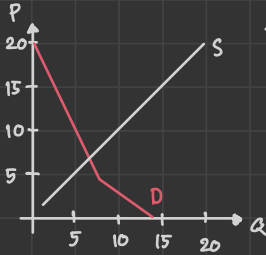
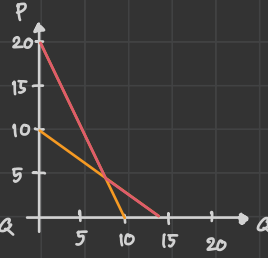
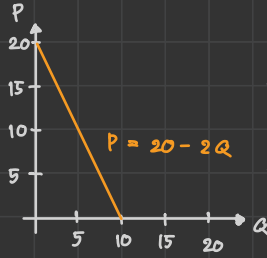
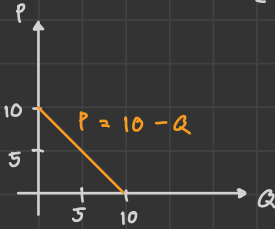


1.) 2 consumers 1 seller

A: $Q_A = 10 - P$ $Q = P$

B: $Q_B = 10 - \frac{1}{2}P$



there are 1 buyer in the market

$$Q_{\text{market}}^D = \begin{cases} 10 - 1/2P; & P > 10 \\ 20 - 3/2P; & P \leq 10 \end{cases}$$

Example 3.J: Excess burden formula under linear model & Tax-Revenue-maximizing tax rate

Demand: $p^d = a - bQ^d$; $a \geq 0, b \leq 0$.

Supply : $p^s = c + dQ^s$; $d \geq 0. \rightarrow p^s = c + dQ^s + t$

- Solve for quantity and prices equilibrium when the unit tax is imposed. Analyze the result

$$Q_D = \frac{a - p}{b}$$

At equilibrium, $P_s = P_d$

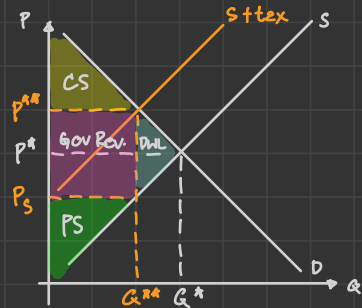
$$c + dQ^s + t = a - bQ^d$$

$$Q_S = \frac{p - c - t}{d}$$

$$dQ_s + bQ_d = a - c - t$$

$$Q^{**} = \frac{a - c - t}{d + b}$$

$$p^{**} = \left[\frac{a - c - t}{d + b} \right] c + t + d$$



o Derive the excess burden formula for buyers and sellers



Before tax : Consumers buy cheap price at P^* , while seller can sell high price at P^*

After tax : Consumer buy higher price at P^{**} , while seller will receive less at P_S

extra price that consumers pay
 extra price that producer pay

o Calculate the tax rate that maximizes the tax revenue of government.

$$\begin{aligned}
 \text{tax revenue} &= \left[\frac{a-c-t}{d+b} \right] t & \frac{d \text{ tax revenue}}{dt} &= \frac{a-c-2t}{d+b} \\
 &= \frac{at - ct - t^2}{dt + bt} & 0 &= a - c - 2t \\
 & & t &= \frac{(c-a)(-1)}{2}
 \end{aligned}$$

Example 3.K Price control and Welfare

Consider the market for apartment rentals in Chicago. The price of rent is determined by the following system of equations.

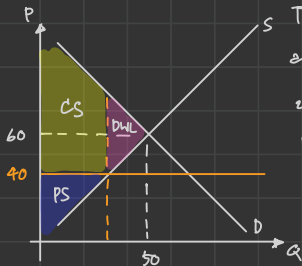
$$\text{Demand: } p = -2q_d + 160$$

$$\text{Supply: } p = q_s + 10$$

o What is the equilibrium price and quantity in the market for apartment rentals?

$$\begin{aligned}
 \text{At equilibrium, } P_S &= P_d & 3q &= 150 \\
 q_s + 10 &= -2q_d + 160 & q &= 50 \quad P = 60
 \end{aligned}$$

o Suppose the government tries to control the rent prices through a price ceiling of \$40. Discuss the implication of this policy. Is there any deadweight loss?



The government policy aim to reduce the quantity of renting an apartment. Because of cheaper price, the owner of the apartment doesn't want to rent out their room while the buyer will demand more apartment.

Deadweight loss