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Question 1:

Suppose that the demand curve derived from marginal benefit associated with a consumption of chocolate is 360 – 4Q and the marginal cost of chocolate production is 6Q. The marginal damage from pollutions generated by chocolate production is 2Q

a) Find the social optimum or efficient production level (P*, Q*)
b) Find the private equilibrium price and quantity when external costs could be ignored by firms
c) What tax level should be set to achieve the efficient/social optimal
d) Calculate deadweight loss from externalities in this case
e) Drawing a graph to illustrate the result from a) to d)

note :
mc = Marginal cost
MB = Marginal benefit (D)
MD = Marginal damage
t = tax
s = social
p = private

marginal benefit = marginal cost + marginal damage

a.) $360 - 4Q = 6Q + 2Q$

$360 = 12Q$

$30 = Q^*$

$P^* = 360 - 4(30)$

$= 240$

marginal benefit = marginal cost (over consumption)

b.) $360 - 4Q = 6Q$

$360 = 10Q$

$36 = Q_m$

$P_m = 360 - 4(36)$

$= 216$

c.) should impose tax → $mc_p + tQ = mc_s$

$6Q + tQ = 240$ → P when Q = 30

$(6+t)(30) = 240$

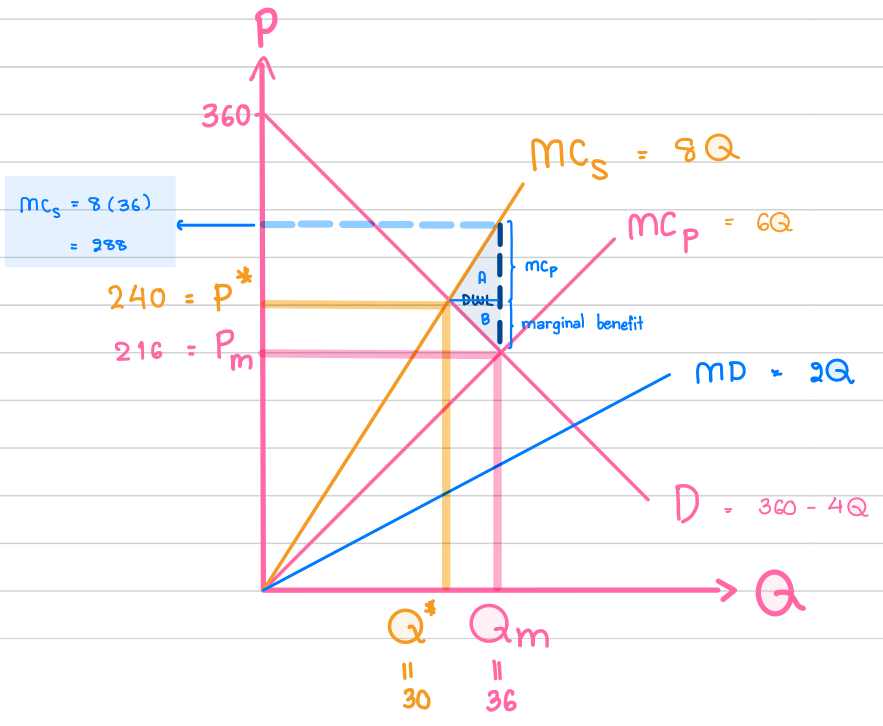
$6+t = 8$

$t = 2$ → if Q = 30 so tax = 60

d.) $DWL = \frac{1}{2}(36-30)(288-240) + \frac{1}{2}(36-30)(240-216)$

$= 144 + 72$

$= 216$

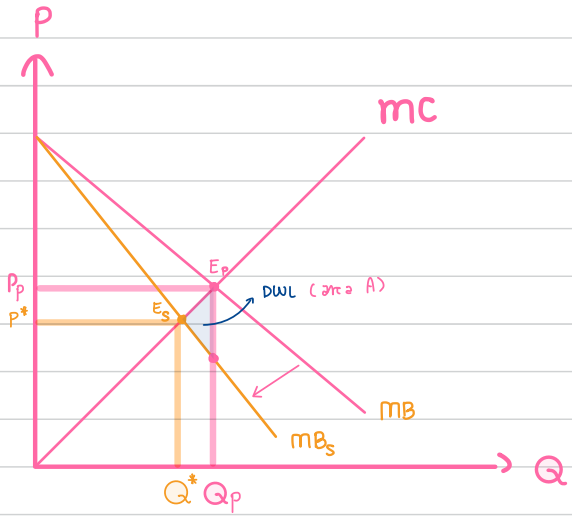


Question 2:

The production of cigarettes (marginal cost of damage) increases water pollutions while the consumption of cigarettes can put their neighbors at health risks (Hint: Impact on social marginal benefits as a whole)

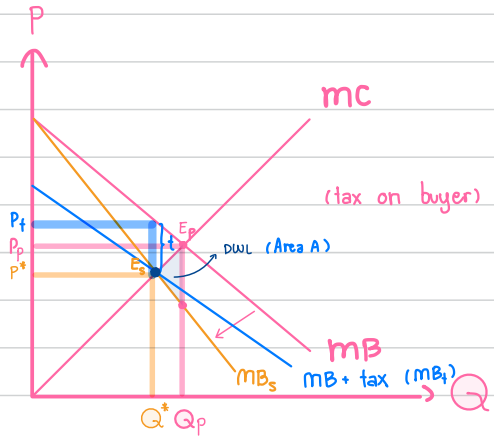
a) Explain how externalities in this case create inefficiencies in the cigarette market and draw a graph to illustrate your explanation, including the market equilibrium for cigarettes at i) socially optimal level, P^* and Q^*; ii) private optimal level (P_p and Q_p) when externalities are not internalized by both firms and consumers and; iii) the deadweight loss area.

b) What policies could be considered to reduce deadweight loss in this case and describe the effects of such policies in the cigarette market.



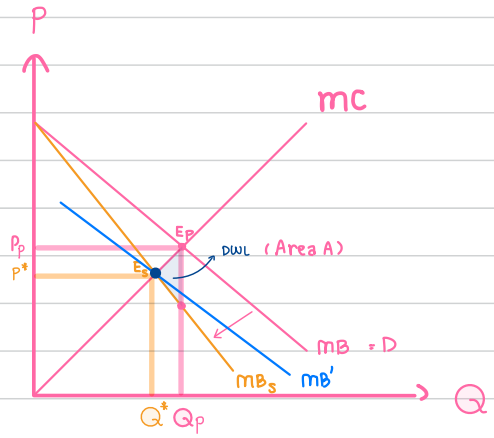
a.) i.)
- ★ There is private optimum level at P_p & Q_p shown as equilibrium at E_p where MB = MC
- ★ By smoking cigarettes, it will reduce MB_s, so MB will rotate quantity downward from $Q_p \rightarrow Q_s$.
  socially optimum level at P^* & Q^*, equilibrium at E^* where MB_s = MC
- ★ During consuming as a private benefit, it will include MC as a area A so when we are concerned more about social marginal benefit, area A will be cut off (DWL = area A)

b.)



① tax on customer or seller
- ★ gov. impose tax on customer P^* increase to P_t
- ★ as P_t so MB shift downward ; MB + tax
- ★ so customer will consume ↓ from $Q_p \rightarrow Q^*$

This affect DWL to be remove as price increase (MB_t = MC + MB_s)



② Applying regulation
eg. restricted age of 18 years of older
create ads. to reduce demand
- ★ D↓ : shift MB downward to MB'
  so customer will change their consumption from Q_p to Q^*
- ★ so DWL will be gone as MB_s = MC = MB'