ASSIGNMENT #1

Pimra Phromchana
6404640220

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.

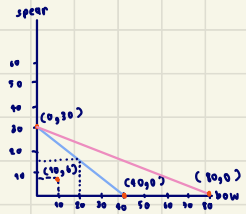
1.a) Assumed that the opportunity cost of using this 120 units of wood to produce the products is constant, draw a production possibility curve (PPC), displaying quantity of spear on the vertical axis and quantity of bow on the horizontal axis, and indicate all the essential details in the graph and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

1a



1b

$\frac{120}{15} = \frac{1.33}{1}$ ∴ The opportunity cost for making 1 spear is around 1.33 bows.

1c

It is possible to produce this amount of product since it is still within the production possibility curve. However, it is not efficient. This is because the point is not on the curve, in this case it is under the curve, which means that there are resources left unused.

1d

$120 = 4s + 1.5b$ $\qquad \frac{90}{15} = \frac{1.66}{1}$

$b=0 \Rightarrow s=30$ // $s=0 \Rightarrow b=80$

∴ The PPC line would stay the same on the vertical axis, but it will increase or move to the right on the horizontal axis. Thus, it causes the PPC line to be longer. The opportunity cost for making a spear would increase as well. It will go from being only 1.33 bow to being 1.66 bows.

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.

Q_1 Q_2 P_1 P_2

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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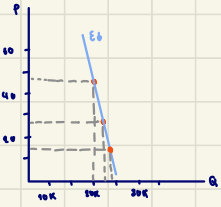
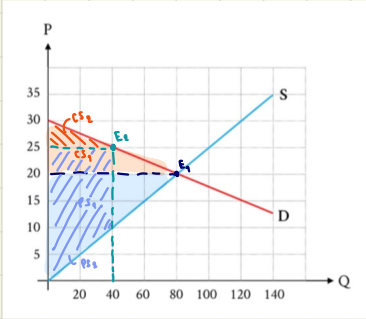
2a

$E_d = \frac{Q_2 - Q_1}{P_2 - P_1} \cdot \frac{P_1}{Q_1} = \frac{21,000 - 20,000}{29 - 42} \cdot \frac{42}{20,000} = \boxed{-0.16}$ // ans

2b



The price-reduction strategy will help increase the revenue of the MRT purple line. This is because $|E_d| < 1$, which means that the demand is in elastic. Therefore, even though the price changes by a lot, the demand would only change by a little. Thus, the revenue will not increase from this strategy.



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 $E_d = \frac{Q_2 - Q_1}{P_2 - P_1} \cdot \frac{P_1}{Q_1} = \frac{40-80}{25-20} \cdot \frac{20}{80} = \boxed{-2 = E_d}$ ans

$E_s = \frac{Q_2 - Q_1}{P_2 - P_1} \cdot \frac{P_1}{Q_1} = \frac{100-80}{25-20} \cdot \frac{20}{80} = \boxed{1 = E_s}$ ans

∴ when P ↑ 1%, quantity demand ↓ 2% and quantity supply ↑ 1%.

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

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

3c consumer surplus (new) $= 5 \times 40 \times \frac{1}{2} = \boxed{100 = CS'}$

∴ the consumer surplus decrease from 400 to 100. on the other hand, the producer surplus remain constant at 800.

producer surplus (new) $= (15 \times 40) + (10 \times 40 \times \frac{1}{2}) = \boxed{800 = PS'}$

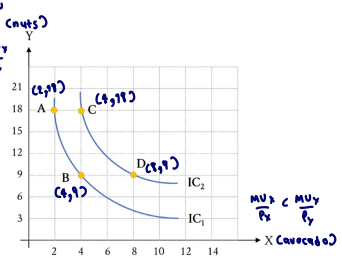
3d deadweight loss = total surplus old − total surplus new

$= 1200 - 900 = \boxed{300}$ ans

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. TU_2 TU_1

net benefit = $\frac{MU}{P}$

$\frac{MU_x}{P_x} > \frac{MU_y}{P_y}$



$\frac{MU_x}{P_x} < \frac{MU_y}{P_y}$

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)

$MRS_{xy} = \left|\frac{\Delta y}{\Delta x}\right| = \frac{MU_x}{MU_y} = \frac{P_x}{P_y}$

4a relative price: $MRS_{xy} = \left|\frac{\Delta y}{\Delta x}\right| = \frac{P_x}{P_y} \rightarrow \left|\frac{9-9}{2-4}\right| = \frac{10}{P_x} \rightarrow \frac{9}{8} = \frac{10}{P_x}$

$\therefore \boxed{P_x = 8.88 \text{ baht}}$ ans

4b $I = P_x(x) + P_y(y) \rightarrow I = 180(4) + 890(9) = \boxed{9,010 \text{ baht}}$ ans

[note: $\frac{9}{8} = \frac{P_y}{180}$ $P_y = 890$]

4c $\left|\frac{\Delta y}{\Delta x}\right| = \frac{MU_x}{MU_y} \rightarrow \left|\frac{18-9}{4-8}\right| = \frac{9}{9} = \frac{MU_x}{MU_y}$ $MU_y(9) = MU_x(4)$ $\therefore MU_y = \frac{9}{9}(MU_x)$

$TU = MU_x(x) + MU_y(y) \rightarrow 12 = MU_x(2) + \frac{9}{9}(MU_x)(9)$

$12 = 2MU_x + 4MU_x \rightarrow 12 = MU_x(2+4) \rightarrow 12 = 12MU_x$ $\therefore \boxed{MU_x = 1}$ ans

4d At point B to A, the consumer is willing to give up 2 avocados for 9 nuts when x=9. while from point D to C, the consumer is willing to give up 4 avocados for 9 nuts. From this, we can see that as x increases, the consumer will be willing to give up more x in order to get the same amount of Y. This relates to the law of diminishing marginal utility because it states that the marginal utility will decrease when you keep consuming the same product for some period of time. Thus, the marginal utility for x would be lower as x increases. which is why the consumer is willing to sacrifice more avocados for the nuts.