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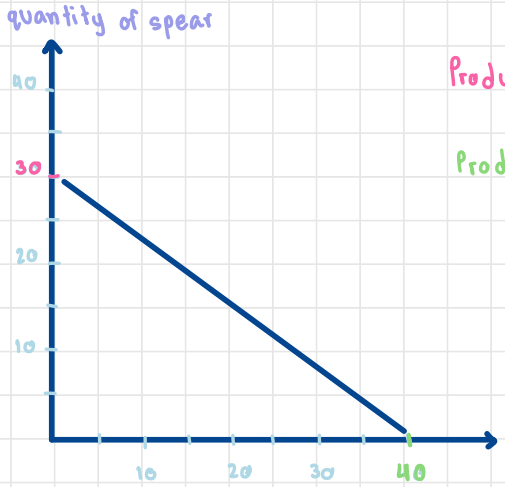
1. A human civilization finds a new wood source of total 120 units. Wood can either be used to produce spear or bow for hunting. A wood master then calculates that in order to produce a spear, it takes 4 units of wood while 3 units for a bow. Answer the following questions.

1.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.



Produce 1 spear take 4 wood = $\frac{4}{120}$ = 30

Produce 1 bow take 3 wood = $\frac{3}{120}$ = 40

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

Opportunity cost for each spear

30 spear = 40 bow

1 spear = x bow

$x = \frac{40}{30} \times 1 = 1.3$ bow

∴ Opportunity cost for 1 spear is 1.3 bow

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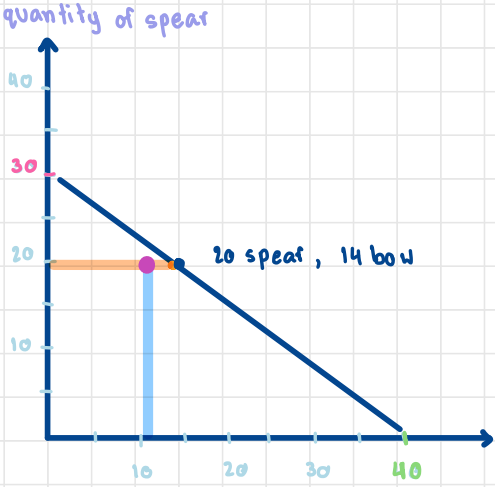
1.c) With this newly found resource, is it possible for this civilization to produce 20 spears and 12 bows? If it is, is this option efficient? Display this option on a graph from (a) and explain.



Produce 20 spears

In term of bow $20 \times 1.3 = 26$ bow

Culculate the rest of bow that is fessible

$40 - 26 = 14$ bow

∴ It is possible but some resources left. The maximum that can produce is 14 bow 20 spear.

We can calculate by use opportunity cost, we know that opportunity cost for 1 spear is 1.3 bow so when we produce 20 spears will need to loss 26 bow. To calculate the rest of bow that possible is $40 - 26 = 14$ bow.

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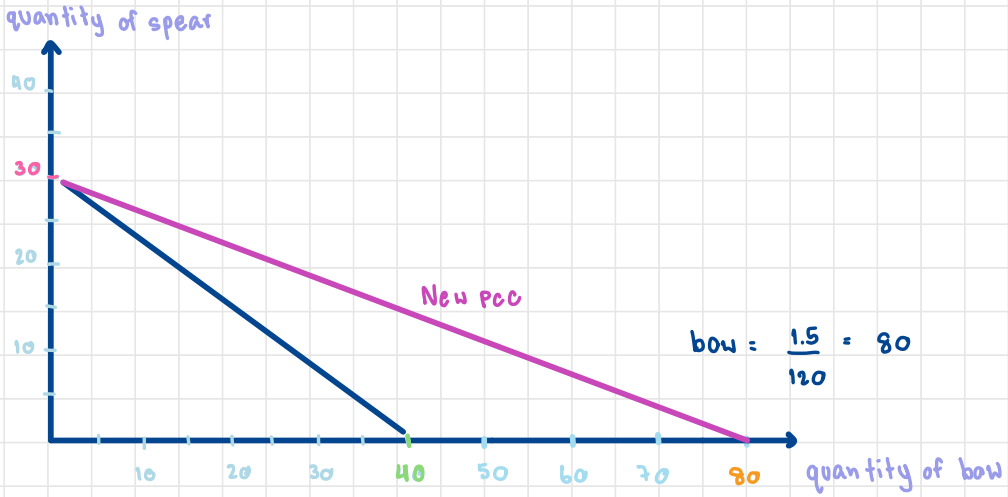
1.d) If a new method of making bow is discovered and requires only 1.5 units of wood for each bow, how does it affect the PPC and the opportunity cost for a spear? Illustrate the change and explain.



