HW3

$MC = \frac{\Delta TC}{\Delta Q} = 4$

Example 2.I: A monopolist firm faces the market demand given by $P = 10 - Q$. Consider the following questions if the cost function $C(Q) = 4Q$.

$P(Q)$

- What is the revenue-maximizing level of output?

Revenue function

$TR(Q) = P(Q) \times Q$

$= (10 - Q) \times Q$

$= 10Q - Q^2$

$slope = \frac{dTR}{dQ} = 10 - 2Q$

maximum occurs when $\frac{dTR}{dQ} = 0$

$10 - 2Q = 0$

$Q = 5$

At $Q = 5$, TR is max.

$TR = 25$

- What is the break-even output?

$\pi = 0 \rightarrow TR = TC$

$\pi = TR - TC = 0$

$TR = TC$

$10Q - Q^2 = 4Q$

$6Q - Q^2$

$Q(6 - Q) = 0 \quad Q = 0, 6$

- What is the profit-maximizing level of output?

① $MR = MC$

$\frac{dTR}{dQ} = \frac{dTC}{dQ}$

$10 - 2Q = 4$

$-2Q = -6$

$Q = 3$

② $\pi = TR - TC$

$\frac{\partial \pi}{\partial Q} = 0 \rightarrow Q^*$

$\pi = TR - TC$

$\pi = 6Q - Q^2$

$\pi = 18 - 9$

$\pi = \$9$

$P = 10 - Q$

$= 10 - 3 = \$7$