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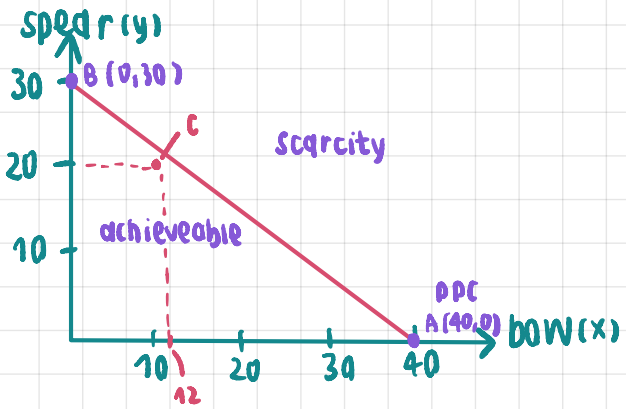
1. A human civilization finds a new wood source of total 120 units. Wood can either be used to produce spear or bow for hunting. A wood master then calculates that in order to produce a spear, it takes 4 units of wood while 3 units for a bow. Answer the following questions.

- 1 spear 4 woods } 120 wood < 30 spears / 40 bows
  1 bow 3 woods }

1.a) Assumed that the opportunity cost of using this 120 units of wood to produce the products is constant, draw a production possibility curve (PPC), displaying quantity of spear on the vertical axis and quantity of bow on the horizontal axis, and indicate all the essential details in the graph and explain.



1.b) How much is the opportunity cost for a spear, in terms of bow? Show how you calculate this figure.

opportunity cost of spear = $\frac{\Delta bow}{\Delta spear} = \frac{40-0}{0-30} = -\frac{4}{3}$

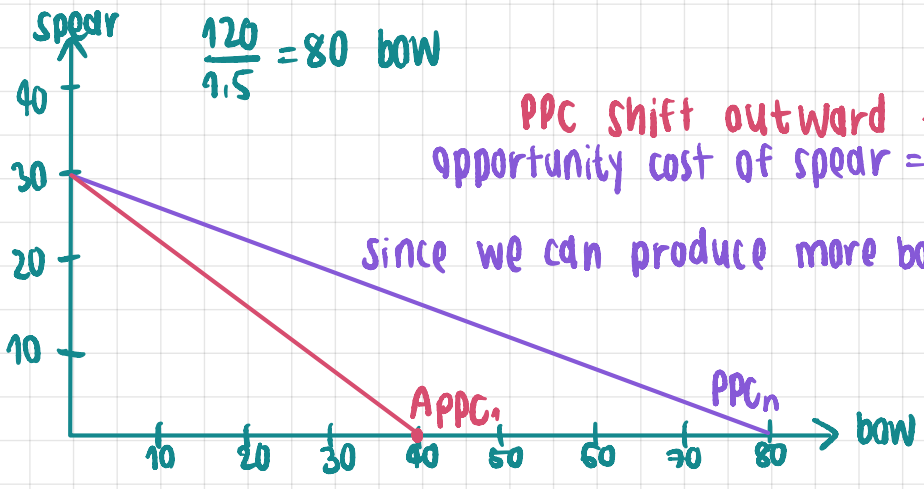
∴ If we produce 1 spear, we will lose $\frac{4}{3}$ bow

1.c) With this newly found resource, is it possible for this civilization to produce 20 spears and 12 bows? If it is, is this option efficient? Display this option on a graph from (a) and explain.

20 spears - 80 woods
12 bows - 36 woods
tool - 116
120 - 116 = 4 woods
> inefficient

(use the same graph with 1.a)

1.d) If a new method of making bow is discovered and requires only 1.5 units of wood for each bow, how does it affect the PPC and the opportunity cost for a spear? Illustrate the change and explain.