New opportunity cost is $\frac{80}{30} = 2.67$

If produce 1 more spear, we will loss 2.67 bow

the opportunity is increase. At past when we produce 1 more spear we will loss only 1.3 bow but now we will loss 2.67 bow.

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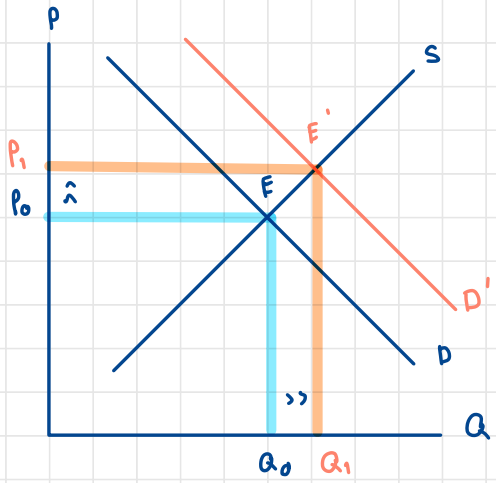
2. Assumed that a computer devices market is perfectly competitive, answer the following questions in detail.

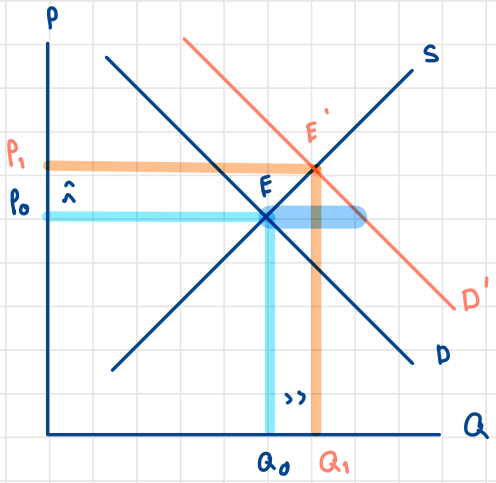
2.a) Draw a graph showing that the computer devices market is in equilibrium at a certain original equilibrium price P_0 and equilibrium quantity Q_0 During the pandemic, many people are assigned to work from home and computer devices are crucial. Does the market demand or market supply of computer devices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



People work from home more so they need to use computer, the demand of computer is increase

Demand line shift to the right

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?



At P_0 it will be excess demand

At the new equilibrium point (E > E') it is increase equilibrium price and quantity.

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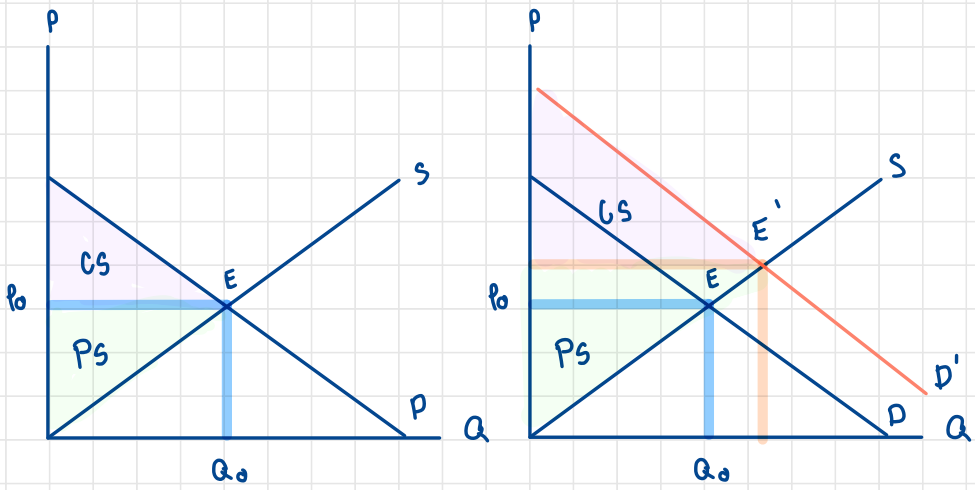
2.c) From the situation in 2.b), compare the consumer surplus and producer surplus in this computer market before and during the pandemic.



