

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?

<p>revenue function</p> $TR(Q) = P(Q) \times Q$ $= (10 - Q) \times Q$ $= 10Q - Q^2$ <p>At $Q = 5$, TR is max</p> $TR = 25$	<p>slope = $\frac{dTR}{dQ} = 10 - 2Q$</p> <p>Maximum occurs when</p> $\frac{dTR}{dQ} = 0$ $10 - 2Q = 0$ $Q = 5$
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- What is the break-even output?

$TR = TC$ $P(Q) \times Q = 4Q$ $(10 - Q) \times Q = 4Q$ $10Q - Q^2 = 4Q$ $Q^2 = 6Q$ $Q = 6$	<p>NOT CIRCULATE</p>
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- What is the profit-maximizing level of output?

$\pi = TR - TC$ $= [(10 - Q) \times Q] - 4Q$ $= 10Q - Q^2 - 4Q$ $= 6Q - Q^2$	$\frac{d\pi}{dQ} = 0$ $6 - 2Q = 0$ $Q = 3$
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