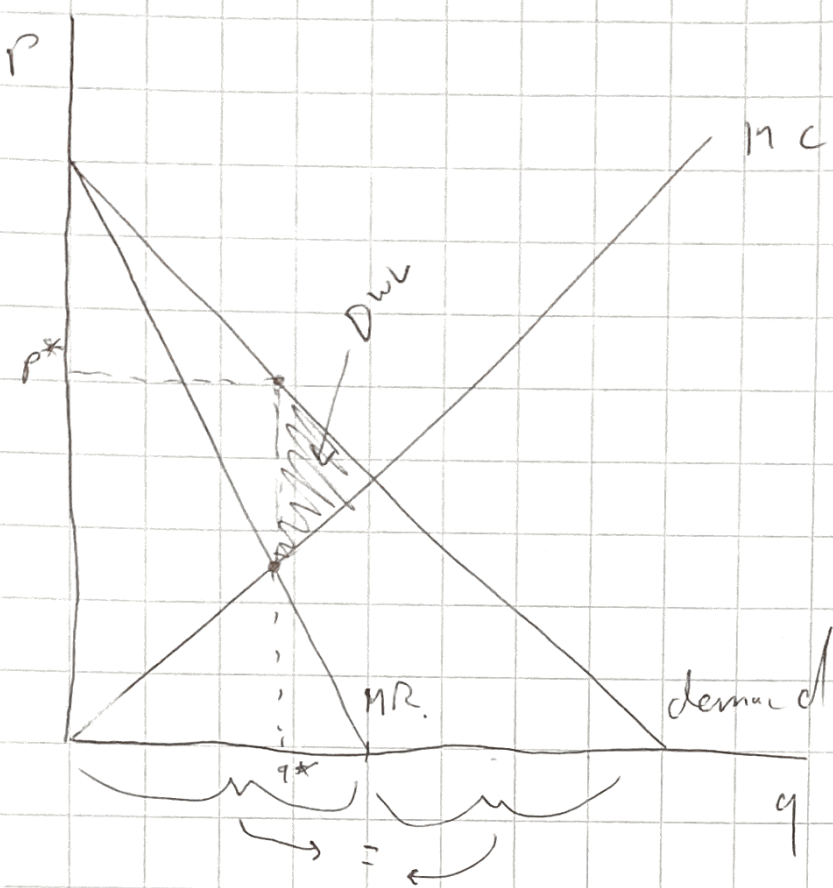
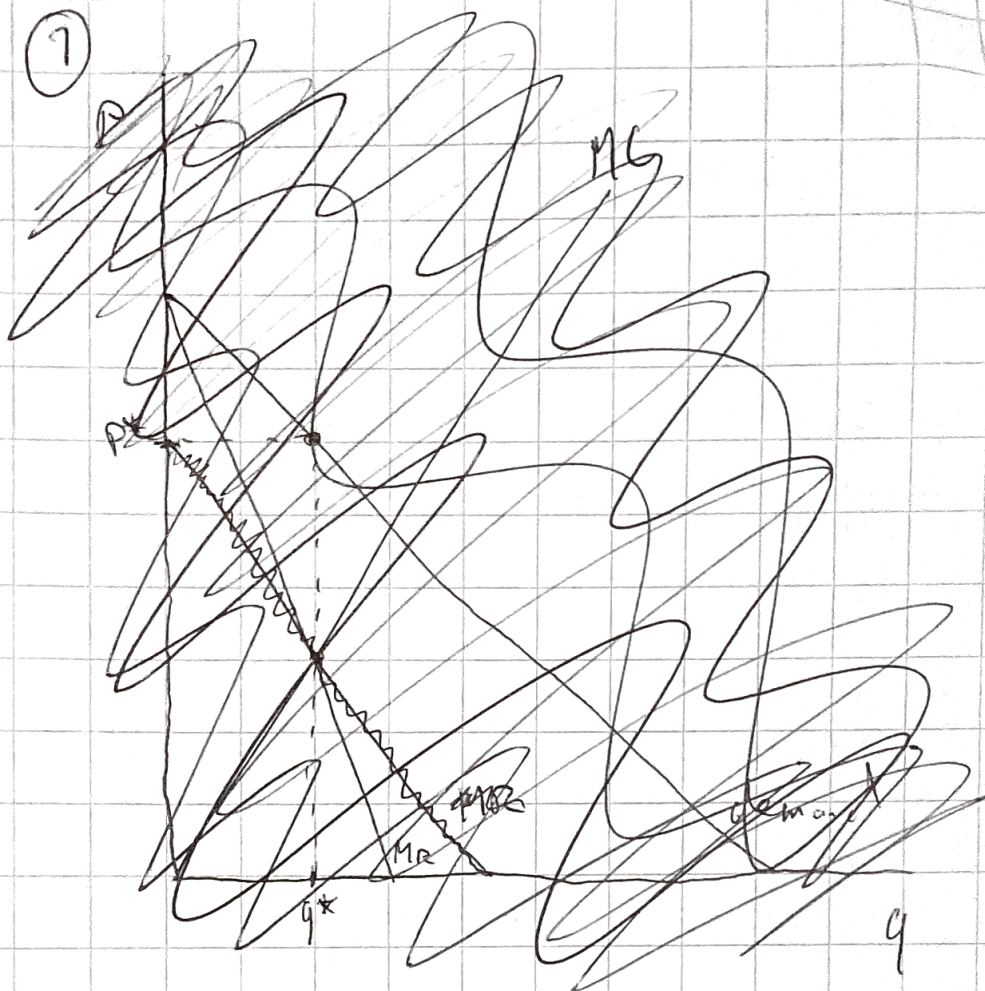