$\frac{120}{1.5} = 80$ bow

PPC shift outward for bow

opportunity cost of spear = $\frac{\Delta B}{\Delta S} = \frac{80-0}{0-30} = -\frac{8}{3}$

Since we can produce more bow, opp. cost of spear will increase

2. Few years ago, the MRT Purple Line electrical train opened to the public but with unexpected low ridership, the operator of MRT decided to lower the fare from 42 to 29 baht per trip. As a result, the number of passengers increased from 20,000 to 21,000 commuters.

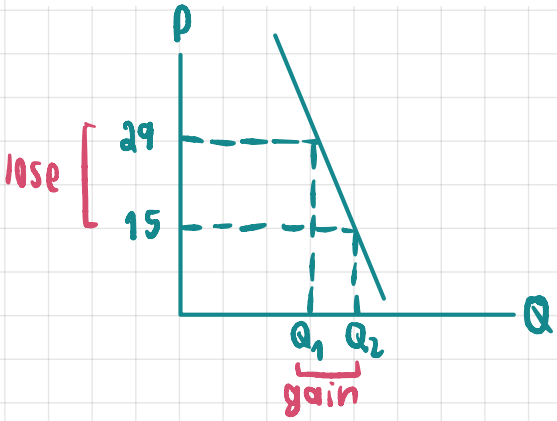
2.a) What is the price elasticity of demand for MRT Purple Line? Show your work.

$$= \left[\frac{Q_2-Q_1}{P_2-P_1}\right]\left[\frac{P_2+P_1}{Q_2+Q_1}\right] = \left[\frac{21{,}000-20{,}000}{29-42}\right]\left[\frac{29+42}{21{,}000-20{,}000}\right]$$

$$= \left[\frac{1000}{13}\right]\left[\frac{71}{41000}\right] = \frac{-71}{533} \approx -0.13$$

$\therefore |E_d| < 1$ = inelastic

2.b) If the MRT operator decides to reduce the fare even further from 29 to 15 baht per trip. Do you think this price-reduction strategy will help increasing total revenue of MRT Purple Line? Give a clear explanation with support of a diagram.



=> when it is inelastic demand, it mean that the price change the quantity demand just a little because people need to use MRT in their daily live.

3. Assumed that a headphones market is perfectly competitive, demand and supply for headphones are illustrated in the graph below. Answer the following questions.

3.a) Calculate price elasticity of demand and price elasticity of supply at the equilibrium price.

- Price elasticity of demand $= \left[\frac{Q_2-Q_1}{P_2-P_1}\right]\left[\frac{P_1}{Q_1}\right]$

$$= \left[\frac{40-80}{25-20}\right]\left[\frac{20}{80}\right]$$

$$= -\frac{40}{5}\cdot\frac{2}{8} = -\frac{10}{5} = -2$$

- Price elasticity of supply $= \left[\frac{Q_2-Q_1}{P_2-P_1}\right]\left[\frac{P_1}{Q_1}\right]$

$$= \left[\frac{100-80}{25-20}\right]\left[\frac{20}{80}\right]$$

$$= \frac{20}{5}\cdot\frac{2}{8} = 4\cdot\frac{1}{4} = 1$$

3.b) Calculate both consumer and producer surplus at the socially optimum price and quantity.

- Consumer surplus $= 1/2 \times 80 \times 10 = 400$
- Producer surplus $= 1/2 \times 80 \times 20 = 800$

TR 1,200

3.c) Now supposed that all the producers collude and become a monopoly, they can charge the price at $25. Consequently, total quantity in this headphones market becomes 40 pairs. Discuss the change in both consumer surplus and producer surplus.

