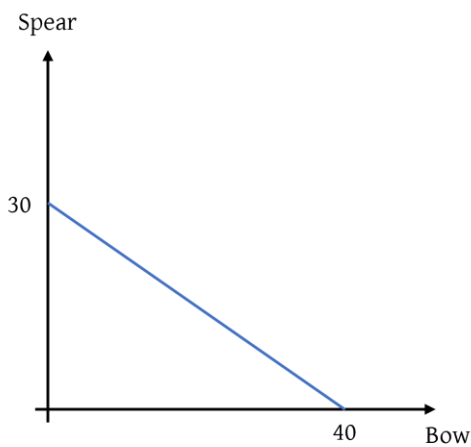


Assignment 1

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.



This 120 units of wood can be used to produce

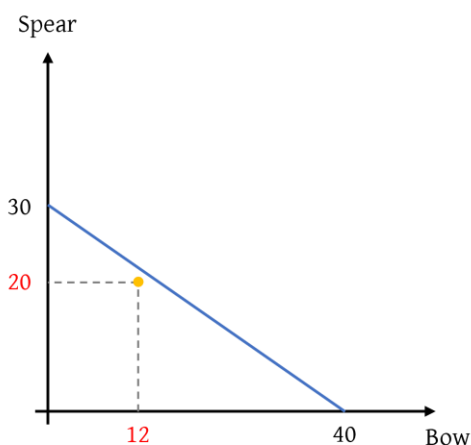
Spear: $120 / 4 = 30$ units

Bow: $120 / 3 = 40$ units

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

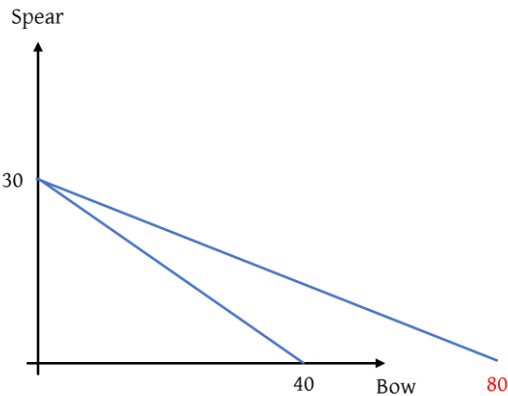
Producing 30 spears is equal to producing 40 bows, therefore, to produce a spear, it will cost $40/30 = 1.33$ bows.

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.



Imagine that we already produce 20 spears, $20 \times 4 = 80$ woods are used up. Therefore, we have $120 - 80 = 40$ woods remaining. Then, to produce 12 bows, it would take $12 \times 3 = 36$ woods, which is **feasible**.

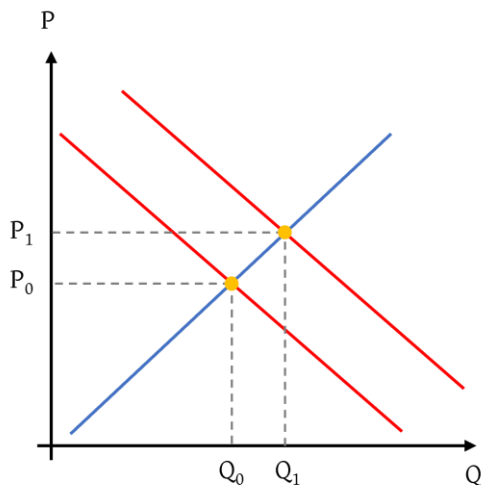
1.d) If a new method of making bow is discovered and requires only 1.5 units of wood for each bow, how does it affect the PPC and the opportunity cost for a spear? Illustrate the change and explain.



PPC is tilted counter-clockwise, extended the capacity to produce bows up to $120 / 1.5 = 80$ units. The opportunity cost of a spear is **increased** from 1.33 to $80/30 = 2.66$ bows.

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.



The equilibrium price and quantity of this computer market was at P_0 and Q_0 respectively.

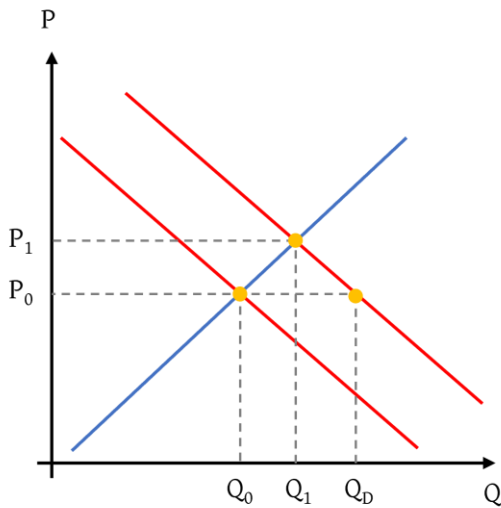
After the pandemic struct, demand shifts to the right-hand side due to work-from-home policy. Therefore, demand for computer devices increases.

Equilibrium price and quantity are then increased to P_1 and Q_1 respectively.

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?