①





a. $R(q) = P(q) \cdot q$

So:

✓ $MR(q) = P(q) \cdot \frac{dq}{dq} + \frac{dP(q)}{dq} q = P(q) + \frac{dP(q)}{dq} q$

this is just the demand curve. Therefore, because the demand curve is downward sloping (unless there is perfect competition) because of the

✓ Law of Demand, $\frac{dP(q)}{dq} q < 0$. therefore, at any given q , MR is going to be $\frac{dP(q)}{dq} q$ less than the demand function.

Therefore, it lies below the demand function. This also makes sense, if the firm increases its output with 1, it gains revenue from that unit (the $P(q)$ term in MR) but ~~loses~~ because it has to lower its price (the $\frac{dP(q)}{dq} q$ term) on all units sold.

$$B. \quad \epsilon = \frac{dq}{dP} \frac{P}{q}$$

$$\begin{aligned} \text{So because } MR &= P + \frac{dP}{dq} q \\ &= P + P \cdot \frac{dP}{dq} \frac{q}{P} \\ &= P + P \frac{1}{\frac{dq}{dP} \frac{P}{q}} \\ &= P \left(1 + \frac{1}{\epsilon} \right) \checkmark \end{aligned}$$

Because when the firm is optimizing

✓

$$MC = MR$$

$$MC = P \left(1 + \frac{1}{\epsilon} \right)$$

$$\frac{P}{MC} = \frac{1}{1 + 1/\epsilon}$$

$$P = \frac{MC}{1 + 1/\epsilon} \checkmark$$

→ Comment, In words what does this mean about the relationship between P and ϵ ?

c. ☒ No, there is no free entry and exit
☒ C't is a monopoly) so profits do not have to be 0. therefore,
 Because $P = AC$ does not have to be true, production does not have to be at the minimum average cost.

d. Because a monopoly would set a price higher than its MC, consumers buy less of the good than in a competitive market, leading to a DWL. ~~there for the 2nd~~
~~1/c the triangle between the monopolist~~
~~output~~ See graph.

But what is it?
 It is the surplus lost on the foregone units

③ a. $R_1 = P(y_1) y_1 = 72y_1 - 3y_1^2 - 3y_2y_1$
 ~~$= 72y_1 - 3y_1^2 - 3y_2y_1$~~
 ~~$= 72y_1 - 3y_1^2 - 3y_2y_1$~~
 ~~$= 72y_1 - 3y_1^2 - 3y_2y_1$~~

i.e. $\sum (WTP - WTA)$
 all units not traded

$$MR_1 = P(y_1) + P'(y_1) y_1 = 72 - 3y_1 - 3y_2 - 3y_1$$

Would prefer for you to write the profit function and explicitly maximize it ... it would explain why $MR = MC$ at the optimum ...
 Firm 1 is trying to optimize, so:
 $MR_1 = MC_1$

