

Week15 習題 = 1

I A) $60 - 2q = 30 \Rightarrow q = 15 \Rightarrow P = 45 \Rightarrow \pi_L = 45 \times 15 - 30 \times 15 = 225 = PS$

$$CS = 15 \times 15 / 2 = 112.5, TS = 225 + 112.5 = 337.5, DWL = 112.5$$

B) $60 - q = 30 \Rightarrow q = 30 \Rightarrow \pi_L = 30 \times 30 / 2 = 450, CS = 0$

$$TS = 0 + 450 = 450, DWL = 0$$

C) $\pi = P(q_1)q_1 + P(q_2)(q_2 - q_1) - TS(q_2)$

$$= (60 + q_1)q_1 + (60 - q_2)(q_2 - q_1) - 30q_2$$

$$= q_1^2 - q_2^2 + 30q_2 + q_1q_2$$

- 階條件為 $= -2q_1 + q_2 = 0, -2q_2 + 30 + q_1 = 0$

\Rightarrow 聯立解得 $-q_1 = 10, q_2 = 20$

對應之價格為 $P_1 = 50, P_2 = 40 \Rightarrow \pi = 50 \times 10 + 40 \times (20 - 10) - 30 \times 20 = 300$

$$CS = (10 \times 10 / 2) + (10 \times 10 / 2) = 100, TS = 100 + 300 = 400$$

$$DWL = 450 - 400 = 50$$

D) $\pi = P(q_1)q_1 + P(q_2)(q_2 - q_1) + P(q_3)(q_3 - q_2) - TS(q_3)$

$$= (60 - q_1)q_1 + (60 - q_2)(q_2 - q_1) + (60 - q_3)(q_3 - q_2) - 30q_3$$

$$= -q_1^2 - q_2^2 - q_3^2 + 30q_3 + q_1q_2 + q_2q_3$$

- 階條件 $= -2q_1 + q_2 = 0, -2q_2 + q_1 + q_3 = 0, -2q_3 + 30 + q_2 = 0$

\Rightarrow 聯立解得 $q_1 = 7.5, q_2 = 15, q_3 = 22.5$

對應之價格為 $P_1 = 52.5, P_2 = 45, P_3 = 52.5$

$$\Rightarrow \pi = 52.5 \times 7.5 + 45 \times (15 - 7.5) + 52.5 \times (22.5 - 15)$$

$$- 30 \times 22.5 = 337.5.$$