**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

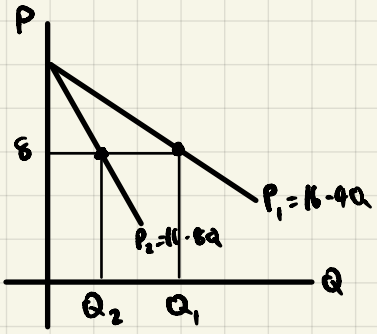
2.A.2) Given the market supply $p = c + dQ$ where $d \geq 0$, show that
(i) elasticity of supply is always greater than 1 if $c > 0$,
(ii) elasticity of supply is always eqaul to 1 if $c = 0$,
(iii) elasticity of supply is always less to 1 if $c < 0$.

2.A.1) $P.E.D. = \frac{1}{-b} \times \frac{P_0}{Q_0}$

<u>Proof of the 3rd property</u>

Let $P_1 = 16 - 4Q$

$P_2 = 16 - 8Q$




if $P_1 = P_2 = 8$

$P_1 = 8 = 16 - 4Q$
$Q_1 = 2$

$P_2 = 8 = 16 - 8Q$
$Q_2 = 1$

$\varepsilon_1 = \frac{1}{-4} \times \frac{8}{2} = -1$

$\varepsilon_2 = \frac{1}{-8} \times \frac{8}{1} = 1$

$\therefore \varepsilon_1 = \varepsilon_2$ $\therefore$ The 3rd property holds <u>Q.E.D.</u>

2.A.2) (i) $d, P_0, Q_0$ are positive

$\therefore \varepsilon = \frac{1}{d} \times \frac{P_2}{Q_0}$ is more than zero. #

(ii) Let $P_1 = 3Q$ and $P_2 = 7Q$ Then $P_1 = 9, Q_1 = 3$ and $P_2 = 40, Q = \frac{40}{7}$

$\varepsilon_1 = \frac{1}{3} \times \frac{9}{3} = 1$ $\varepsilon_2 = \frac{1}{7} \times \frac{40 \times 7}{40} = 1$ #

(iii) If $c$ is negative, $Q$ will always more than $P$. Therefore, $\frac{P_2}{Q_0} \in [0, 1)$.

Yet, $\frac{1}{b} \in [0, 1]$. When $\frac{1}{b}$ multiplies by $\frac{P_2}{Q_0}$ will result in $[0, 1)$, which always less than 1. #