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.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.

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.

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.

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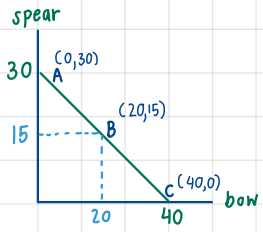
1a)



$\frac{120}{4}$ = 30 spears

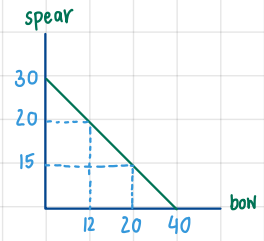
$\frac{120}{3}$ = 40 spears

1b)

Activities	Benefit	opportunities cost
Spear	30	40
Bow	40	30

opp. cost for spear is 40 in term of bow

1c)



Spear = 20 x 4 = 80

Bows = 12 x 3 = 36

80+36 = 116 units of wood

120 > 116 = possible

$y - y_1 = m(x - x_1)$

$30 - 0 = m(0 - 40)$

$30 = m(-40)$

$m = \frac{30}{-40} = \frac{-3}{4}$

$y = mx + c$

$y = \frac{-3}{4}x + 30$

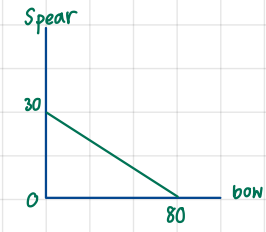
$20 = \frac{-3}{4}x + 30$

$-10 \cdot \frac{4}{-3} = x$

$x = 13.33$

It's possible but not efficient as there are resources left.

1d)



opp. cost ↑ from 40 to 80

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.

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.

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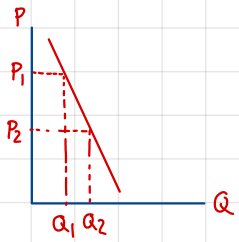
2a) $E_d = \frac{Q_2 - Q_1}{P_2 - P_1} \cdot \frac{P_1}{Q_1}$

$\frac{21000 - 20,000}{29 - 42} \cdot \frac{42}{20000}$

$= -\frac{21}{130} = -0.1615$

2b) $E_d = -0.1615 \rightarrow |0.1615| < 1 \rightarrow$ inelastic



- demand is inelastic
- ↑ in P will not affect in ↑ in TR
- as QD ↑ only a little

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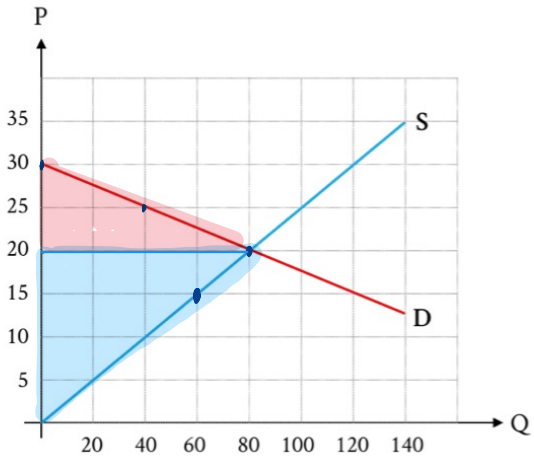
3. Assumed that a headphones market is perfectly competitive, demand and supply for headphones are illustrated in the graph below. Answer the following questions.



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

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

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.

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

3a) $\varepsilon_d = \frac{P_1}{Q_1} \cdot \frac{Q_2 - Q_1}{P_2 - P_1}$

$= \frac{25}{40} \cdot \frac{80-40}{20-25}$

$= \frac{25}{40} \cdot \frac{40}{-5} = -5$

$\varepsilon_S = \frac{P_1}{Q_1} \cdot \frac{Q_2 - Q_1}{P_2 - P_1}$

$= \frac{15}{60} \cdot \frac{80-60}{20-15}$

$= \frac{\cancel{15}^{3}}{\cancel{60}_{3}} \cdot \frac{\cancel{20}}{\cancel{5}_{1}}$

