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2 consumers

A : $Q_A = 10 - P$

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

1 seller

$Q = P$

1) draw diagram

- individual demand
- mkt demand

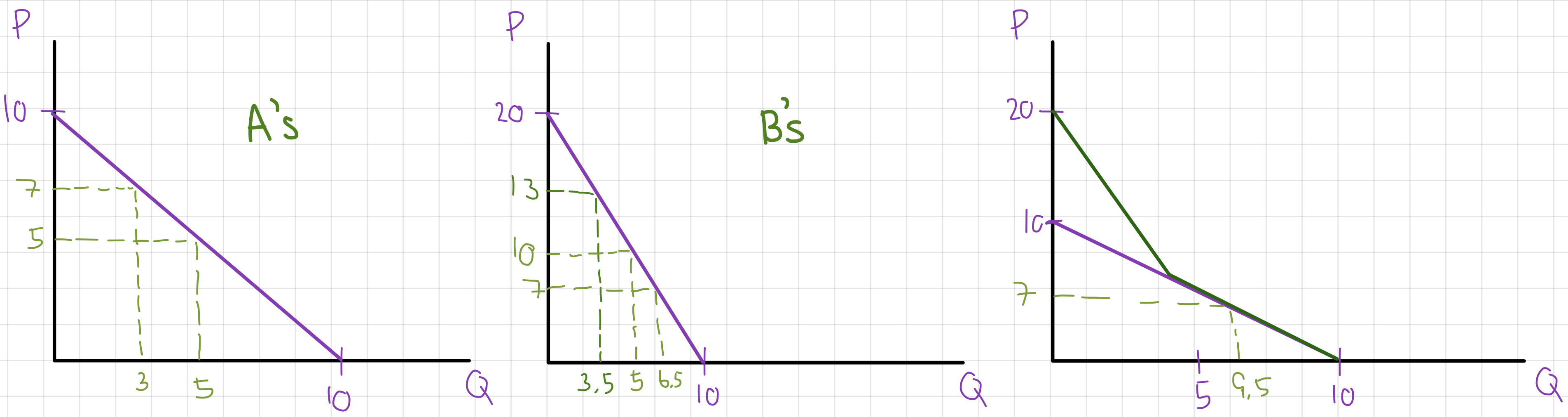
2) find equilibrium

-how many buyer buys.

$10 - \frac{1}{\cancel{2}}(\cancel{13})$ 6.5

$10 - \frac{1}{\cancel{2}}(\cancel{10})$ 5

1) draw diagram



To find mkt Demand : derived from horizontal summation

$Q_A + Q_B = (10 - P) + (10 - \frac{1}{2}P)$

$Q_{mkt} = 20 - 1.5P$

to check equation

$P = 7 \rightarrow Q_{mkt} = 9.5$

2) find equilibrium -how many buyer buys.

to find equilibrium : $Q^d = Q^s$

$Q^d_{mkt} = Q^s_{seller}$

$20 - 1.5P = P$

$P^* = 8$

→

Plug in P^* in mkt demand.

$Q_{mkt} = 20 - 1.5(8)$

$= 8$ #

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

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

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

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

Hint

Before Tax — solve for P^*, Q^*

$P^* = f(a, b, c, d)$

$Q^* = f(a, b, c, d)$

After Tax — Assume tax/unit = t

new s : $P = c + dQ + t$

$P^*_{tax} = f(a, b, c, d, t)$

$Q^*_{tax} = f(a, b, c, d, t)$

Befor tax.

to find Q^* : $P^d = P^s$

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

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

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

to find P^* : plug in Q^*

$$P = c + d\frac{(a-c)}{b+d}$$

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

$$= \frac{cb + \cancel{cd} + da - \cancel{dc}}{b+d}$$

$$= \frac{cb + da}{b+d} \quad \#$$

After tax.

Assume tax/unit = t

new s : $P = c + dQ + t$

to find Q^*_{tax} : $P^d = P^s$

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

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

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

to find P^*_{tax} : Plug in Q^*_{tax}

$$P = c + d\frac{(a-c-t)}{b+d}$$

$$= \frac{cb + \cancel{cd} + da - \cancel{dc} - dt}{b+d} = \frac{cb + da - dt}{b+d} \quad \#$$

- Derive the excess burden formula for buyers and sellers

consumer's burden

$= (P_B - P^q) \times Q_{tax}$

from formula

$= (P^d - P^*) \times Q_{tax}$

$= \left[(a - bQ^d) - \left(\frac{cb + da - dt}{b+d}\right)\right] \times \frac{a-c-t}{b+d}$

$= \left[\frac{ab + \cancel{ad} - b^2Q^d - bdQ^d - cd - \cancel{da} + dt}{b+d}\right] \times \frac{a-c-t}{b+d}.$

$= \left(\frac{ab - b^2Q^d - bd\,Q^d - cd + dt}{b+d}\right) \times \frac{a-c-t}{b+d}$