According to the demand shift right hand side it make a price increase also increase equilibrium quantity. Producer surplus will happy They can sell more with high price. Consumer also extend because people willing to pay eventhough the higher price

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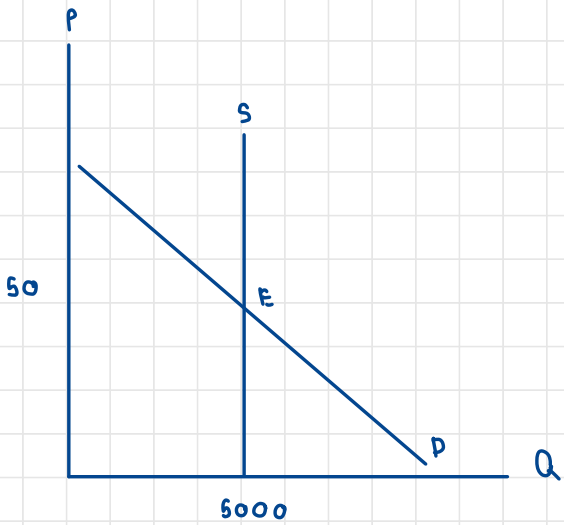
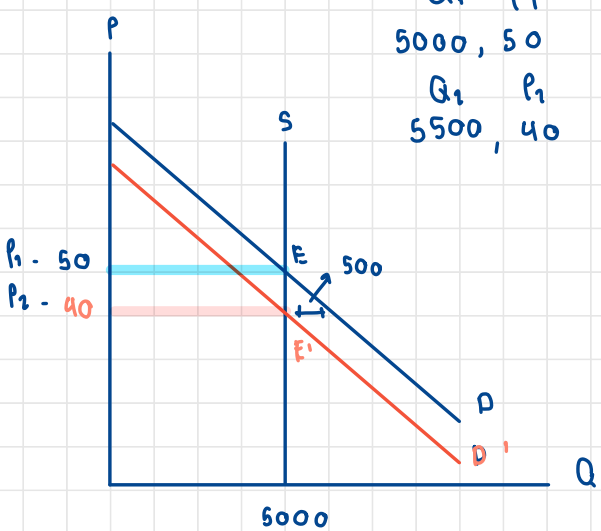
3. Consider a System-on-a-Chip (SoC) market that is assumed to be perfectly competitive, due to a technical problem of production, there are only a few factories that can produce the next generation SoC. Answer the following questions in detail.

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**.



$Q_1 \quad P_1$

$5000, \; 50$

$Q_2 \quad P_2$

$5500, \; 40$

Price Elastic demand

$$\frac{P_2 + P_1}{Q_2 + Q_1} \cdot \frac{Q_2 - Q_1}{P_2 - P_1}$$

$$\frac{40 + 50}{5500 + 5000} \cdot \frac{5500 - 5000}{40 - 50}$$

$$= \frac{90}{10{,}500} \cdot \frac{500}{-10}$$

$$0.008 \cdot -50$$

$$= -0.4$$

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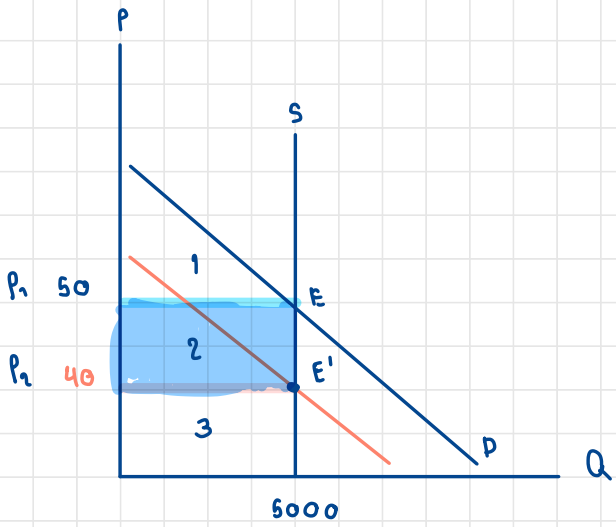
3.c) With the situation in 3.a), if a unit tax is imposed on buyers for $10, portray the result of this intervention including the new equilibrium price and quantity, deadweight loss, and tax burden. Also, indicate which part of the burden belongs the either the buyers or the sellers.



New equilibrium price is 40 (P_2) quantity remain the same

No deadweight loss

Tax burden 2

Consumer Surplus before & after is 1

Producer Surplus before (2+3) after (3)

Consumer are less willing to pay push the burden to seller