Integration: Applications

Introduction to Engineering Mathematics

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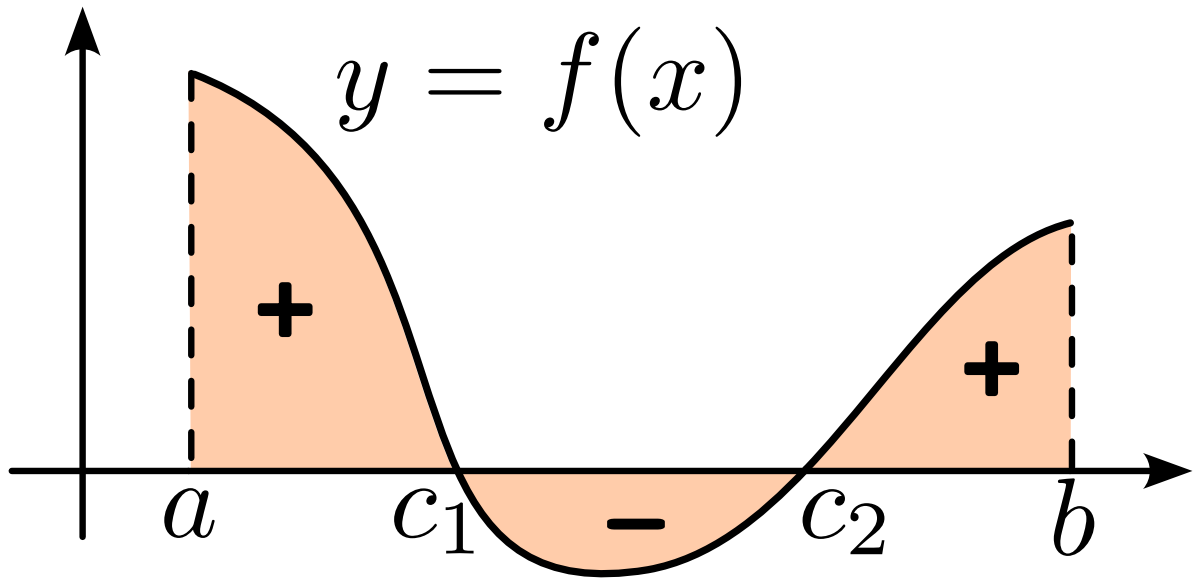
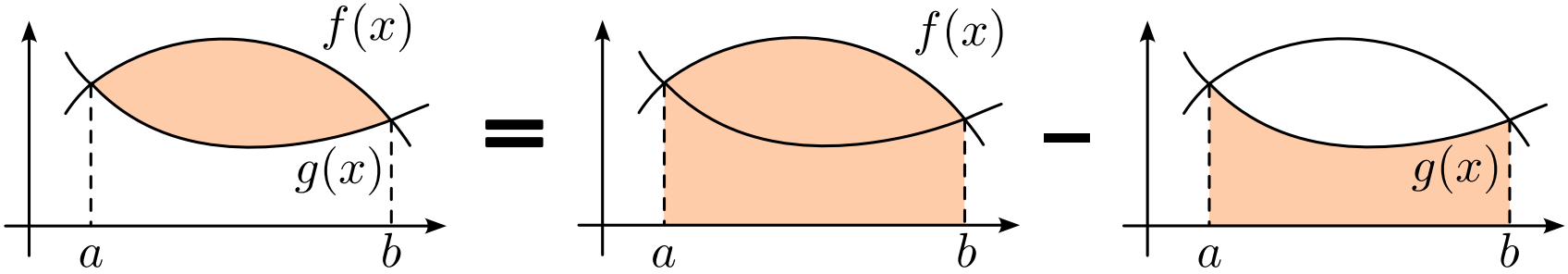
Reminder: area under the curve



$$\text{Area} = \int_a^{c_1} f(x)dx - \int_{c_1}^{c_2} f(x)dx + \int_{c_2}^{b} f(x)dx.$$

Area between two curves



Recipe for finding the area

1. Make a figure
2. Determine intersection points
3. Figure out which curve is upper/lower
4. Integrate

Example

Find the area bounded by $y = \sin x$, $y = 0$, and $x = \dfrac{3\pi}{2}$.

Example

Find the area of the region between the curves $y = x^2 - 2x$ and $y = 4 - x^2$.

Example

Find the area of the region between $x = 12 - y^2$ and $y = -x$.