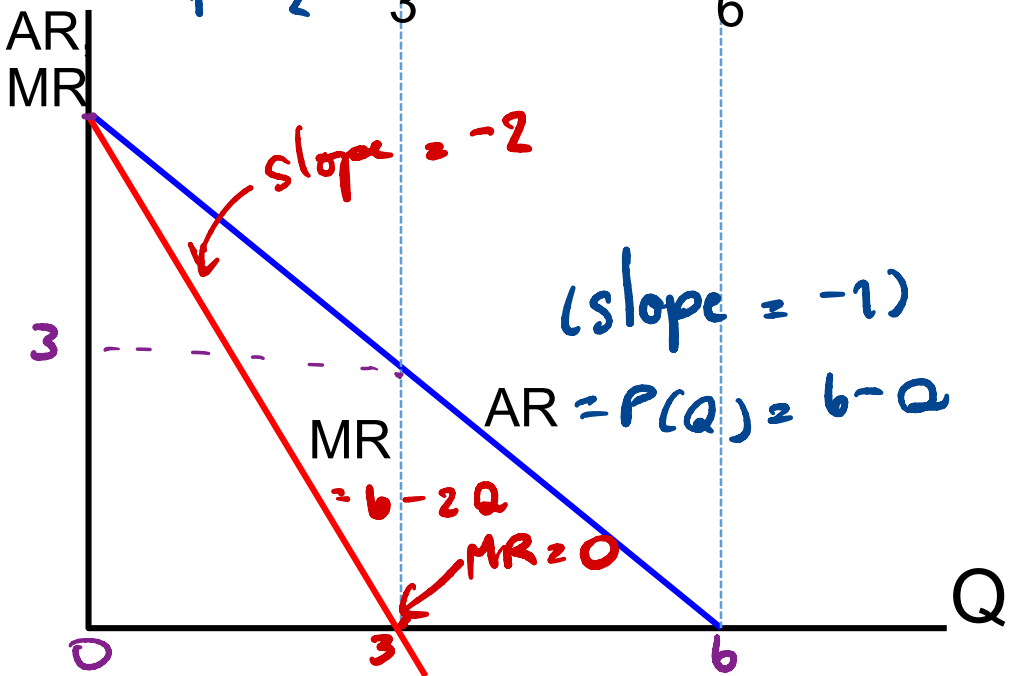
Example:

Let $P = 6 - Q$.

$P \times Q$ $\frac{TR}{Q}$ $\frac{d(TR)}{dQ}$

P	Q	TR	AR	MR
\$6	0	0	6	6
\$5	1	5	5	4
\$4	2	8	4	2
\$3	3	9	3	0
\$2	4	8	2	-2
\$1	5	5	1	-4
\$0	6	0	0	-6
		$6Q-Q^2$	$6-Q$	$6-2Q$





Short-Run Profit Maximization

- **Rule 1**: The firm should not produce at all unless its revenues exceed its variable cost (i.e. produce zero unit if P < AVC)

$P \geq AVC$

- **Rule 2**: If the firm does produce, it should produce a level of output such that its marginal revenue equals its marginal cost.

