

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?

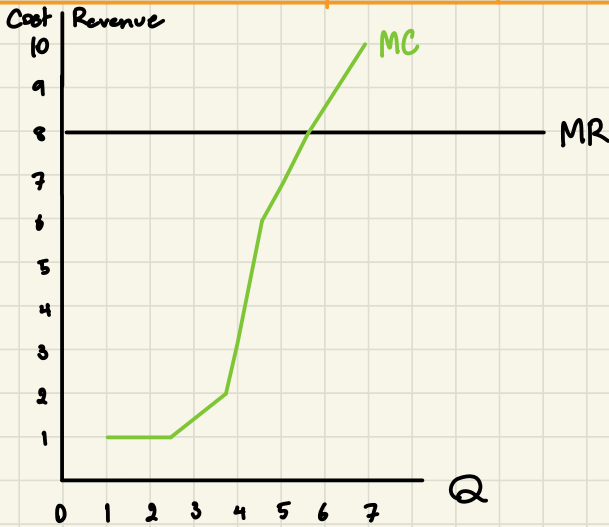
a.) Profit come from $TR(Q) - TC(Q)$ then.

Quantity	TR	TC	π
0	0	8	-8
1	8	9	-1
2	16	10	6
3	24	11	13
4	32	13	19
5	40	19	21
6	48	27	21
7	56	37	19

To maximize profit, firm should produce 5 or 6 units of output.

b.) Marginal Revenue & Marginal Cost for each quantity

Quantity	TR	TC	$MR = \frac{\Delta TR}{\Delta Q}$	$MC = \frac{\Delta TC}{\Delta Q}$
0	0	8	8	1
1	8	9	8	1
2	16	10	8	1
3	24	11	8	2
4	32	13	8	6
5	40	19	8	8
6	48	27	8	10
7	56	37		



- The MC and MR curves cross between the output level of 5 and 6.
- The cross point is between the maximum unit of output.

c.) The firm is in a competitive industry

The industry is not in 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?

a.) Profit

$$\begin{aligned}\text{From the formula: Profit} &= (P - ATC) \times Q \\ &= (10 \text{ (per unit)} - 8) \times 100 \\ &= (2) \times 100 \\ &= 200 \$\end{aligned}$$

b.) Marginal Cost

Since MR equals to AR, the MC of firm equals to 10\$.
Because for the competitive firm, at the maximized level of output, MR = MC

c.) AVC

① Compute fixed cost

$$AFC = \frac{TFC}{Q} = \frac{200}{100} = 2 \$ \text{ per unit}$$

② Compute variable cost

$$\begin{aligned}AVC &= ATC - AFC \\ &= 8 \text{ per unit} - 2 \text{ per unit} \\ &= 6 \text{ per unit}\end{aligned}$$

d.) efficient scale with 100 unit

since MC = 10 \$

ATC = 8 \$

MC > ATC

efficient scale = ATC is at min

∴ efficient level of output
is less than 100 units.