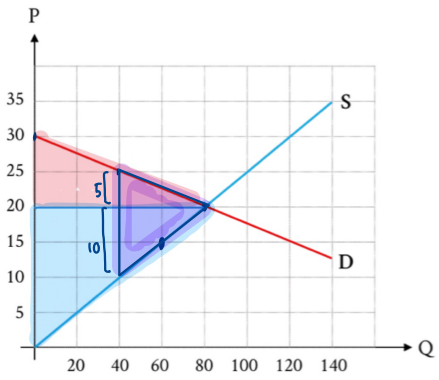
$= 1$

3b) consumer surplus (CS) $= \frac{1}{2} \times 80 \times 10 = 400$

producer surplus (PS) $= \frac{1}{2} \times 80 \times 20 = 800$

3c) Price is higher, producer sell less

- Producer surplus become smaller
- consumer surplus become smaller



3d) Deadweight loss $= \frac{1}{2} \times 10 \times 40 + \frac{1}{2} \times 5 \times 40$

$= 200 + 100$

$= 300$

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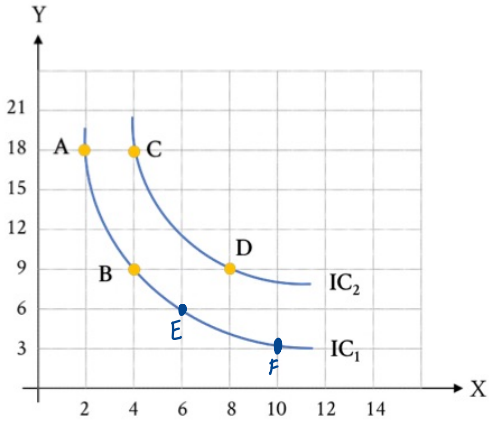
4. A consumer finds that for him/her avocado (X) and nuts (Y) are substitutes. Assumed that this consumer yields 8 and 12 utils on IC1 and IC2 respectively, show your work and answer the following questions.



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?

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?

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

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)

4a) slope of budget line = $\frac{Px}{Py} = \frac{Px}{10}$

slope of IC curve = $|MRS_{xy}| = \left|\frac{\Delta Y}{\Delta X}\right| = \left|\frac{Y_b - Y_a}{X_b - X_a}\right| = \left|\frac{9-18}{4-2}\right| = \left|\frac{-9}{2}\right| = \frac{9}{2}$

$\frac{MU_X}{MU_Y} = \frac{P_X}{P_Y}$ $\quad |MRS_{xy}| = \frac{Px}{Py}$ $\quad \frac{9}{2} = \frac{Px}{10}$ $\quad Px = \frac{90}{2} = 45$

4b) $\frac{MU_X}{MU_Y} = \frac{Px}{Py}$

$|MRS_{xy}| = \frac{Px}{Py}$

$\frac{9}{2} = \frac{180}{Py}$

$Py = 40$

4c) $|MRS_{xy}| = \left|\frac{\Delta Y}{\Delta X}\right| = \left|\frac{y_d - y_c}{x_d - x_c}\right| = \left|\frac{9-18}{8-4}\right| = \left|\frac{-9}{4}\right| = 2.25$

4d) $|MRS_{xy\,(CB)}| = \left|\frac{\Delta y}{\Delta x}\right| = \left|\frac{9-18}{4-2}\right| = \frac{-9}{2} = 4.5$

$|MRS_{xy\,(CE)}| = \left|\frac{\Delta y}{\Delta x}\right| = \left|\frac{6-9}{6-4}\right| = \frac{-3}{2} = 1.5$

$|MRS_{xy\,(CF)}| = \left|\frac{\Delta y}{\Delta x}\right| = \left|\frac{3-6}{10-6}\right| = \left|\frac{-3}{4}\right| = 0.75$

∴ consumer's utility follows the law of diminishing of return as consumer consume more, will get less marginal utility.