$$72 - 6y_1 - 3y_2 = 12$$

$$y_1 = 10 - \frac{1}{2} y_2$$

Because Firm 2 has the same MC,

$$y_2 = 10 - \frac{1}{2} y_1$$

So, outputs will be:

$$y_2 = 10 - \frac{1}{2} \left(10 - \frac{1}{2} y_2 \right)$$

$$y_2 = 10 - 5 + \frac{1}{4} y_2$$

$$\frac{3}{4} y_2 = 5$$

$$y_2 = \frac{20}{3}$$

- Because the firms are equal $y_1 = y_2 = \frac{20}{3}$

$$- P = 72 - 3 \cdot \left(\frac{20}{3} + \frac{20}{3} \right) = 72 - 40 = 32$$

$$- Y = y_1 + y_2 = \frac{40}{3}$$

$$- \pi_1 = \pi_2 = 32 \cdot \frac{20}{3} - 12 \cdot \frac{20}{3} = 20 \cdot \frac{20}{3} = \frac{400}{3}$$

$$- \Pi = \pi_1 + \pi_2 = \frac{800}{3}$$

$$B. \quad \frac{P - MC_i}{P} = \frac{S_i}{|\epsilon|}$$

Because $S_i = \frac{1}{2}$ for every firm here
(they are identical)

$$\text{and } \epsilon = \frac{dy}{dp} \frac{p}{y}$$

$$\frac{dy}{dp} = y = 24 - \frac{1}{3}p$$

$$\frac{dy}{dp} = -\frac{1}{3}$$

$$\epsilon = -\frac{1}{3} \cdot \frac{32}{40/3} = -\frac{4}{5}$$

so

$$\frac{S_i}{|\epsilon|} = \frac{5}{8} \quad \checkmark$$

and

$$\frac{P - MC_i}{P} = \frac{32 - 12}{32} = \frac{5}{8} \quad \checkmark$$

$$C. \quad HHI = \sum_{i=1}^{i=N} S_i^2 = \left(\frac{1}{2}\right)^2 + \left(\frac{1}{2}\right)^2 = \frac{1}{2} \quad \checkmark$$

d.

$$MR_1 = 72 - 6y_1 - 3y_2$$

$$MR_1 = MC_1 = 6$$

$$72 - 6y_1 - 3y_2 = 6$$

$$-6y_1 - 3y_2 = -66$$

$$y_1 + \frac{1}{2}y_2 = 11$$

$$y_1 = 11 - \frac{1}{2}y_2$$

and For Firm 2 it stays the same:

$$y_2 = 10 - \frac{1}{2}y_1$$

So:

$$y_1 = 11 - \frac{1}{2} \left(10 - \frac{1}{2}y_1 \right)$$

$$y_1 = 11 - 5 + \frac{1}{4}y_1$$

$$\frac{3}{4}y_1 = 6$$

$$y_1 = 8$$

and

$$y_2 = 10 - \frac{1}{2} \cdot 8 = 6$$

$$- y_1 = 8 ; y_2 = 6 ; y = 14 \frac{40}{3}$$

$$- P = 72 - 3 \cdot 14 = 30 < 32$$

$$- \pi_1 = 8 \cdot 30 - 6 \cdot 8 = 192 ; \pi_2 = 6 \cdot 30 - 12 \cdot 6 = 108 ; \pi = 300$$

no more production

$\frac{800}{3}$

7

$$\text{HHI} = \sum_{i=1}^N s_i^2$$

$$s_i = \frac{p - MC_i}{p} \cdot |\varepsilon|$$

$$s_1 = \frac{30 - 6}{30} \cdot |\varepsilon| = \frac{4}{5} |\varepsilon|$$

$$s_2 = \frac{30 - 12}{30} \cdot |\varepsilon| = \frac{3}{5} |\varepsilon|$$

and

$$\varepsilon = -\frac{1}{3} \cdot \frac{30}{14} = -\frac{5}{7}$$

so $s_1 = \frac{4}{5} \cdot \frac{5}{7} = \frac{4}{7}$

and $s_2 = \frac{3}{5} \cdot \frac{5}{7} = \frac{3}{7}$

so $\text{HHI} = \sum_{i=1}^N s_i^2 = \left(\frac{4}{7}\right)^2 + \left(\frac{3}{7}\right)^2 = \frac{25}{49}$

$$\frac{25}{49} > \frac{1}{2}$$

so it is

more

monopolistic