Upstream

$MC = 2$ Find MR

$P = 10 - 2Q$

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

$MR = 10 - 4Q$

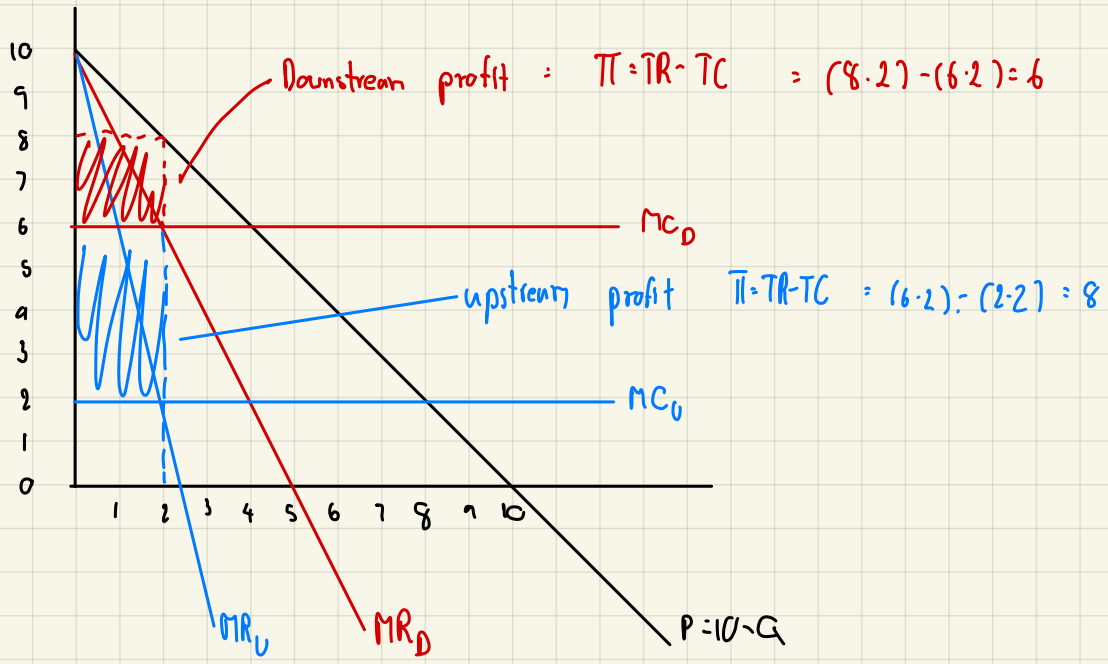
$MR = MC$	$Q = 2$
$10 - 4Q = 2$	$P = 10 - 2Q$
$Q = 2$	$P = 6$

Downstream

$MR = 10 - 4Q$ $MC = P_U^* = 6$

$MR = MC$	sub $Q = 1$ in $P = 10 - 2Q$
$10 - 4Q = 6$	$P = 10 - 2$
$Q = 1$	$P = 8$

