

HW#11 Due November 24, 2020

3. Consider total cost and total revenue given in the following table:

Quantity	0	1	2	3	4	5	6	7
Total cost	\$8	9	10	11	13	19	27	37
Total revenue	\$0	8	16	24	32	40	48	56

- Calculate profit for each quantity. How much should the firm produce to maximize profit?
- Calculate marginal revenue and marginal cost for each quantity. Graph them. (*Hint*: Put the points between whole numbers. For example, the marginal cost between 2 and 3 should be graphed at $2\frac{1}{2}$.) At what quantity do these curves cross? How does this relate to your answer to [part \(a\)](#)?
- Can you tell whether this firm is in a competitive industry? If so, can you tell whether the industry is in a long-run equilibrium?

7. A profit-maximizing firm in a competitive market is currently producing 100 units of output. It has average revenue of \$10, average total cost of \$8, and fixed cost of \$200.

- What is its profit?
- What is its marginal cost?
- What is its average variable cost?
- Is the efficient scale of the firm more than, less than, or exactly 100 units?

i.e. Is AC at its minimum?

③ a) $\pi(Q) = TR(Q) - TC(Q)$

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$Q = 0 ; \pi(Q) = 0 - 8 = -8$

$Q = 1 ; \pi(Q) = 8 - 9 = -1$

$Q = 2 ; \pi(Q) = 16 - 10 = 6$

$Q = 3 ; \pi(Q) = 24 - 11 = 13$

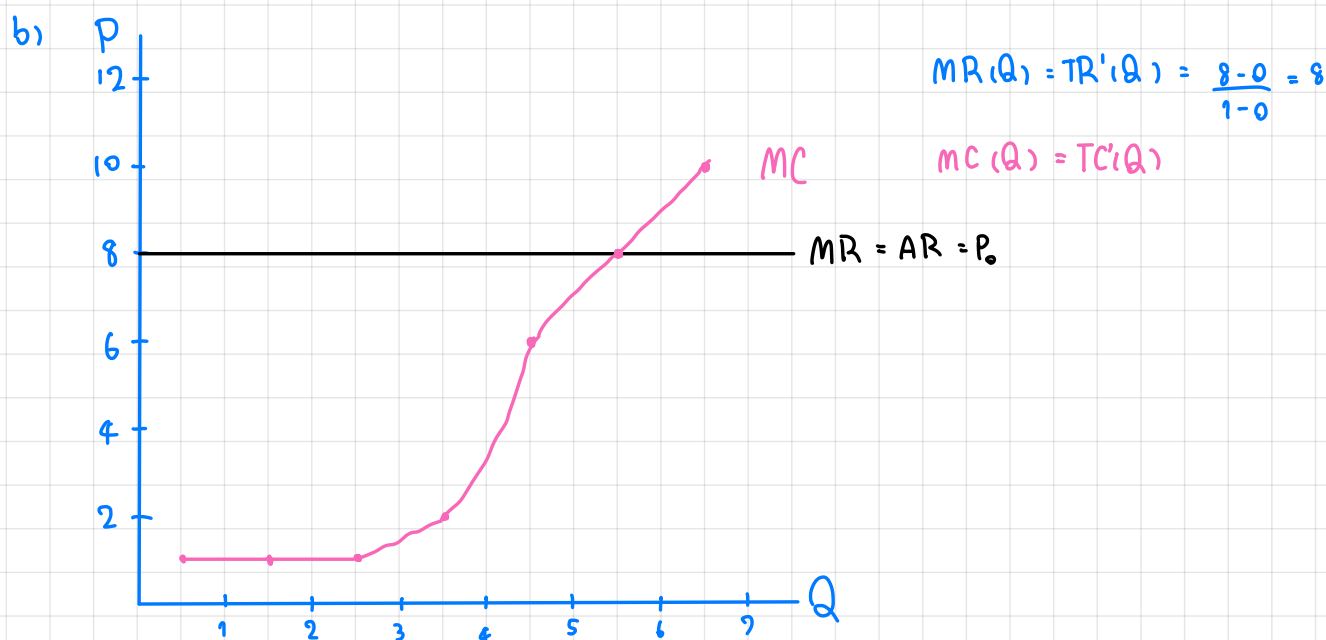
$Q = 4 ; \pi(Q) = 32 - 13 = 19$

$Q = 5 ; \pi(Q) = 40 - 19 = 21$

$Q = 6 ; \pi(Q) = 48 - 27 = 21$

$Q = 7 ; \pi(Q) = 56 - 37 = 19$

$\therefore$ A firm should produce 5 or 6 units to maximize profit.



$\therefore$ The curves cross between the quantity of 5 and 6, which is the same as part a)

c) - This firm is in competitive industry because there is the same marginal revenues at any quantity.

$$\textcircled{7} \quad a) \quad \begin{array}{l|l} TC(Q^*) = AC(Q^*) \cdot Q^* & TR(Q^*) = AR(Q^*) \cdot Q^* \\ = 8(100) & = 10(100) \\ = 800 & = 1000 \end{array}$$

$$\begin{aligned} \pi(Q^*) &= TR(Q^*) - TC(Q^*) \\ &= 1000 - 800 \\ &= 200 \\ \therefore \text{profit is } \$200 \end{aligned}$$

$$b) \quad \text{In short-run} \quad MR = AR \rightarrow MR = 10$$

$$\begin{aligned} \text{At } Q^* \quad MR &= MC \\ 10 &= MC \\ \therefore \text{marginal cost is } \$10 \end{aligned}$$

$$\begin{aligned} c) \quad AFC &= \frac{TFC}{Q} \\ &= \frac{200}{100} \\ &= 2 \end{aligned}$$

$$\begin{aligned} AC &= AFC + AVC \\ 8 &= 2 + AVC \\ AVC &= 8 - 2 \\ AVC &= 6 \end{aligned}$$

$\therefore$ average variable cost is \$6

$$d) \quad \text{minimum AC is at } AC = MC$$

$$\begin{aligned} AC &= 8, \quad MC = 10 \quad \Rightarrow AC < MC \\ \therefore \text{the efficient scale of the firm is less than 100 units} \end{aligned}$$