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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 $2Q$. The marginal damage from pollutions generated by chocolate production is $2Q$.

$MC_S = 6Q + 2Q$
 MC_P

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

a) $P = MC_S$

$360 - 4Q = 2Q + 6Q$

$360 = 12Q$

$Q^* = 30$, $P^* = 360 - 4(30) = 240$

b) $P = MC_P$

$360 - 4Q = 6Q$

$360 = 10Q$

$Q_P = 36$, $P_P = 360 - 4(36) = 216$

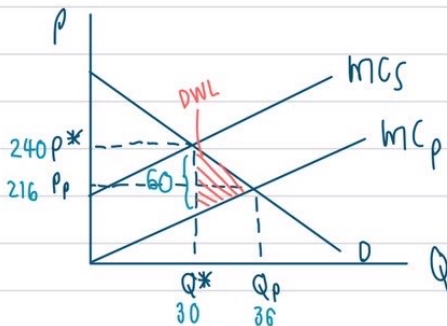
c) $tqX = 2Q$

$= 2 \times 30$

$= 60$

d) $DWL = \frac{1}{2} \times 6 \times 60 = 180$

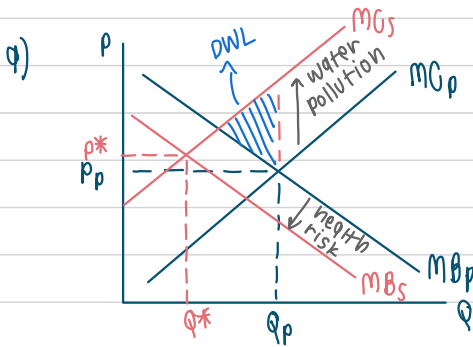
e)



Question 2:

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

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



To maximize the profit, a firm produce at (Q_p, P_p) . However, an increase in water pollution makes MC_p increase to MC_s , and health risk reduce MB_p to MB_s .

- government can apply the putting a cap policy to restrict the production level at Q^* . The punishment will be in a form of jail sentences or fines to prevent potential actions and violators. In the cigarette market, the price of the cigarette will be increase. At the same time, the production level and demand for cigarette will be decrease.