

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

- What is the revenue-maximizing level of output?

• revenue function  $\rightarrow TR(Q) = P(Q) \times Q$   
 $= (10 - Q) \times Q = 10Q - Q^2$   
 $= Q(10 - Q)$

• slope  $= \frac{dTR}{dQ} = 10 - 2Q$  maximum occurs when  $\frac{dTR}{dQ} = 0$   
 $10 - 2Q = 0$  ,  $Q = 5$   $\therefore$  at  $Q = 5$ , TR is max 25 #

- What is the break-even output?

$\pi = 0 \rightarrow TR = TC$   
 $\pi = TR - TC$   
 $= (10Q - Q^2) - 4Q = 10Q - Q^2 - 4Q = 6Q - Q^2$  ,  $Q(6 - Q) = 0$   
 $Q = 0, 6$

- What is the profit-maximizing level of output?

$MR = MC$   
 $10 - 2Q = 4$   
 $-2Q = -6$   
 $Q = 3$  units #