Mkt. demand : $P = 10 - Q$ Due to 18 Nov

Mc of upstream : $MC_u = m = 2$

Downstream firm has no additional MC other than intermediate input price charged by upstream firm

- Calculate $P_D^+, P_u^+, Q_D^+, Q_u^+, \pi_D^+, \pi_u^+$
- If 2 firm merge to form a single monopolist calculate P^+, Q^+, π^+
- Compare welfare of consumer and producer

$TR = (10-Q)Q = 10Q - Q^2$

$MR = \frac{dTR}{dQ} = 10 - 2Q$

$TR = 10Q - 2Q^2$

$MR = \frac{dTR_u}{dQ} = 10 - 4Q$

Upstream monopoly max π

$MR_u = MC_u$

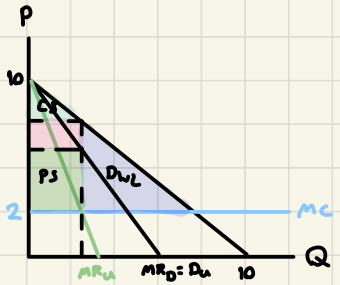
$10 - 4Q = 2$

$4Q = 8$

$Q = 2$

$P_u = 10 - 2(2) = 6$

$P_D = 10 - 2 = 8$



$\pi_u = TR_u - TC_u = 6(2) - 2(2) = 8$

$\pi_D = TR_D - TC_D = 8(2) - 6(2) = 4$

$\pi_{total} = 8 + 4 = 12$

$CS = \frac{1}{2} \times 2 \times 2 = 2$

$PS_D = 4$

$PS_u = 8$

Total $PS = 4 + 8 = 12$

$DWL = 1/2 \times 6 \times 6 = 18$

Monopoly

$MR = 10 - 2Q = MC = 2$

$10 - 2Q = 2$

$2Q = 8$

$Q_m = 4$

$P_m = 10 - 4 = 6$

$\pi_m = 6(4) - 2(4) = 16$

$CS = 1/2 \times 4 \times 4 = 8$

$PS_m = 16$

$DWL = 1/2 \times 4 \times 4 = 8$