1

2 consumers

A : $Q_A = 10 - P$

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

1 seller

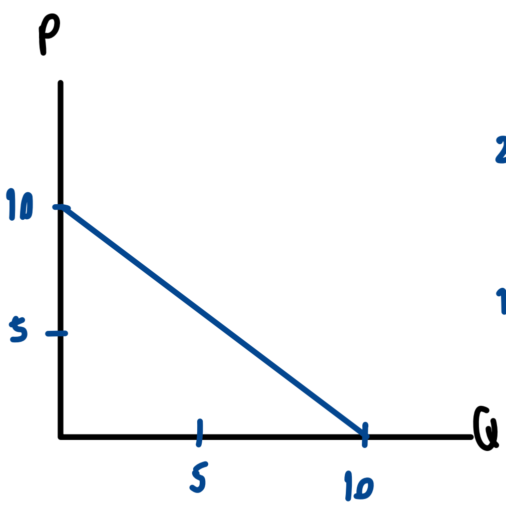
$Q = P$

1) Draw Diagrams
- Individual demand
- Market demand

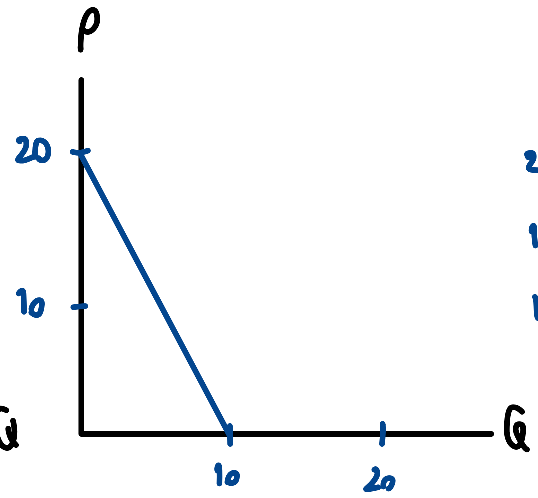
$Q_A = 10 - P \rightarrow P = 10 - Q$

$Q_B = 10 - \frac{1}{2}P \rightarrow P = \frac{10 - Q}{\frac{1}{2}} = 20 - 2Q$

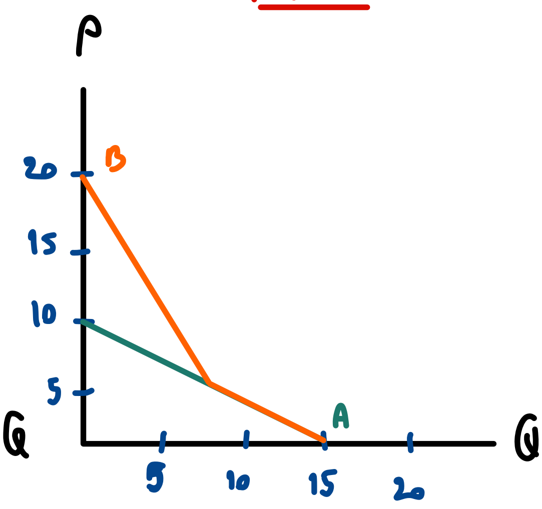
A



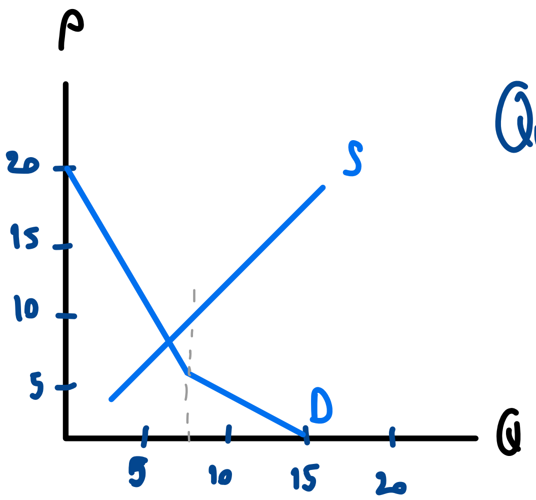
B



Market



2) Find equilibrium, how many buyers buy



Quantity of market demand
- B : $10 - \frac{1}{2}P$; $P > 10$
- A + B : $20 - \frac{3}{2}P$; $P \leq 10$

$\therefore$ There is only one consumer that is willing to buy.

