

m² = math
minute

Calculus: Indeterminate Forms & L'Hospital's Rule

Marginal Cost

The **marginal cost** is the additional cost added by increasing the quantity. This is also known as the *additional cost "at the margin."*

$$\begin{aligned} \text{Marginal Cost} &= MC = C'(q) \\ \text{Marginal Cost} &\approx C(q+1) - C(q) \end{aligned}$$

Marginal Revenue

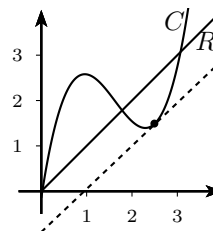
The **marginal revenue** is the additional revenue added by increasing the quantity. This is also known as the *additional revenue "at the margin."*

$$\begin{aligned} \text{Marginal Revenue} &= MR = R'(q) \\ \text{Marginal Revenue} &\approx R(q+1) - R(q) \end{aligned}$$

Maximize/Minimize Profit using Marginal Cost and Revenue

When $MC = MR$ or $C'(q) = R'(q)$ then the profit is:

- Maximized given that $R(q) > C(q)$
- Minimized given that $C(q) > R(q)$



Maximize/Minimize Profit using Marginal Profit

Recall that, $Profit = Revenue - Cost$. Therefore,

$$\begin{aligned} Profit &= Revenue - Cost \\ P &= R - C \\ MP &= MR - MC && \text{differentiate both sides} \\ MP &= 0 && \text{profit is maximized when } MR = MC \end{aligned}$$

Therefore, profit is maximized when **marginal cost** equals **marginal revenue** which is the same as saying when **marginal profit** equals *zero*.

$$C'(q) = R'(q) \quad \text{or} \quad P'(q) = 0$$