Case 2 firm



If there are 2 firms $P_U^* = 6$, $Q_U^* = 4$, $P_D^* = 8$, $Q_D^* = 2$

$\pi_U^* = 8$, $\pi_D^* = 6$

Many firm

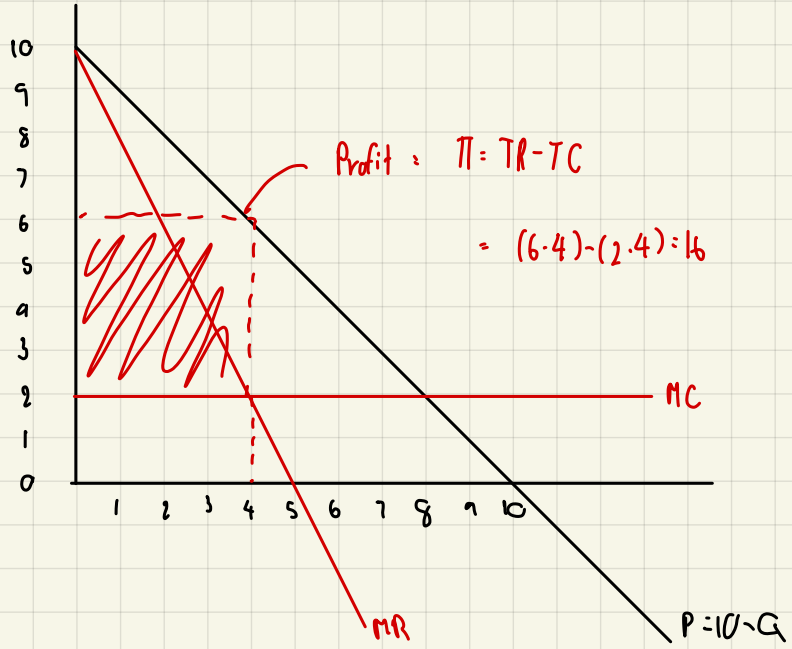
$MR = MC$ sub $Q = 4$ in $P = 10 - Q$

$10 - 2Q = 2$ $P = 10 - 4$

$8 = 2Q$ $P = 6$

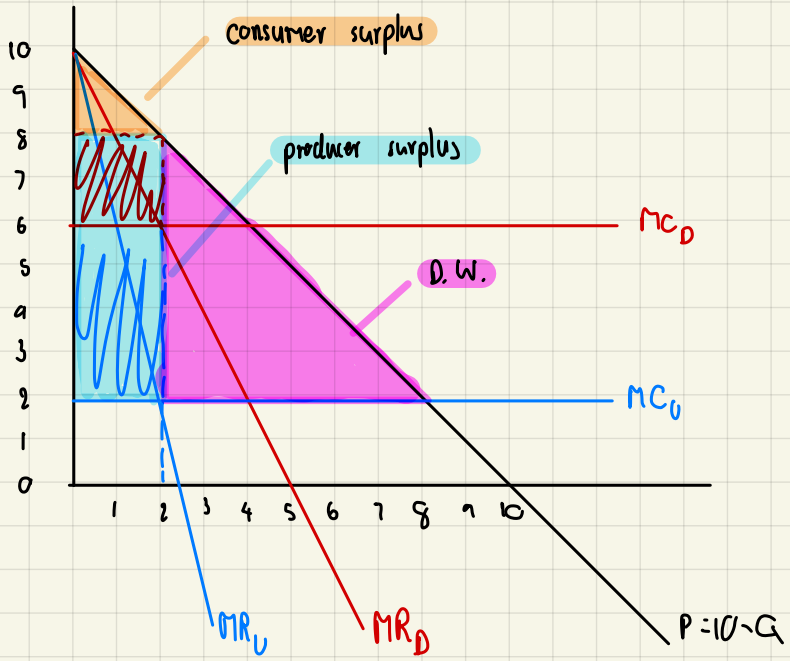
$Q = 4$

Merge firm $P^* = 6$, $Q^* = 4$, $\pi^* = 16$

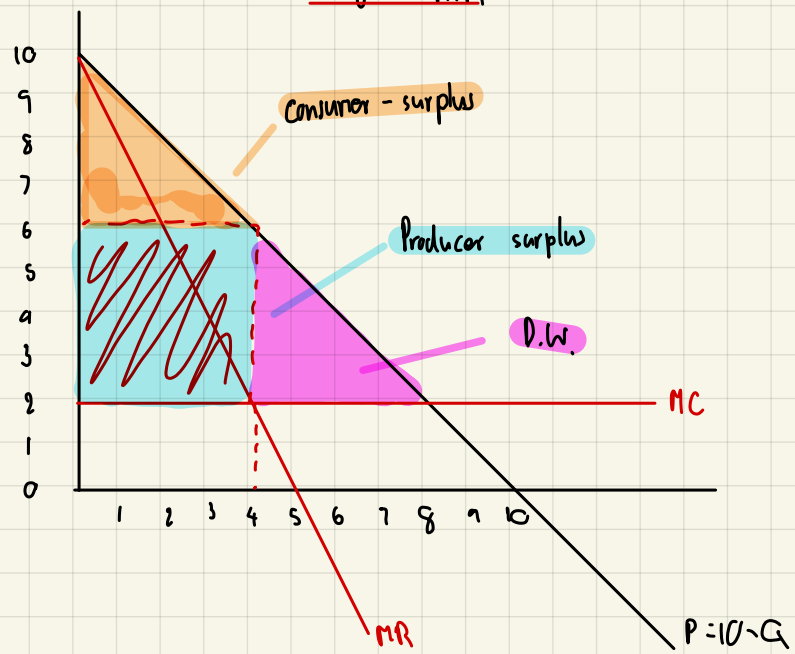


Welfare

2 firm



Merge firm



∴ Because the firm was merge both consumer and producer will have a gain in economic welfare as the size of dead weight loss decrease.