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

$\to Q^d = \frac{a-P}{b}$

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

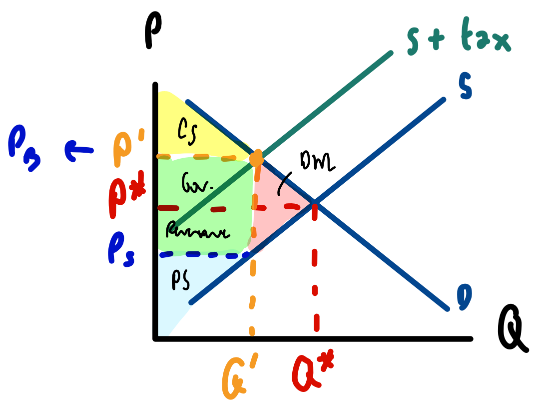
$\to Q^s = \frac{P-C-t}{b}$

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

tax

$a - b\left(\frac{a-c-t}{d+b}\right)$

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



From equilibrium condition, $P^s = P^d$

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

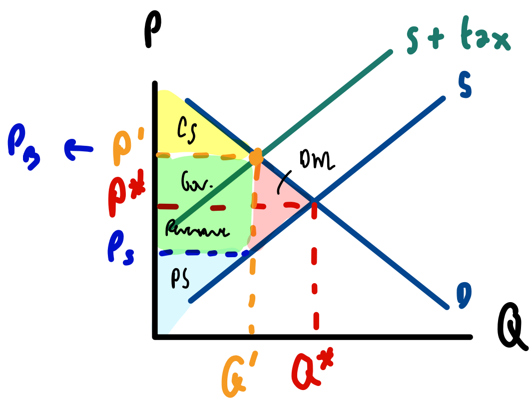
$$dQ^s + bQ^d = a - c - t$$

$$Q(d+b) = a - c - t$$

$$Q' = \frac{a-c-t}{(d+b)}$$

Plug in Q' in p^d ; $P' = a - b\left[\frac{a-c-t}{d+b}\right]$

- Derive the excess burden formula for buyers and sellers



- Consumers can buy at P^* and sellers can sell at P^* before tax.
- After tax, consumers have to buy at higher price (P') and sellers have to get a lower price at P_s.

For consumers, they pay extra price equal to $(P' - P^*) \times Q'$

For producers, they pay extra price equal to $(P_s - P^*) \times Q'$

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

$$\frac{\partial \text{ Tax Revenue}}{\partial t} = \left[\frac{a-c-t}{d+b}\right] \times t = \frac{at - ct - t^2}{d+b} = at - ct - t^2 + d^{-1}t + b^{-1}t$$

$$0 = a - c - 2t - d - b$$

$$2t = a - c - d - b$$

$$t = \frac{a-c-d-b}{2}$$

<u>Example 3.K</u> ***Price control and Welfare***

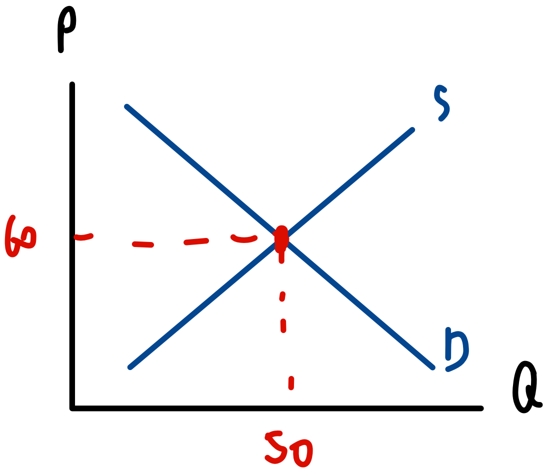
Consider the market for apartment rentals in Chicago. The price of rent is determined by the following system of equations.

Demand: $p = -2q_d + 160$

Supply: $p = q_s + 10$

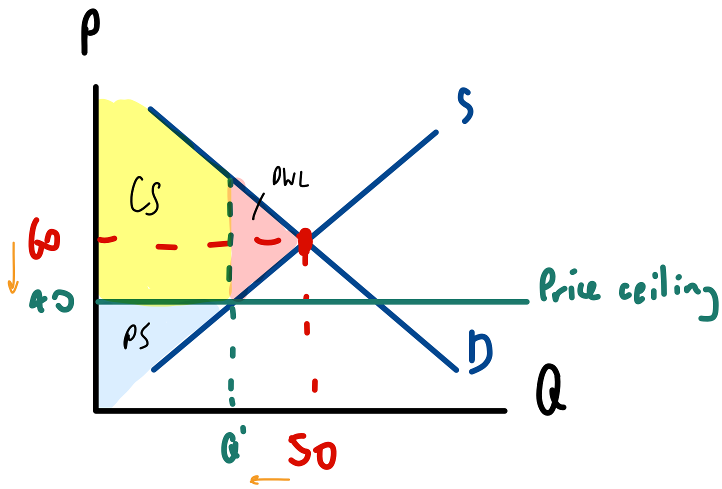
- What is the equilibrium price and quantity in the market for apartment rentals?

Equilibrium Condition; $p^s = p^d$



$$q^s + 10 = -2q^d + 160$$
$$q + 2q = 160 - 10$$
$$3q = 150$$
$$q = \frac{150}{3} = 50$$
$$p = q + 10$$
$$p = 50 + 10 = 60$$

- 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 intervenes to control the rent price by setting a price ceiling at $40 which is lower than original price. Consumers will demand more apartment but the owners don't want to allow the rent due to getting a lower price than before. There are some deadweight loss as shown in the diagram.