Principles of Microeconomics
National Taiwan University
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Homework 7

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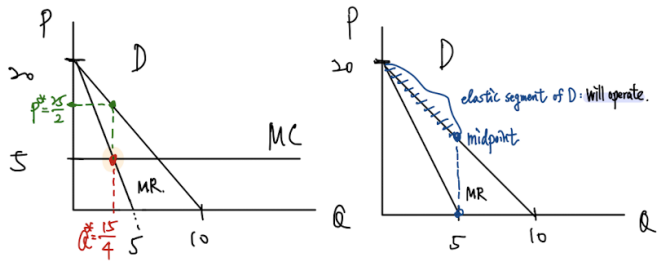
In this sheet the problem sets are answered sequentially.

1. Monopolist, given MC $= 5$, D: $P = 20 - 2Q$

   (a) TR(Q)$= P \cdot Q = 20Q - 2Q^2 \Rightarrow$ MR$=\frac{dTR(Q)}{dQ} = 20 - 4Q$
   Optimal Output Q^*: MR=MC $\Rightarrow 20 - 4Q = 5,\ Q^* = \frac{15}{4}$
   Price "Maker": plug Q^* in D: $Q_D = \frac{20-P}{2},\ P^* = \frac{25}{2}$



   (b) Maximize profit where MR = MC. Since MC $\geq 0 \Rightarrow$ MR = MC ≥ 0, it provides the critical point driving MR $= 0$, Q $= 5$. Referring this point vertically back to D, observe that the intersection point is right on the midpoint of D. Thus, a firm will operate on the left segment, which is elastic and has a range $\{P = 20 - 2Q,\ 0 \leq Q \leq 5\}$

2. **(D)** Buyers who buy in bulk are often offered discounts. This is an example of **second-degree price discrimination**.
   Expl.: Second-degree: Different price set based on the characteristics of **the purchase**. [target: goods]

3. **(D)** When the price of the same product varies by location attributes, it is an example of **third-degree price discrimination**.
   Expl.: Third-degree: Different price set based on the characteristics of **the customers and locations**. [target: ppl, places]

4. **(B)** Refer to Table 1. If Agatha has $80,000 in taxable income, her average tax rate is **20.2%**.
   Expl.: $\frac{8375\times10\%+(34000-8375)\times15\%+(80000-34000)\times25\%}{80000} \doteqdot 20.22\%$

5. **(B)** Refer to Table 1. If Agatha has $80,000 in taxable income, her marginal tax rate is **25%**.
   Expl.: $80,000 lies in the segment which is charged a 25% tax rate.