- Consumer surplus = $1/2 \times 40 \times 5 = 100$
- Producer surplus = $(15 \times 40) + (1/2 \times 40 \times 10) = 600 + 200 = 800$

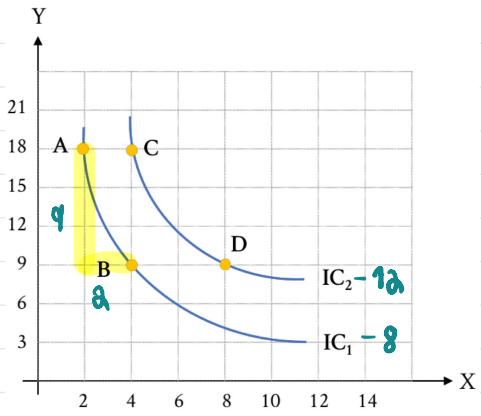
$TR = 100 + 800 = 900$

∴ When the Charge the price at 25$, consumer surplus & total surplus we decrease while the producer surplus still the same.

3.d) Is there any deadweight loss due to the collusion? If there is, how much is it?

$DWL = 1/2 \times 40 \times 15 = 300$

4. A consumer finds that for him/her avocado (X) and nuts (Y) are substitutes. Assumed that this consumer yields 8 and 12 utils on IC1 and IC2 respectively, show your work and answer the following questions.



4.a) Measured from point A to B, assumed Py is 10 baht per unit, how much Px must be to make you conclude that the consumer's equilibrium is on point B?

- $P_y = 10$, $P_x = ?$

Slope IC = Slope BL

$MRS = \frac{P_x}{P_y}$

find MRS $= \frac{\Delta y}{\Delta x} = \frac{9}{2} = 4.5$

$MRS = \frac{P_x}{P_y}$

$4.5 = \frac{P_x}{10}$

$P_x = 45$

4.b) Measured from point A to B, assumed Px is 180 baht per unit, how much budget does this consumer has to achieve the equilibrium on point B?

$MRS = \frac{P_x}{P_y}$

$4.5 = \frac{180}{P_y}$

$P_y = 40$

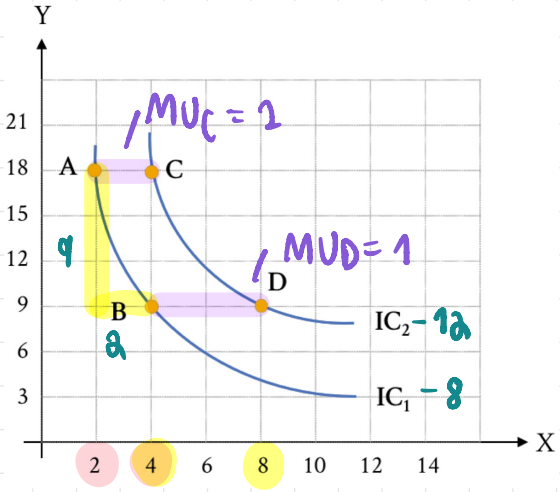
At point B $\Rightarrow x = 4$, $y = 9$

$M = P_x X + P_y Y$

$= 180(4) + 40(9)$

$= 1080$

M = Budget



4.c) Measured from point C to point D, how much is the average marginal utility per unit of avocado?

Marginal utility = $\frac{\Delta U}{\Delta X}$

$MU_A = MU_C = \frac{\Delta U}{\Delta X}$

$= \frac{12-8}{4-2} = \frac{4}{2} = 2$

$MU_B = MU_D = \frac{12-8}{8-4} = \frac{4}{4} = 1$

$\therefore MU_C = 2$, $MU_D = 1$

4.d) Show that this consumer's utility received from consuming avocado is in accordance with the law of diminishing marginal utility, using any essential information from any point. (But highly recommend that you consider all the points)

Low of diminishing marginal utility = $X \uparrow \rightarrow MU_X \downarrow$

point C → $X = 4$, $MU = 2$
point D → $X = 8$, $MU = 1$
} $X \uparrow$, $MU \downarrow$ → law of diminishing

point A → $X = 2$, $MU_X = 2$
point B → $X = 4$, $MU_X = 1$
} $X \uparrow$, $MU_X \downarrow$ → law of diminishing