Example 3.G: Solve for the market equilibrium using the information in **Example 3.E** and **Example 3.F.** Justify your answer!

2 consumers

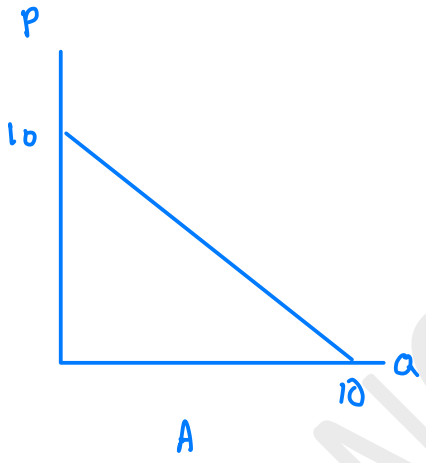
1 seller

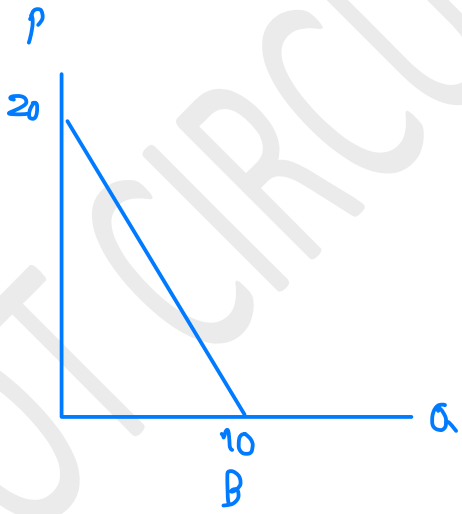
A: $Q_A = 10 - P$

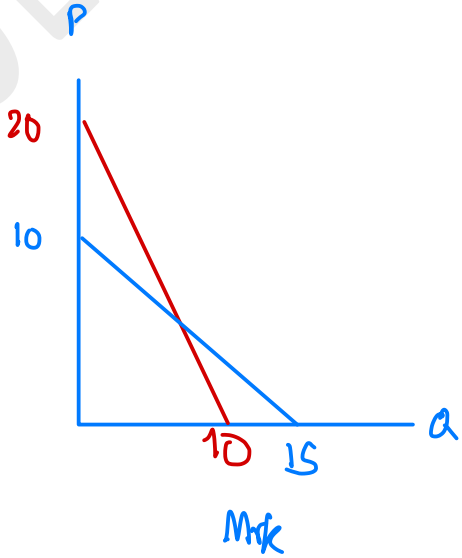
B: $Q_B = 10 - \frac{1}{2}P$

$Q = P$

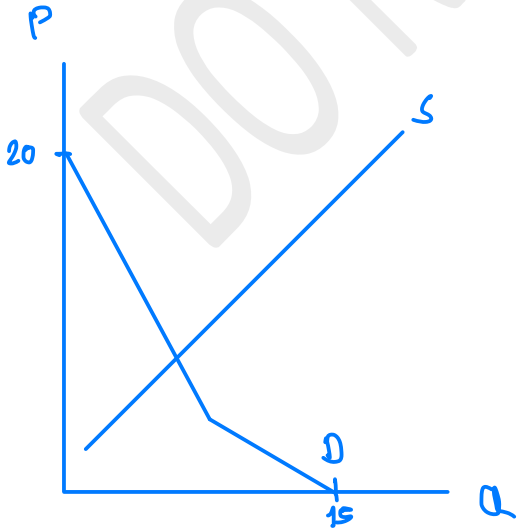
(1.1)







(1.2)



there are 1 buyer in the market

$$Q^D_{mkt} \begin{cases} 10 - \frac{1}{2}P ; P > 10 \\ 20 - \frac{3}{2}P ; P \leq 10 \end{cases}$$

