

Assignment 1

Assigned on Sep 7th, 2021. To be submitted on Sep 14th, 2021 before midnight.

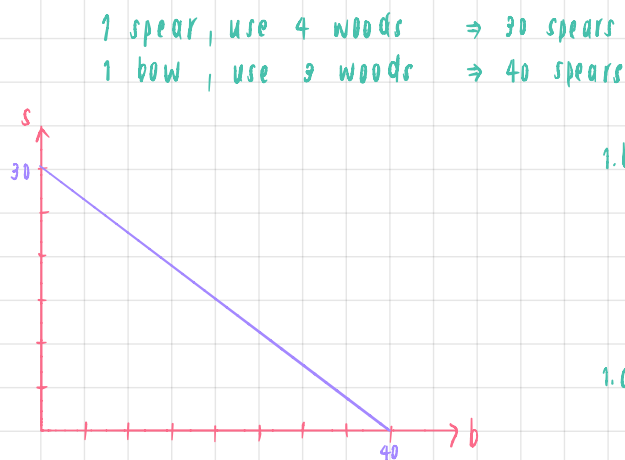
1. A human civilization finds a new wood source of total 120 units. Wood can either be used to produce spear or bow for hunting. A wood master then calculates that in order to produce a spear, it takes 4 units of wood while 3 units for a bow. Answer the following questions.

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.

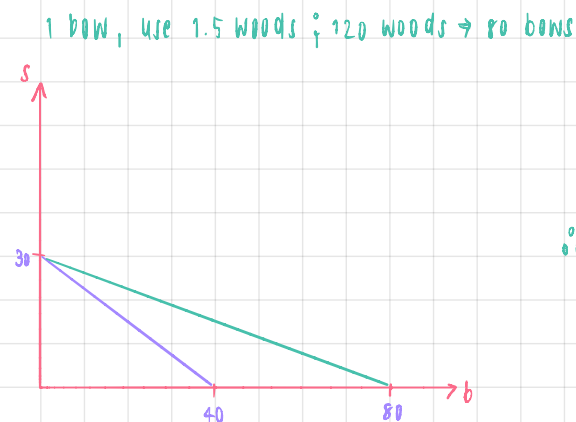
1.d) If a new method of making bow is discovered and requires only 1.5 units of wood for each bow, how does it affect the PPC and the opportunity cost for a spear? Illustrate the change and explain.



1.b) opportunity cost: $\frac{\Delta b}{\Delta s} = \frac{40-0}{0-30} = -\frac{4}{3}$

if we produce 1 more spear, we must sacrifice $\frac{4}{3}$ bows

1.c) if we produce 1 more spear, we must sacrifice $\frac{4}{3}$ bows
if we produce 20 more spear, we must sacrifice $20 \cdot \frac{4}{3}$ bows
so we can produce 20 spears, we must sacrifice 26.67 bows



1.d) PPC will shift outward only for bow

opportunity cost of spear = $\frac{\Delta b}{\Delta s} = \frac{80-0}{0-30} = -2.67$

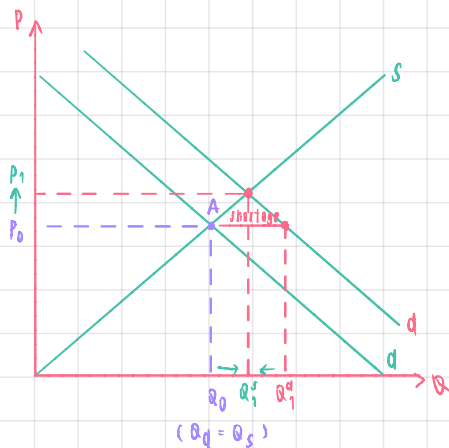
% if we can produce more bow, the opportunity cost will increase as well

2. Assumed that a computer devices market is perfectly competitive, answer the following questions in detail.

2.a) Draw a graph showing that the computer devices market is in equilibrium at a certain original equilibrium price P_0 and equilibrium quantity Q_0 . During the pandemic, many people are assigned to work from home and computer devices are crucial. Does the market demand or market supply of computer devices change? Explain.

2.b) After what happened in 2.a), at the original equilibrium price P_0 will there be excess demand or excess supply? Show the new market equilibrium and state the equilibrium condition. Does the pandemic cause the equilibrium price and quantity to increase or decrease?

