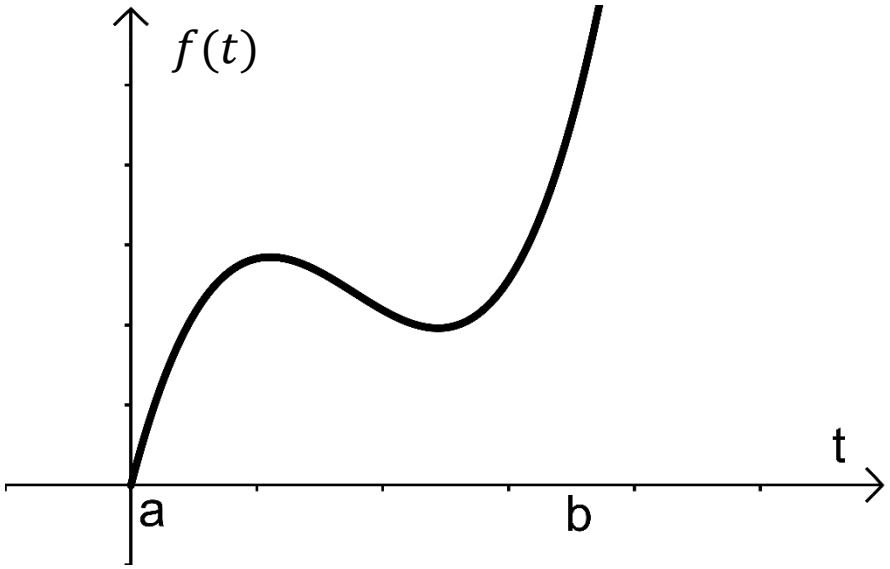
$$\int_a^b f(t)dt \;=\; \begin{array}{c} area\ under\ graph\ of\ f(t) \\ from\ t = a\ to\ t = b \end{array}$$



$$\int_a^b f(t)dt$$

$$\int_a^b f(t)dt = \lim_{n\to\infty} \sum_{i=1}^{n} f(t_i) \cdot \Delta t$$

$$\int_a^b f(t)dt + \int_a^b g(t)dt =$$

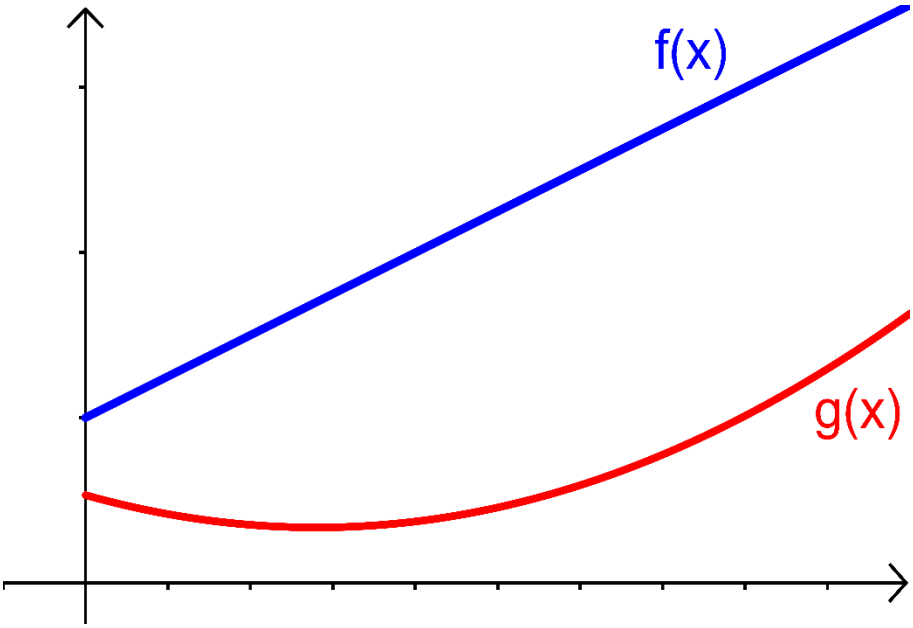
Conclusion:

$$\int_a^b f(t)dt + \int_a^b g(t)dt =$$

$$\int_a^b f(t)dt - \int_a^b g(t)dt =$$

Ex: Suppose that we have two curves: $y = f(x)$ & $y = g(x)$

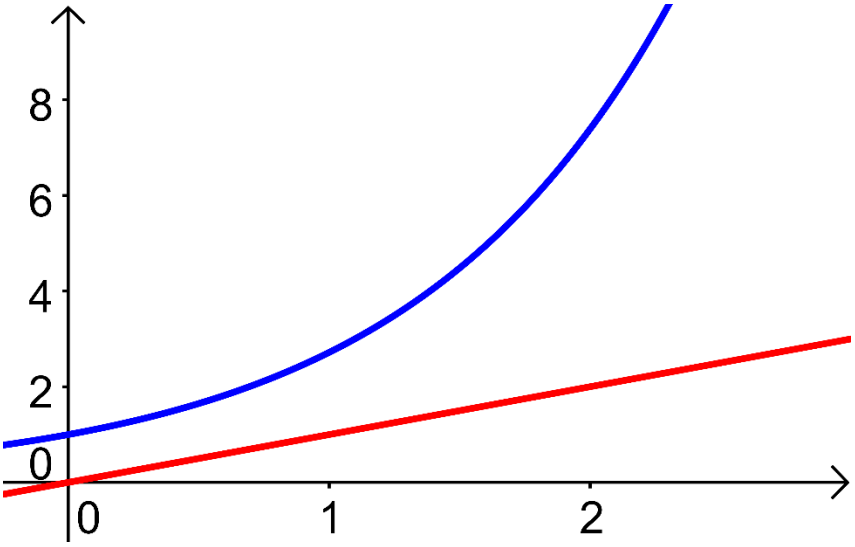
What is the area between the graphs from $x = a$ to $x = b$?



