3.1-2 Third Degree

Friday, January 22, 2021 8:35 PM

$P^* = (\beta/(1+\beta))MC$

$\pi = P_1(q_1)q_1 + P_2(q_2)q_2 - C(q_1+q_2)$

$\frac{d\pi}{dq_1} = MR_1 - \frac{dC}{dq_1} = 0 \quad MR_1 = MC$

$\frac{d\pi}{dq_2} = MR_2 - MC = 0 \quad MR_2 = MC$

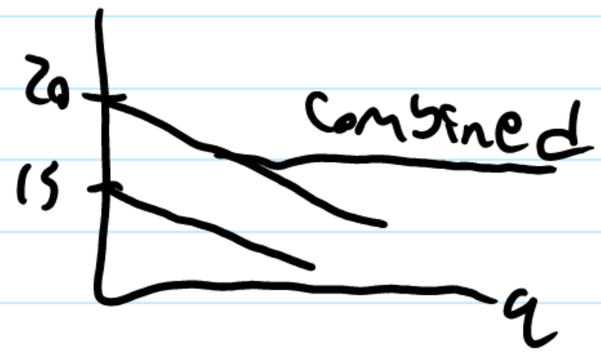
$MR_1 = MR_2$

$P_1 = \beta_1/(1+\beta_1)\, MC \qquad P_2 = \beta_2/(1+\beta_2) MC$

1) Must be able to differentiate
2) No resale

Example:

$P_1 = 20 - \frac{1}{2}q_1 \qquad P_2 = 15 - \frac{1}{2}q_2 \qquad C = (q_1+q_2)^2$



$\pi = (20 - \frac{1}{2}q_1)q_1 + (15 - \frac{1}{2}q_2)q_2 - (q_1+q_2)^2$

$20 - q_1 = 2(q_1+q_2)$

$15 - q_2 = 2(q_1+q_2)$

$20 - q_1 = 15 - q_2$

$5 + q_2 = q_1$

$15 - q_2 = 2(5 + q_2 + q_2)$

$15 - q_2 = 10 + 4q_2$

$5 = 5q_2$

$q_2 = 1 \qquad P_2 = 14.5$

$q_1 = 6 \qquad P_1 = 17$

$\pi = 6 \cdot 17 + 1 \cdot 14.5 - 7^2 = 67.5$

$\frac{1}{2}q_1 = 20 - P_1$

$q_1 = 40 - 2P_1$

$\frac{1}{2}q_2 = 15 - P_2$

$q_2 = 30 - 2P_2$

$q = 70 - 4P$

$\frac{d\pi}{dq} = \frac{20}{4} - \frac{1}{2}q - 2q = 0$

$q = 7$

$P = \frac{20}{4} - \frac{1}{4}(7)$

$= 63/4 = 15.75$

$\pi = 7 \cdot 63/4 - 49 = 61.25$