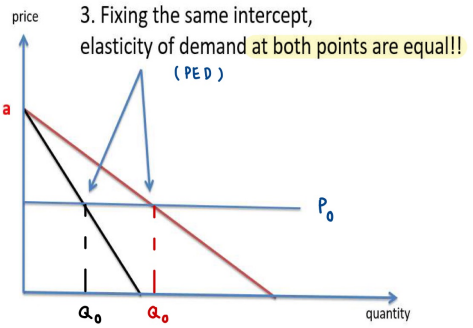
Exercise 2.A:

2.A.1) Given a demand function by $p = a - bQ$, derive the formula for the elasticity of demand, and show that the third property holds

2.A.2) Given the market supply $p = c + dQ$ where $d \geq 0$, show that
(i) elasticity of supply is always greater than 1 if $c > 0$,
(ii) elasticity of supply is always eqaul to 1 if $c = 0$,
(iii) elasticity of supply is always less to 1 if $c < 0$.



HOME WORK 2.A.1)
Prove that PED at both points are equal

① black line : $P = a - bQ$
② red line : $P = a - cQ$
} inverse demand eq

Demand eq :

① $Q_0 = \frac{a - P_0}{b}$

$PED = \frac{\Delta Q}{\Delta P} \cdot \frac{P_0}{Q_0}$

$= \frac{1}{b} \cdot \frac{P_0}{Q_0}$

$\therefore PED = \frac{1}{b} \cdot \frac{bP_0}{a - P_0} = \frac{P_0}{a - P_0}$

② $Q_0 = \frac{a - P_0}{c}$

$PED = \frac{\Delta Q}{\Delta P} \cdot \frac{P_0}{Q_0}$

$= \frac{1}{c} \cdot \frac{P_0}{Q_0}$

$= \frac{1}{c} \cdot \frac{cP_0}{a - P_0} = \frac{P_0}{a - P_0}$

2.A.2) $p = c + dQ$, $d \geq 0$

$Q_0 = \frac{P_0 - c}{d}$

i) $c > 0$

$\frac{-1 \cdot \Delta Q_S}{-1 \cdot \Delta P} = \frac{\Delta Q_S / Q_0}{\Delta P / P_0} = \frac{\Delta Q_S}{\Delta P} \cdot \frac{P_0}{Q_0}$

$= \frac{1}{d} \times \frac{P_0}{Q_0} = \frac{1}{d} \times \frac{P_0}{\frac{P_0 - c}{d}}$

$= \frac{1}{d} \times \frac{dP_0}{P_0 - c}$

$= \frac{P_0}{P_0 - c} = \frac{c + dQ}{c + dQ - c} > 1$

ii) $c = 0$

$\frac{-1 \cdot \Delta Q_S}{-1 \cdot \Delta P} = \frac{P_0}{P_0 - c_0} = 1$

iii) $c < 0$

$\frac{-1 \cdot \Delta Q_S}{-1 \cdot \Delta P} = \frac{P_0}{P_0 - c} = \frac{c + dQ}{c + dQ - c} < 1$