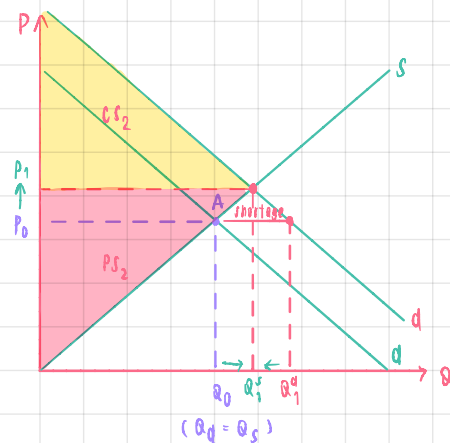
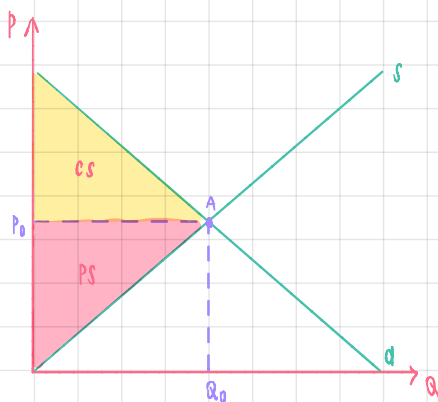
2.c) From the situation in 2.b), compare the consumer surplus and producer surplus in this computer market before and during the pandemic.



since people have to work from home during pandemic, they need more personal computer for working.
 $\therefore$ the market demand will shift rightward

2.b) at P_0 : $Q \uparrow \therefore Q_1^d > Q_0^s$ (excess demand)
 $\therefore$ excess demand will cause the price to increase, and adjust both quantity demand & supply
 $P_0 : Q^d > Q^s, P \uparrow \rightarrow P_1 : Q^d \downarrow, Q^s \uparrow$
 $\therefore$ new equilibrium P & Q are both increase

2.c)



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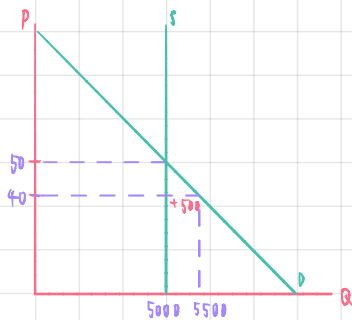
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3. Consider a System-on-a-Chip (SoC) market that is assumed to be perfectly competitive, due to a technical problem of production, there are only a few factories that can produce the next generation SoC. Answer the following questions in detail.

3.a) Draw a demand and supply on graph when the demand has normal downward slope while the supply is perfectly inelastic. The equilibrium price is at \$50 and the equilibrium quantity is at 5,000 units a day.

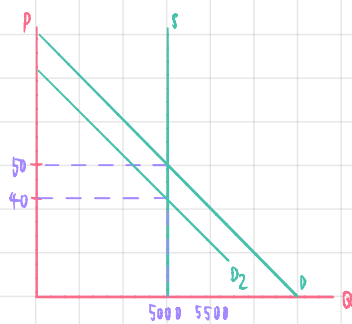
3.b) With the situation in 3.a), a study reveals that when the price drops to \$40, there will be 500 units of excess demand. Calculate the price elasticity of demand and supply at the equilibrium.

3.c) With the situation in 3.a), if a unit tax is imposed on buyers for \$10, portray the result of this intervention including the new equilibrium price and quantity, deadweight loss, and tax burden. Also, indicate which part of the burden belongs to either the buyers or the sellers.



$$3.b) \quad PED : \frac{\Delta Q}{\Delta P} \times \frac{P}{Q} = \frac{5000 - 5500}{50 - 40} \times \frac{50}{5000} = \frac{-500}{10} \times \frac{50}{5000} = -0.5$$

$$PES : \frac{\Delta Q}{\Delta P} \times \frac{P}{Q} = \frac{5000 - 5000}{50 - 40} \times \frac{50}{5000} = 0$$



demand shift leftward

$P \downarrow = 40$, $\bar{Q} = 5000$, $DWL = 0$

% Tax burden all belong to seller at $(50 - 40) \times 5000 = 50,000$