

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

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

2) find eqbm
- how many
buyers buy

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Comments are welcomed. Please alert if typos caught. Do not circulate without author's permission.

2 consumers, 1 seller

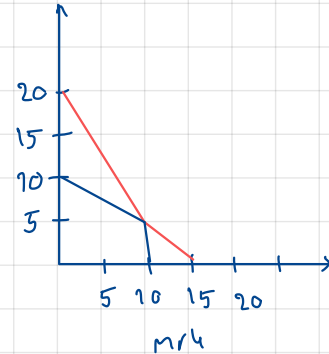
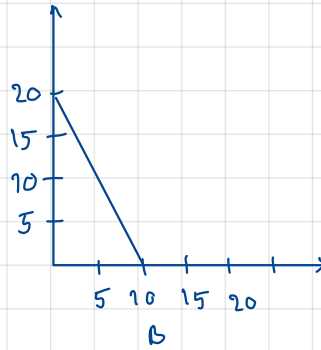
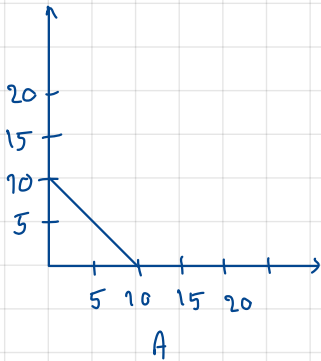
$$A: Q_A = 10 - P \quad Q = P$$

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

$$A: P = 10 - Q_A$$

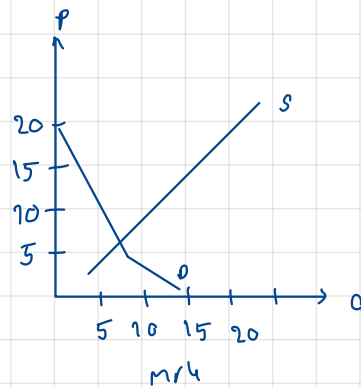
$$B: \frac{1}{2}P = 10 - Q_B$$

$$P = 20 - 2Q_B$$



There are 1 buyer in the market

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



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

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

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

$$\downarrow$$

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

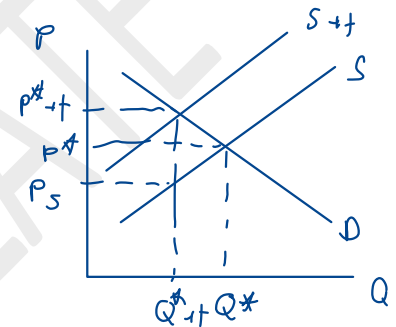
eqbm: $p^s = p^d$

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

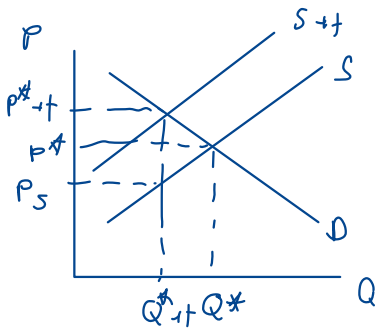
$$Q(d+b) = a - c - t$$

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

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



- o 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^*+t and producer will receive less at P_s

Extra price that consumers pay is $(P_b - P^*) \times Q^*+t$

Extra price that producer pay is $(P_s - P^*) \times Q^*+t$

How

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

$$\text{tax revenue} = t \times Q_{\text{tax}}(\dots, t)$$

$$\frac{d \text{ tax rev}}{dt} = 0$$

$$\rightarrow t^*$$

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

$$= a t - c t - t^2 + d^{-1} t + b^{-1} t$$

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

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

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