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① $Q(p) = p^{\epsilon}$

$\frac{dQ}{dp} = \epsilon p^{\epsilon-1}$

$\frac{dQ}{dp} \cdot \frac{p}{Q} = \epsilon p^{\epsilon-1} \cdot \frac{p}{p^{\epsilon}}$

$= \epsilon p^{\epsilon-1} \cdot p^{1-\epsilon}$

$= \epsilon$ → elasticity

$TR = Q^{1/\epsilon + 1}$ $\quad MR = \left(\frac{1}{\epsilon}+1\right) Q^{1/\epsilon}$ $\quad \epsilon = -2$

Find $MC = MR$

$1 = \left(\frac{1}{\epsilon}+1\right) Q^{1/\epsilon}$

$Q^{1/\epsilon} = \frac{1}{\frac{1}{\epsilon}+1}$

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

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

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

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

$\frac{dQ}{dp} \cdot \frac{p}{Q} = \epsilon \cdot \frac{Q^{\frac{1}{\epsilon}}}{Q}$

$= -2 \cdot \frac{2}{\frac{1}{4}} = -16$

② $Q = 10 - p$

$p = 10 - Q$

$TR = 10Q - Q^2$

$MR = 10 - 2Q$

$MC = 0$

Find $MR = MC$

$10 - 2Q = 0$

$2Q = 10$

$Q = 5$

Total output sold by competitive firms $= 100 \times 0.05 = 5$

∴ No, monopoly sell the same amount of output as in the competitive market.

③ $P = 488 - Q$

$Q = 488 - P$

$C = Q_i^2$ $\quad MC_i(Q_i) = 2Q_i$

a) Cournot model

$\pi = P(Q)Q - C(Q)$

$= (488 - Q_i - Q_x)Q_i - Q_i^2$

$= 488Q_i - Q_i^2 - Q_xQ_i - Q_i^2$

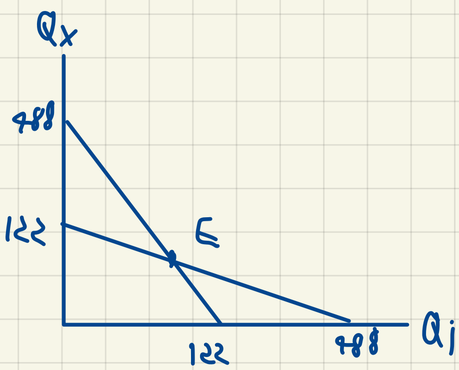
$= 488Q_i - Q_xQ_i - 2Q_i^2$

$\frac{d\pi}{dQ_i} = 488 - Q_x - 4Q_i$

$4Q_i = 488 - Q_x$

$Q_i = 122 - \frac{1}{4}Q_x$

$Q_x = 488 - 4Q_i$



they are identical firms

$\therefore Q_i = 122 - \frac{1}{4}Q_x$

$Q_x = 122 - \frac{1}{4}Q_i$

$Q_i = 122 - \frac{1}{4}\left(122 - \frac{1}{4}Q_i\right)$

$Q_i = 122 - 30.5 + \frac{1}{16}Q_i$

$\frac{15}{16}Q_i = 91.5$

$Q_i = 97.6$

$Q_x = 97.6$

b) Stackelberg equilibrium (if firm 1 moves first)

Firm 2 : $\pi = P \cdot q_2 - q_2^2$

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

$$= 448 q_2 - q_2^2 - q_1 q_2 - q_2^2$$

$$= 448 q_2 - 2q_2^2 - q_1 q_2$$

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

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

Firm 1 : $\pi = P \cdot q_1 - q_1^2$

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

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

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

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

$$\frac{\partial \pi}{\partial q_1} = 336 - \frac{7}{2} q_1 = 0 \qquad \therefore q_1^* = 96 \qquad q_2^* = 112 - \frac{1}{4}(96) = 88$$

(4) For example of an industry that has a dominant firm is french fries. At Lotus's, there are many firms that produce french fries. Lotus's is the minant firm. Super Crispy and Sunny day Gold are the fringe firms. The french fries from Lotus's brand in the same ratio from another they can sell in the cheaper price. Because the dominant firm has better technology, more capital, and has lower production cost. So, it can show that in large markets with relatively inelastic demand for the fringe firms' products and a cost advantage of the dominant firm, the fringe firms are better off if they produce a heterogeneous product.