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3.(A)$MR_A = MC : 100 - 2q_A = 20 \Rightarrow q_A = 40 \Rightarrow P_A = 60$

$MR_B = MC : 80 - 2q_B = 20 \Rightarrow q_B = 30 \Rightarrow P_B = 50$

$\pi = 60 \times 40 + 50 \times 30 - 20 \times (40 + 30) = 2500 = PS$

$CS = CS_A + CS_B = 800 + 450 = 1250$; $TS = CS + PS = 3750$

(B)先將需求水平相加：(統一定價)

$P = 100 - q$ ， $q \leqq 20 \Rightarrow MR_1 = 100 - 2q$ ， $q \leqq 20$

$= 90 - 0.5q$ ， $q > 20 \Rightarrow MR_2 = 90 - q$ ， $q > 20$

令 $MR_1 = MC \Rightarrow 90 - q = 20 \Rightarrow q = 40$ (不合)

再令 $MR_2 = MC \Rightarrow 90 - q = 20 \Rightarrow q = 70$ (合) $\Rightarrow P = 55$

$\Rightarrow \pi_2 = 55 \times 70 - 20 \times 70 = 2450 = PS$

$CS = CS_A + CS_B = 1012.5 + 312.5 = 1325$ ， 故 $TS = 3775$

(C)$F = (80 - P) \times q / 2 = (80 - P)(80 - P) / 2 = (80 - P)^2 / 2$

$\pi = 2F + (P - 20)(q_A + q_B) = (80 - P)^2 + (P - 20)(180 - 2P) = -P^2 + 60P + 2800$

由一階條件可解得：$P = 30$，故 $F = 1250$，$q = 120$，$\pi = 3700$

$CS = CS_A(P = 30) + CS_B(P = 30) - 2F = 2450 + 1250 - 2500 = 1200$

$TS = CS + PS = 1200 + 3700 = 4900$