Example 1: Find the area between the curves

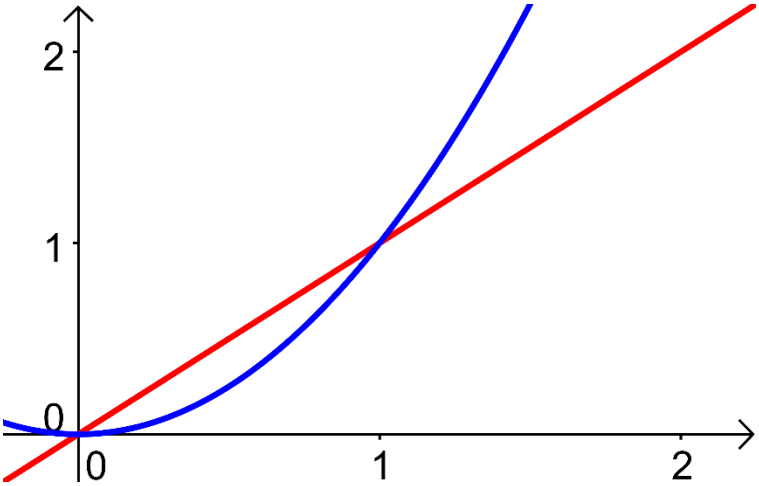
$y = e^x$ $y = x$

On the interval $x = 0$ to $x = 2$



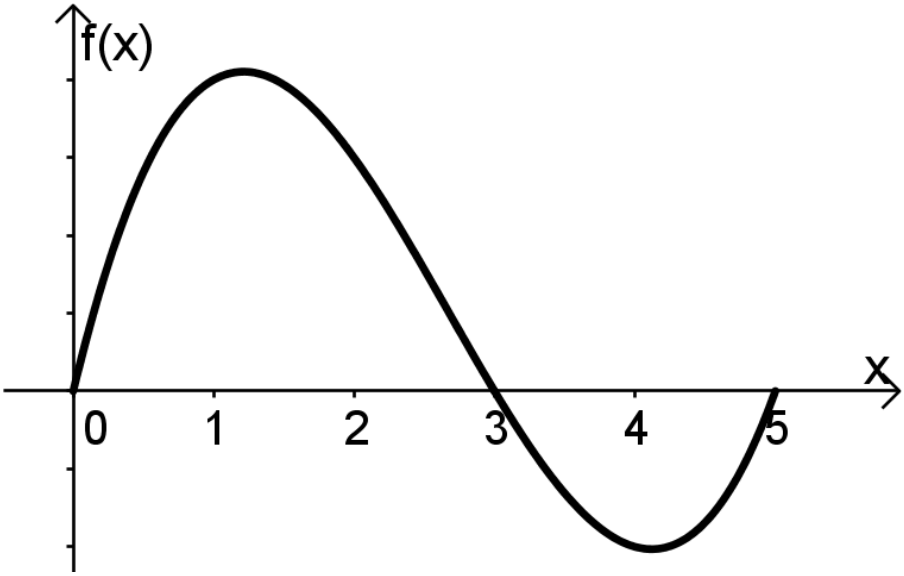
Example 2: Find the area enclosed by the graphs

$$y = x \quad \& \quad y = x^2$$



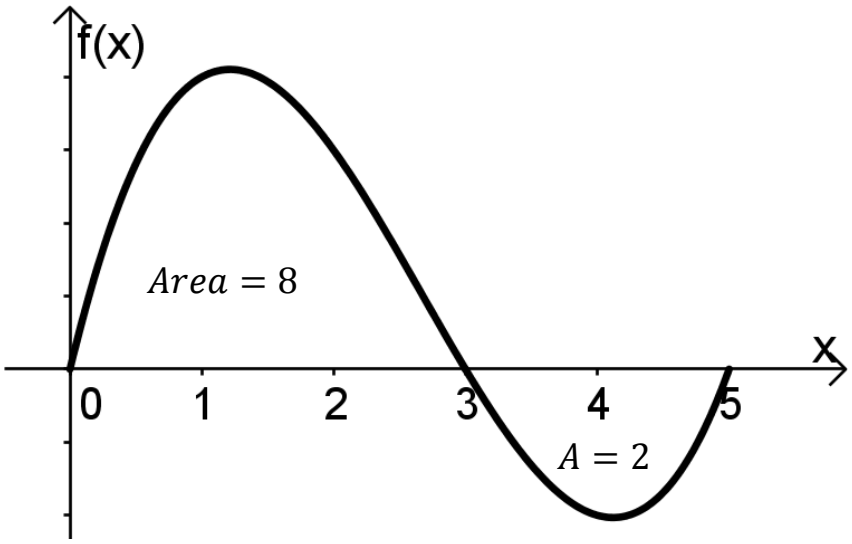
$$\int_a^b f(x)dx \quad = \quad \begin{array}{c} area\ under\ graph\ of\ f(x) \\ from\ x = a\ to\ x = b \end{array}$$

Area ***under*** the graph only makes sense for:



For $f(x) < 0$: $\int_a^b f(x)dx \ =$

Example:



$$\int_0^5 f(x)dx =$$