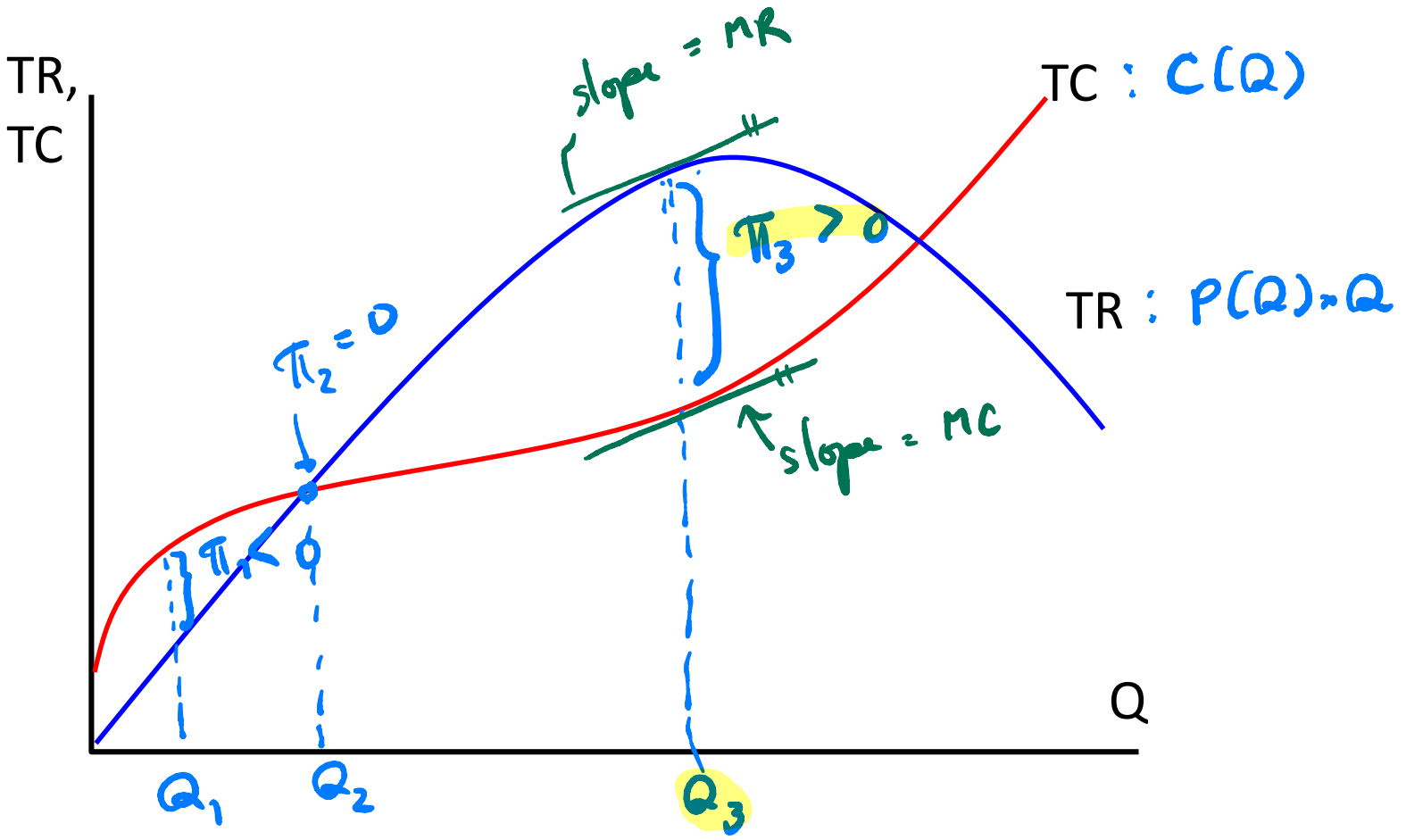
$MR(Q_m^*) = MC(Q_m^*)$

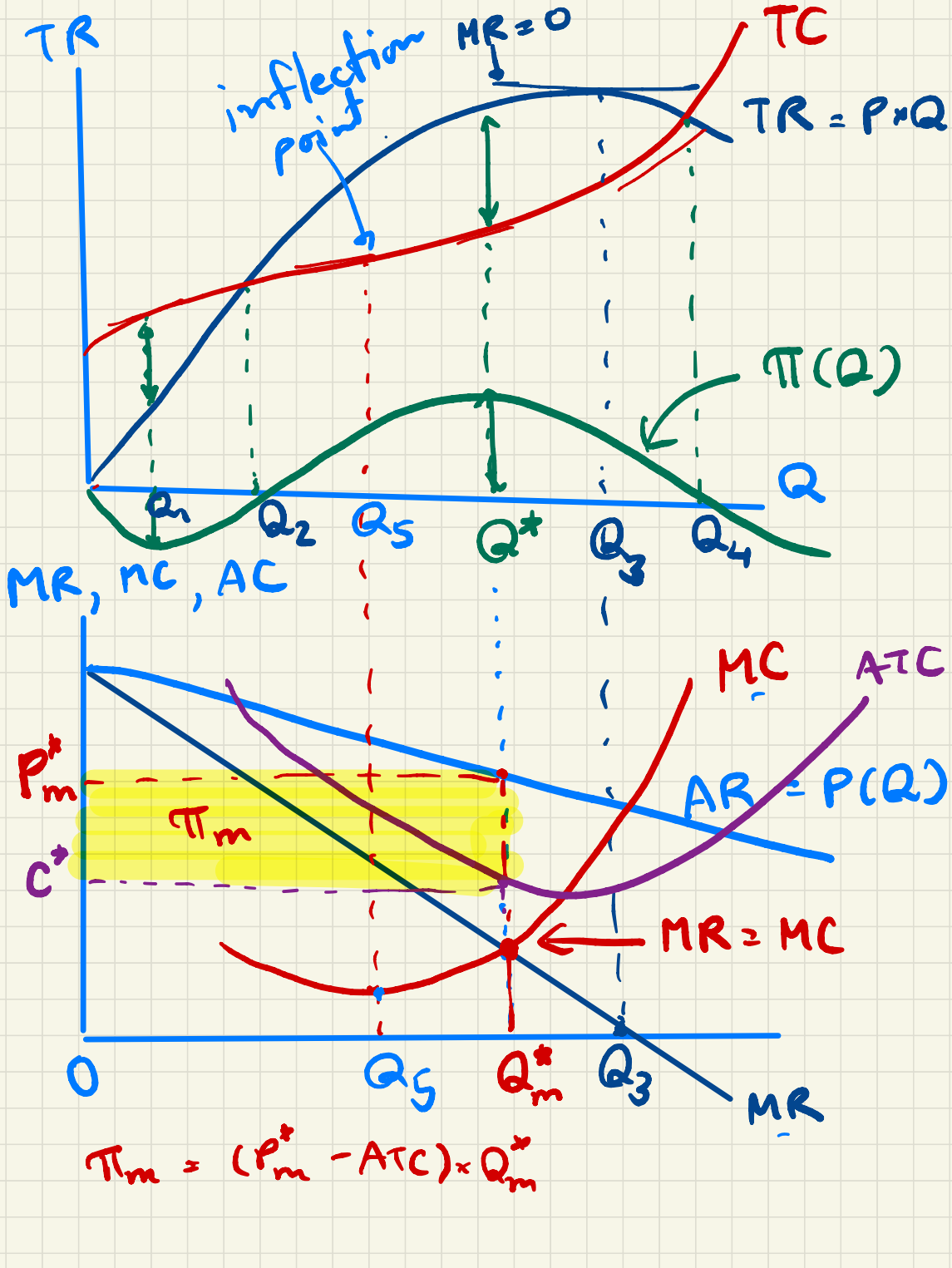
$(P \neq MR)$

Profit Maximization

$\pi(Q) = TR - TC$

$= P(Q) \cdot Q - C(Q)$




TR
inflection point
MR=0
TC
TR = P×Q
π(Q)
Q
Q1
Q2
Q5
Q*
Q3
Q4
MR, MC, AC
MC
ATC
P*m
πm
C*
AR = P(Q)
MR = MC
0
Q5
Q*m
Q3
MR
πm = (P*m - ATC) × Q*m

Derivation of Monopolist's Profit-Max condition using calculus (optional)

Firm's Obj: $\max_{Q} \pi(Q) = TR(Q) - TC(Q)$

π is maximized when $\frac{d\pi}{dQ} = 0$ $\left(\frac{\Delta\pi}{\Delta Q} \approx \frac{d\pi}{dQ}\right)$.

