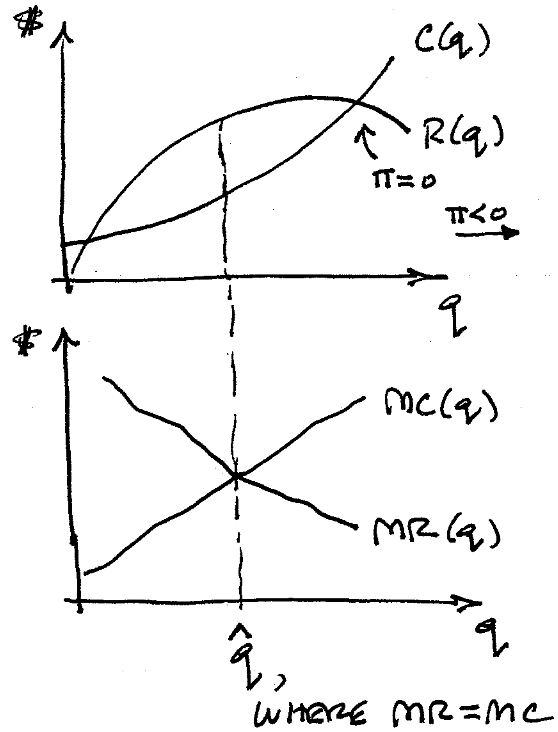
THE ELEMENTARY THEORY OF THE FIRM

IN THE MOST BASIC THEORY OF THE FIRM, THE FIRM PRODUCES ONE PRODUCT AND CHOOSES ITS LEVEL OF OUTPUT q, TO MAXIMIZE ITS PROFIT, $\pi(q)$:

$$\max_q \pi(q) := R(q) - C(q)$$



<u>FOMC:</u> $\pi'(q) \leq 0$ & $\pi'(q) = 0$ IF $q > 0$

i.e., $R'(q) - C'(q) = 0$

i.e., $MR(q) = MC(q)$

SECOND-ORDER CONDITION:

$\pi''(q) < 0$

i.e., $MR'(q) < MC'(q)$

i.e., "MC CUTS MR FROM BELOW"

A SUFFICIENT SECOND-ORDER CONDITION IS THAT

MC IS INCREASING

MR IS DECREASING

IN THE BASIC MODEL, THE PRODUCT IS HOMOGENEOUS AND IS SOLD AT A UNIFORM PRICE. THEREFORE, $R = pq$, SO THE RELATION BETWEEN p AND q — THE DEMAND CURVE THE FIRM FACES — IS CENTRAL.

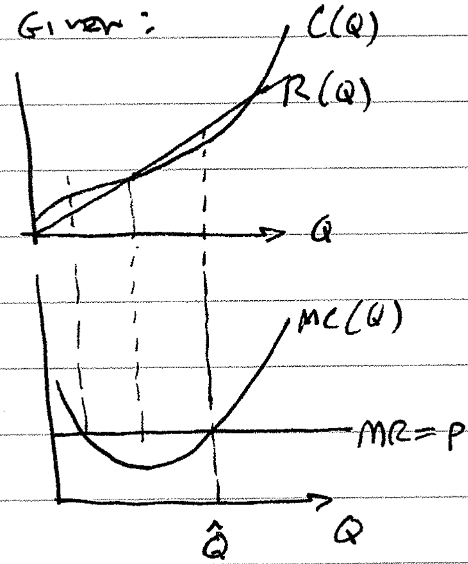
Some Special Cases

① Firm takes price as given:

$$R(Q) = pQ$$

$\therefore MR = p$

"Firm has no market power"



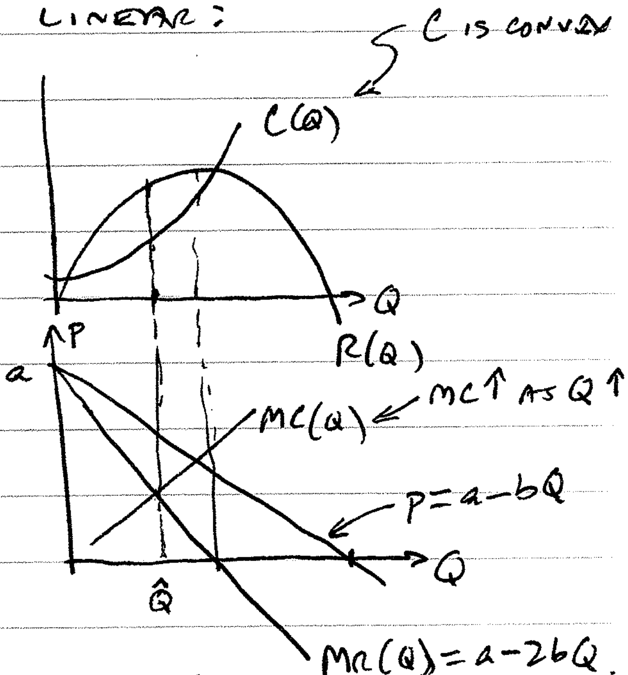
② Demand curve facing firm is linear:

