

Suppose the demand curve is $Q(p) = p^\epsilon$, what is the elasticity of demand? If marginal cost is \$1 and $\epsilon = -2$, what is the profit-maximizing price?

$$\sum Q, P = \frac{\% \Delta Q}{\% \Delta P} = \frac{\Delta Q}{\Delta P} \cdot \frac{P}{Q}$$

$$Q = P^{-2}$$

$$\frac{\Delta Q}{\Delta P} = -2P^{-3}$$

$$\sum Q, P = \frac{\Delta Q}{\Delta P} \cdot \frac{P}{Q} = -2P^{-3} \times \frac{P}{P^{-2}} \rightarrow -2P^{-3} \times P^3 = -2$$

$$\text{Max } \pi, MR = MC$$

$$\frac{1}{2} Q^{-\frac{1}{2}} = 1$$

$$Q^{-\frac{1}{2}} = 2$$

$$Q = \frac{1}{4}$$

$$TR = P \cdot Q$$

$$TR = Q^{\frac{1}{2}} \cdot Q = Q^{\frac{3}{2}}$$

$$MR = \frac{1}{2} Q^{-\frac{1}{2}}$$

$$\text{Let } Q = \frac{1}{4} \text{ in } Q = P^{-2}$$

$$P^{-2} = \frac{1}{4}$$

$$P = 2$$

Suppose the demand curve for corn is $Q(p) = 10 - p$. Suppose that one firm owns all five units of corn in the world and has zero marginal cost. Does a monopoly sell less output than would be sold in a competitive market in which 100 firms each own 0.05 units?

$$TR = Q(-Q + 10)$$

$$TR = -Q^2 + 10Q$$

$$MR = -2Q + 10$$

$$MR = MC$$

$$-2Q + 10 = 0 \quad Q_M = 5$$

$\therefore$ Monopoly should sell at $Q = 5$

Total output in competitive market is $100(0.5) \rightarrow Q_C = 50$

Both market have sell outputs at the same level.

8. Output is homogenous and the demand curve is

$$P = 448 - Q.$$

There are two firms with identical costs given by $C = q_i^2$ where q_i is the production of firm i . The marginal cost of firm i is $MC_i(q_i) = 2q_i$.

(a) Find the Cournot equilibrium firm outputs.

(b) Find the Stackelberg equilibrium firm outputs.

Problem 8, Chapter 13 in Church and Ware (2000) (Church and Ware (2000) is an e-book and is available online).

$$\text{Firm 1} = \pi = P \cdot q_1 - q_1^2$$

$$\pi = (448 - q_1 - q_2) \cdot q_1 - q_1^2$$

$$\pi = 448q_1 - q_1^2 - q_2q_1 - q_1^2$$

$$\frac{\partial \pi}{\partial q_1} = 448 - 2q_1 - q_2 = 0$$

$$q_2 = -4q_1 + 448$$

$$\text{Firm 2} = \pi = P \cdot q_2 - q_2^2$$

$$\pi = (448 - q_2 - q_1)q_2 - q_2^2$$

$$\pi = 448q_2 - q_2^2 - q_1q_2 - q_2^2$$

$$\frac{\partial \pi}{\partial q_2} = 448 - 2q_2 - q_1 = 0$$

$$q_1 = -4q_2 + 448$$

$$q_1 = -4(-4q_1 + 448) + 448$$

$$q_1 = 16q_1 - 1792 + 448$$

$$q_1 = 16q_1 - 1344$$

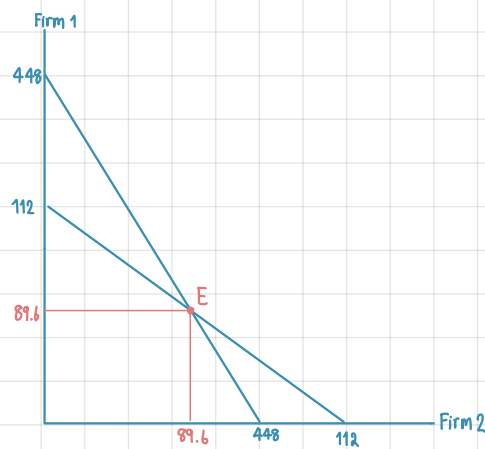
$$-15q_1 = -1344$$

$$q_1 = 89.6$$

$$q_2 = -4(89.6) + 448$$

$$= -358.4 + 448$$

$$q_2 = 89.6$$



Stackelberg Equilibrium.

Assume that firm 1 moves first

$$\begin{aligned}
 \text{Firm 2 ; } \pi &= P(q_1, q_2)q_2 - q_2^2 \\
 &= (448 - q_1 - q_2)q_2 \\
 &= 448q_2 - q_2^2 - q_1q_2 \\
 &= 448q_2 - 2q_2^2 - q_1q_2 \\
 \frac{\partial \pi}{\partial q_2} &= 448 - 4q_2 - q_1 \\
 q_2 &= 112 - \frac{1}{4}q_1
 \end{aligned}$$

$$\begin{aligned}
 \text{Firm 1 } \pi &= P(q_1, q_2)q_1 - q_1^2 \\
 &= (448 - q_1 - 112 + \frac{1}{4}q_1)q_1 - q_1^2 \\
 &= (336 - \frac{3}{4}q_1)q_1 - q_1^2 \\
 &= 336q_1 - \frac{3}{4}q_1^2 - q_1^2 \\
 &= 336q_1 - \frac{7}{4}q_1^2 \\
 \frac{\partial \pi}{\partial q_1} &= 336 - \frac{7}{2}q_1 = 0 \quad q_2 = 112 - \frac{1}{4}(q_1) \\
 q_1 &= 96 \quad q_2 = 88
 \end{aligned}$$

- 4 (write about 0.5 page) Find 1 example of an industry that has a dominant firm. Describe what this industry is, which firm is the dominant firm, which firms are fringe firms (name the ones that you

I would use pork industry at Thailand as a example, which the dominant firm in this industry is CPF or Charoen Pokphand Foods as it has the sale values around 200 billion baht which show that it is a significant share of pork industry that can raise competition concerns when it have the power to set the prices independently. while the fringe firm is other's firm like the pork's sellers on the market, they need to set the price by follow the price leadership of the dominant firm and they have to copy what dominant firm is doing since deviating from it could have adverse effects.