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

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

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

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

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

$Q^s = \frac{P-c-t}{d}$

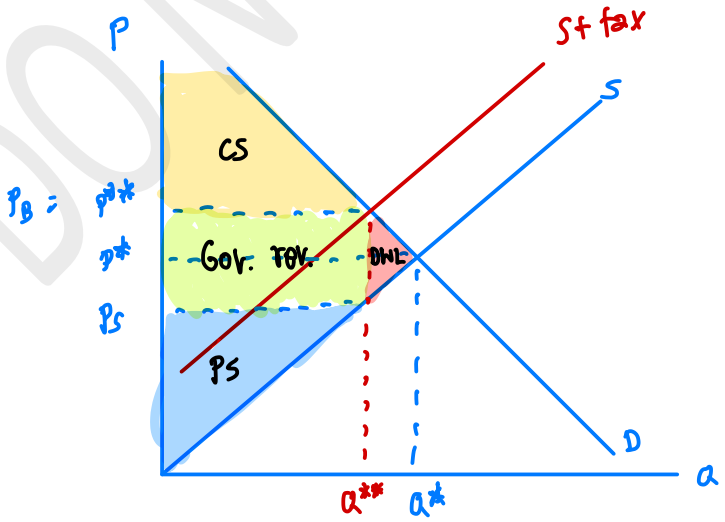
equilibrium : $P^s = P^d$

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

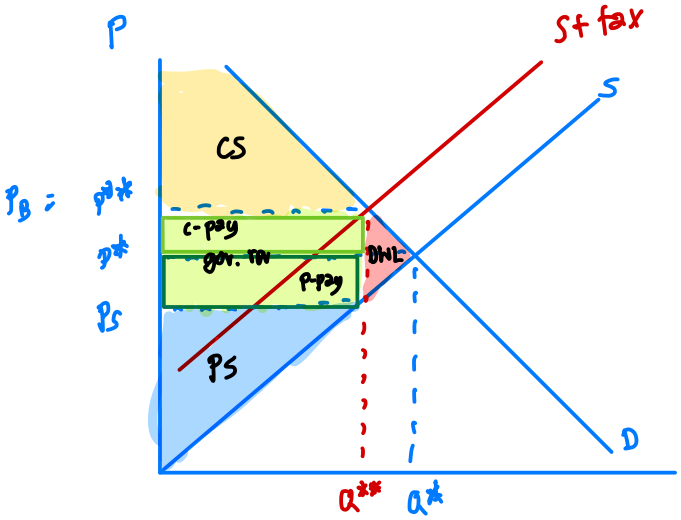
$Q(d+b) = a-c-t$

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

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



- Derive the excess burden formula for buyers and sellers



Before tax : Consumers buy at P^*, which is cheap. While seller can sell at high price (P^*)

After tax : consumers buy at higher price at P^{**} (P_B), and producer will receive less at P_S

extra price that consumers pay is $-(P_B - P^*) \times Q^{**}$

extra price that producers pay is $-(P_S - P^*) \times Q^{**}$

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

$$\frac{\partial \text{tax. rev.}}{\partial T} = \left[\frac{a-c-t}{d+b}\right] \times t$$

$$= at - ct - t^2 + d^{-1}t + b^{-1}t$$

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

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

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

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.

Demand: $p = -2q_d + 160$

Supply: $p = q_s + 10$

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

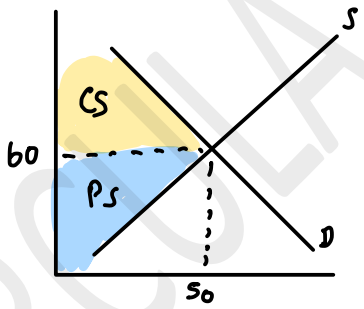
eqbm : $p^s = p^d$

$q^s + 10 = -2q^d + 160$

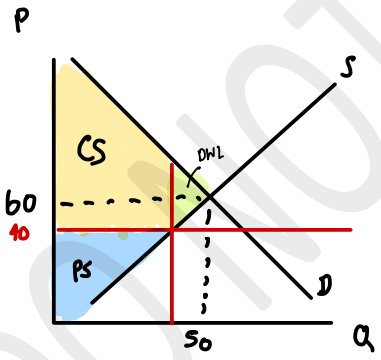
$3q = 150$

$q = 50$

$p = 60$



- 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 policy is announce to reduce the quantity of renting an apartment. By having a cheaper price people will demand more of apartment, while the owner of the apartment does not want to rent their room out. The pink area is the dead weight loss.