

- ① 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?

1st assignment - 6304641886

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

Substitute $\alpha = \frac{1}{4}$ into $Q = P^{-\alpha}$

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

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

$$P = 2$$

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

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

$$= -2P^{-3} \times P^2$$

$$= -2$$

Max π ; $MR = MC$

$$TR = P \cdot Q$$

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

$$TR = Q^{-1/2} \cdot Q = Q^{1/2}$$

$$Q^{-1/2} = 2$$

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

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

- 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?

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

Monopoly should sell at $Q = 5$

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

Total outputs in competitive market is $100(0.05) \quad Q_c = 5$

$$MR = -2Q + 10$$

Both market have sell outputs at the same level (5 unit)

$$MR = MC$$

$$-2Q + 10 = 0$$

$$Q_M = 5$$

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.

- ⑤ Problem 8, Chapter 13 in Church and Ware (2000) (Church and Ware (2000) is an e-book and is available online).

Cournot equilibrium

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

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

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

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

$$q_1 = 16q_1 - 1,992 + 448$$

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

$$\pi = 448q_1 - q_1^2 - q_1q_2 - q_1^2$$

$$q_1 = 16q_1 - 1,344$$

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

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

$$-15q_1 = -1,344$$

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

$$-4q_2 = q_1 - 448$$

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

$$q_2 = -358.4 + 448$$

$$q_2 = 89.6$$

Stackelberg Equilibrium

Assume that firm 1 moves first

$$\text{Firm 2 ; } \pi = P(q_1, q_2) \cdot q_2 - q_2^2$$

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

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

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

$$\frac{\partial \pi}{\partial q_2} = 448 - 4q_2 - q_1 = 0$$

$$q_2 = 112 - \frac{1}{4}q_1$$

$$\text{Firm 1 ; } \pi = P(q_1, q_2) \cdot q_1 - q_1^2$$

$$= (448 - q_1 - 112 + \frac{1}{4}q_1) \cdot q_1 - q_1^2$$

$$= (336 - \frac{3}{4}q_1) \cdot q_1 - q_1^2$$

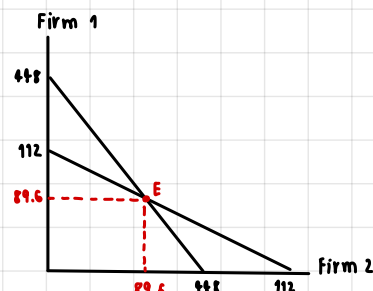
$$= 336q_1 - \frac{3}{4}q_1^2 - q_1^2$$

$$= 336q_1 - \frac{7}{4}q_1^2$$

$$\frac{\partial \pi}{\partial q_1} = 336 - \frac{7}{2}q_1 = 0$$

$$q_1 = 96$$

$$q_2 = 112 - \frac{1}{4}(96) = 88$$



- 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

A dominant firm is considered as a firm that accounts for a significant share in a given market and also, market share is significantly considered above 40 percent of a whole of market share. Moreover, a dominant firm basically holds at least 40% of total market share, so it is considered as a price maker, or price leadership. For example of dominant firm is Apple which is a leader of multinational technology company in electronic software industry. Apple computer company holds 60% of market share of smartphone industry in 2021.

A fringe firms are defined as a group of small enterprises with small price taking and they typically follow a dominant firm in a same market. On the other hand, a dominant firm sets a price and fringe firms take it as given. In addition, each fringe firm is usually small market share although all fringe firms have a considerable market share, while it is likely to be less than a dominant firm's market share such as Samsung, Oppo, Vivo mobile phones.