$$R(Q) = pQ = (a-bQ)Q = aQ - bQ^2$$

$$p = a - bQ$$

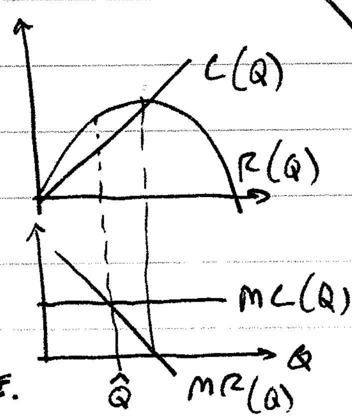
$$MR(Q) = a - 2bQ,$$

★ { Twice the slope of demand, same vertical intercept a



If CRS ($C(Q)$ linear):

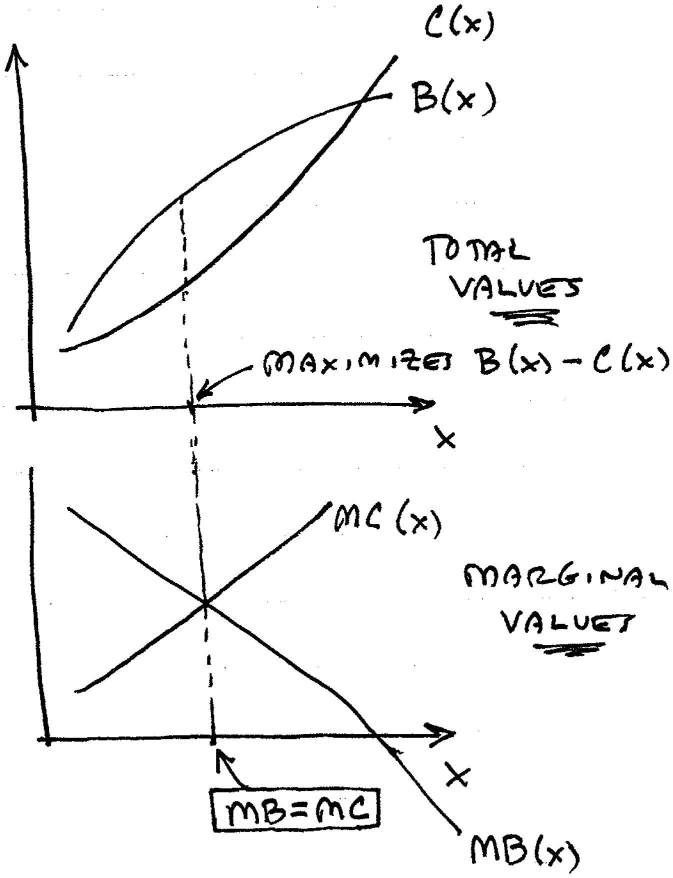
$$C(Q) = cQ;\ MC = c$$



You first encounter this as the model of a monopoly. But it is really the basic model of any firm that has "market power" — a downward-sloping demand curve.

General Marginal Analysis

(Marginal Cost-Benefit Analysis)



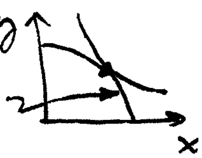
Firm: $\pi(x) = R(x) - C(x)$

Consumer: $u(x,y) = y + v(x)$

$\therefore$ MRS $(x) = p$

MV(x) $= v'(x)$ MC(x)

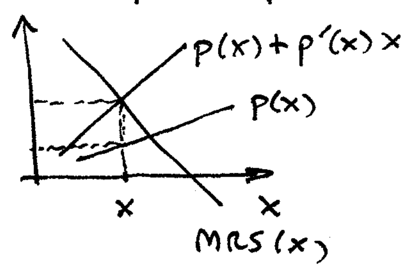
But if $p\uparrow$ as $x\uparrow$:



BUDGET CONSTRAINT

we have

$$\text{MRS}(x) = p(x) + p'(x)x$$



In general, depends on second-order (convexity/concavity) conditions: MC must "cut MB from below" — i.e., $B(x) - C(x)$ must be concave.

Sufficient: B concave, C convex.