Assignment 1

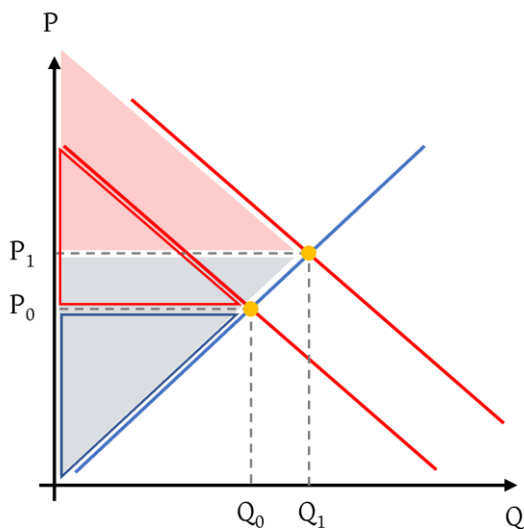
Assigned on Sep 7th, 2021. To be submitted on Sep 14th, 2021 before midnight.



If the price remains at P_0 , there will be excess demand ($Q_D - Q_0$). Therefore, the price moves upward to P_1 , removing all the excess demand in this market.

Equilibrium price and quantity are then increased to P_1 and Q_1 respectively.

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



Both consumer and producer surplus increase when demand increases.

As displayed here, the red and blue triangles represent CS and PS before demand shift.

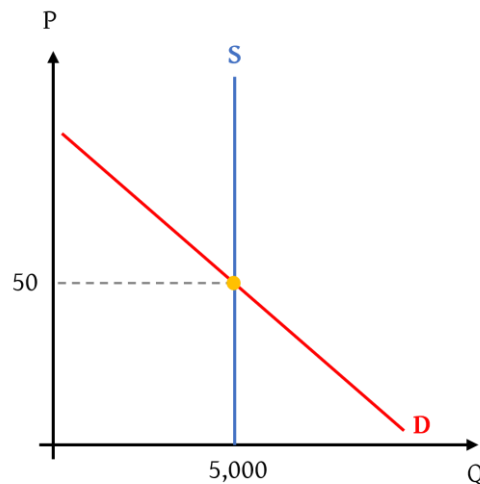
After the demand shift, CS and PS becomes the red and blue shaded areas respectively.

Assignment 1

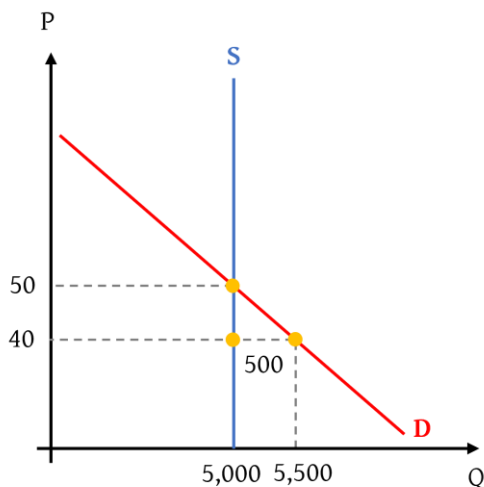
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3. Consider a System-on-a-Chip (SoC) market that is assumed to be perfectly competitive, due to a technical problem of production, there are only a few factories that can produce the next generation SoC. Answer the following questions in detail.

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**.



At $P = 40$, quantity demanded is $5,000 + 500 = 5,500$ units due to the excess demand of 500 unit.

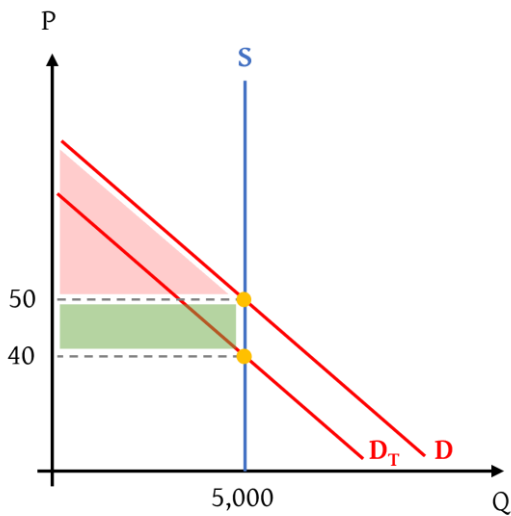
Calculate the price elasticity of demand at the equilibrium

$$\epsilon_d = \frac{Q_2 - Q_1}{P_2 - P_1} \cdot \frac{P_1}{Q_1} = \frac{5,500 - 5,000}{40 - 50} \cdot \frac{50}{5,000} = -0.5$$

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.

Assignment 1

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When unit tax is imposed on buyers \$10 each, the demand shifts downward in accordance to the amount of tax, reducing the equilibrium price down to \$40, while the equilibrium quantity remains the same as the supply is perfectly inelastic.

The green box is total tax burden. It belongs entirely to the sellers since the buyers can push all the burden to the sellers. Consumer surplus remain the same amount, only shifted downward.