Week 14.

3.

(A) $MR_A = MC = 100 - 2q_A = 20 \Rightarrow q_A = 40,\ p_A = 60$

$MR_B = MC = 80 - 2q_B = 20 \Rightarrow q_B = 30,\ p_B = 50$

$TV = 60 \times 40 + 50 \times 30 - 20(40+30) = 1500 = PS$

$CS = 800 + 450 = 1250 \Rightarrow TS = CS + PS = 2750$

$(CS_A + CS_B)$

(B) $\begin{cases} P = 100 - q, & q \le 20 \\ = 90 - 0.5q, & q > 20 \end{cases} \Rightarrow \begin{cases} MR_1 = 100 - 2q, & q \le 20 \\ MR_2 = 90 - q, & q > 20 \end{cases}$

令 $MR_1 = MC \Rightarrow 100 - 2q = 20 \Rightarrow q = 40$ (不合)

$MR_2 = MC \Rightarrow 90 - q = 20 \Rightarrow q = 70$ (合), $p = 55$

$TV_2 = 55 \times 70 - 20 \times 70 = 2450$ (PS)

$CS = 1012.5 + 312.5 = 1325,\ TS = 1325$

(C) $F = (80 - P) \times \frac{q}{2} = \frac{(80-P)(80-P)}{2} = \frac{(80-P)^2}{2}$

$TV = 2F + (P - 20)(q_A + q_B) = (80 - P)^2 + (P - 20)(180 - 2P)$

$= -P^2 + 60P + 2800$

$P = 30 \quad F = 1250,\ q = 120,\ TV = 3700$

$CS = CS_A(P = 30) + CS_B(P = 30) - 2F$

$= 1450 + 1750 - 2500 = 1100$

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