$$\frac{d\pi}{dQ} = 0 \iff \frac{d}{dQ}[TR(Q) - TC(Q)] = 0$$

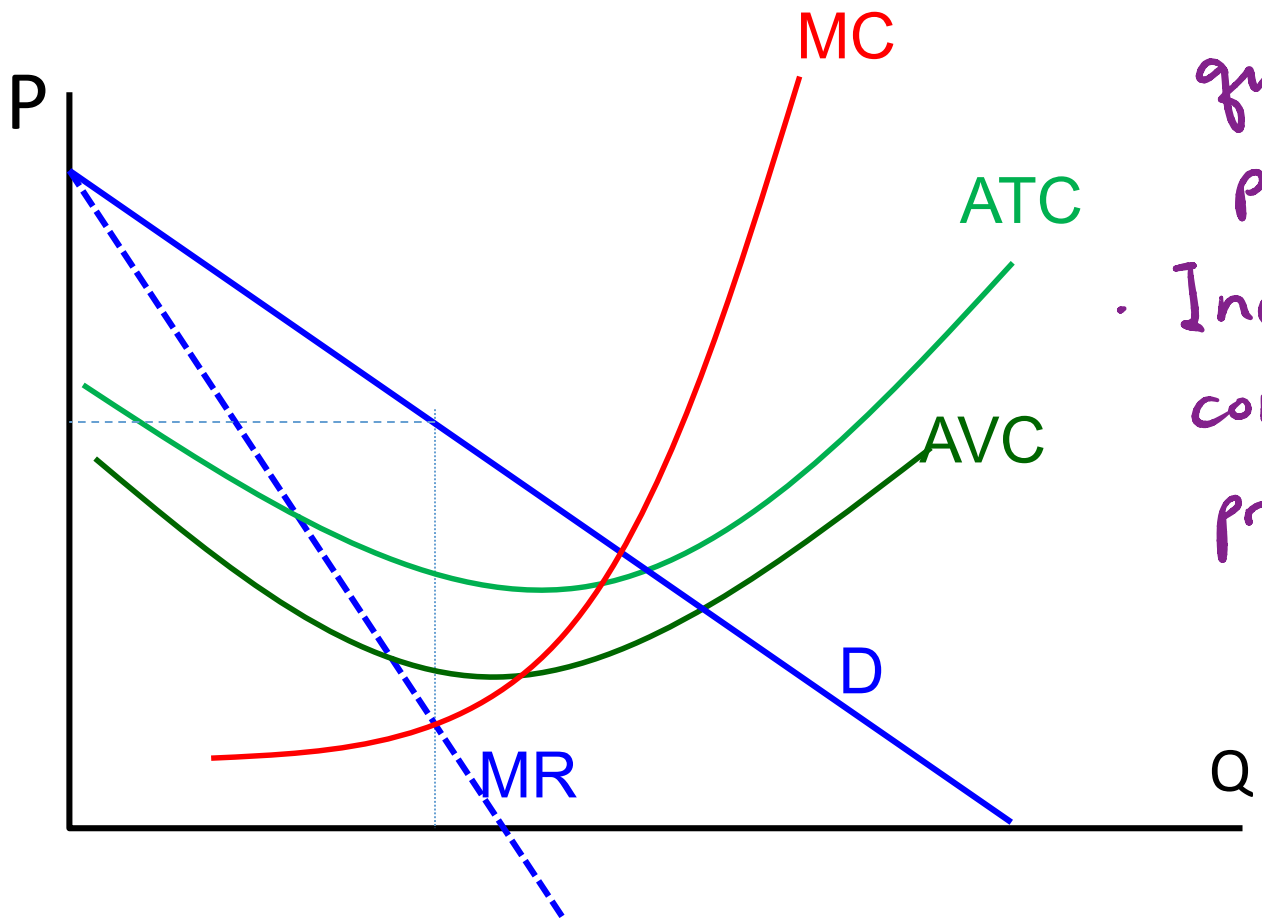
$$\frac{d(TR)}{dQ} - \frac{d(TC)}{dQ} = 0$$

$$MR(Q^*) - MC(Q^*) = 0$$

$\therefore$ $\pi(Q^*)$ is maximum when $MR(Q^*) = MC(Q^*)$

Necessary condition for π-max.

Monopoly Equilibrium in Short-Run



- Find π-max quantity and price.
- Indicate the corresponding profit.