

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?

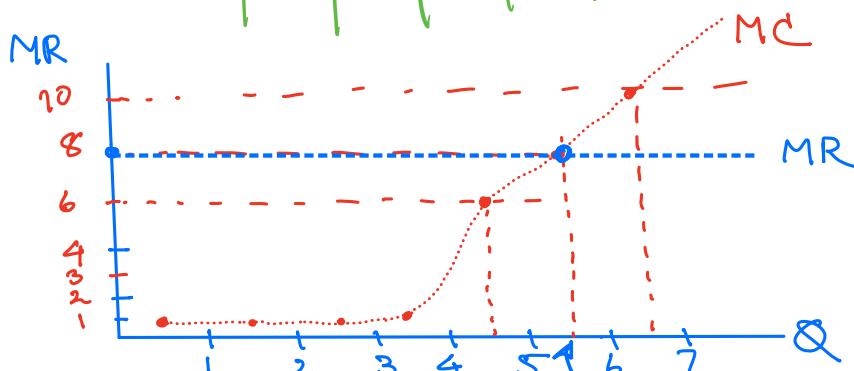
(3.a)

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

max profit.

(3.b)

Q	0	1	2	3	4	5	6	7
TC	8	9	10	11	13	19	27	37
MC		1	1	1	2	6	8	10
TR	0	8	16	24	32	40	48	56
MR		8	8	8	8	8	8	8



$MR = MC$ at $Q = 5.5$. This relates to (3.a) where profit is maximized at Q between 5 and 6.

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?

$$(7.a) \text{ Profit} = Q \cdot (AR - AC) = 100(10 - 8) = \$200$$

(7.b) Since the quantity $Q = 100$ is where the firm is maximizing its profit, $MR = MC$.
In perfect competition $P = AR = MR = \$10$
∴ $MC = \$10$.

$$(7.c) \text{ Total Cost} = TC = AR \cdot Q = 8 \cdot 100 = 800$$

Total Fixed Cost = TFC is \$200 as given.

$$\therefore \text{Total Variable Cost} = TVC = TC - TFC = 800 - 200 = 600$$

$$\text{Average Variable Cost} = AVC = \frac{TVC}{Q} = \frac{600}{100} = \$6$$

(7.d) At $Q = 100$, we have profit = \$200 > 0 because

$$AR > AC.$$

Since $AR = MR = MC$, at $Q = 100$, $MC > AC$

When $MC > AC$, we will have AC increasing.

Thus $Q = 100$ is greater than the quantity that is most efficient where AC is min.

