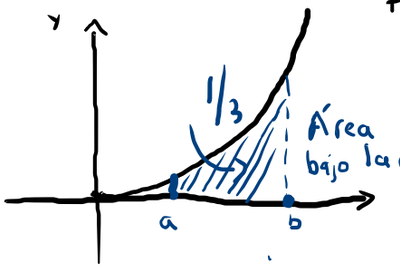
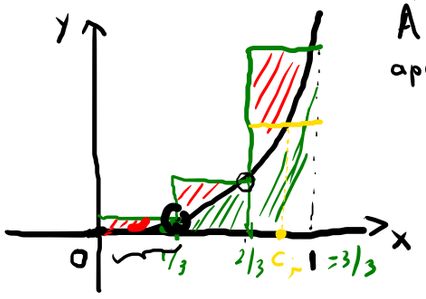
Repaso de integración.

$f(x) = x^2$



Área bajo la curva $= \int_a^b f(x)\,dx$



$$\text{Área aproximada} = \left(\frac{1}{3}\right)\left(\frac{1}{3}\right)^2 + \left(\frac{1}{3}\right)\left(\frac{2}{3}\right)^2 + \left(\frac{1}{3}\right)\left(\frac{3}{3}\right)^2$$

$$= \left[\left(\frac{1}{3}\right)^2 + \left(\frac{2}{3}\right)^2 + \left(\frac{3}{3}\right)^2\right]\left(\frac{1}{3}\right)$$

$$= \sum_{i=1}^{3} \left(\frac{i}{3}\right)^2 \left(\frac{1}{3}\right)$$

$$= \sum_{i=1}^{3} f\left(\frac{i}{3}\right)\left(\frac{1}{3}\right)$$

$$= \sum_{i=1}^{3} f(c_i)\left(\frac{1}{3}\right)$$

$$\approx \int_0^1 f(x)\,dx$$

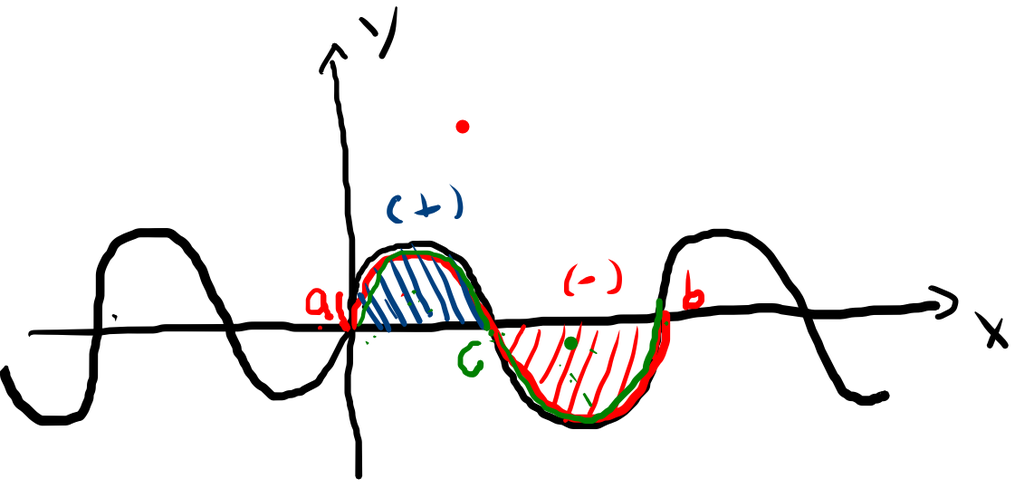
a) Integral indefinida

$$\int x^2\,dx = \frac{x^3}{3} + C$$

b) Integral definida

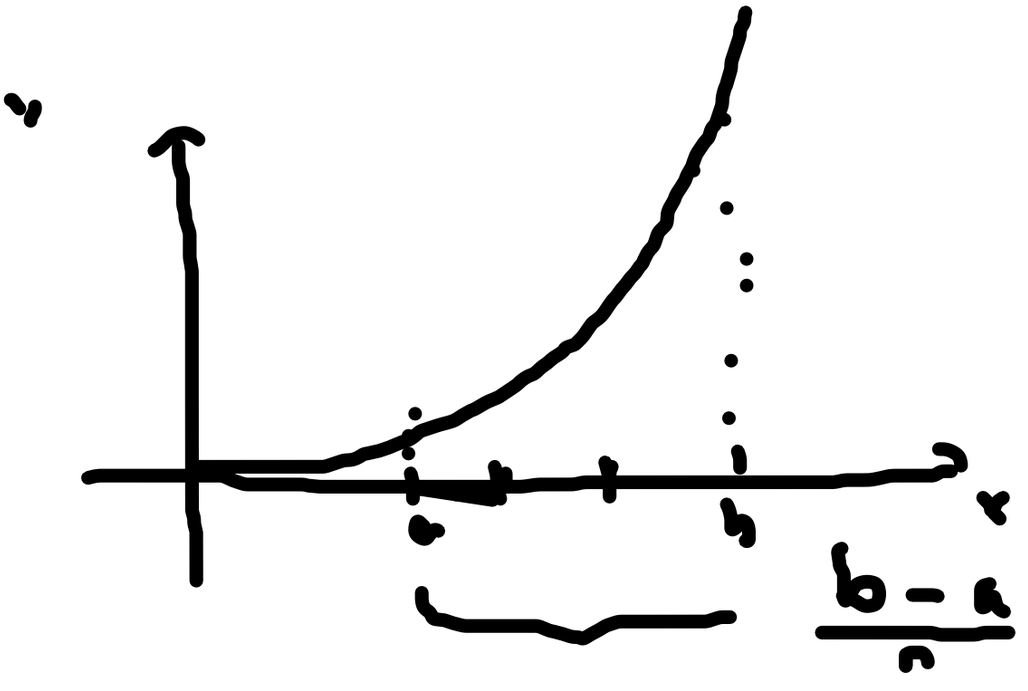
$$\int_0^1 x^2\,dx = \frac{x^3}{3}\Big|_0^1 = \frac{(1)^3}{3} - \frac{(0)^3}{3} = \frac{1}{3}$$

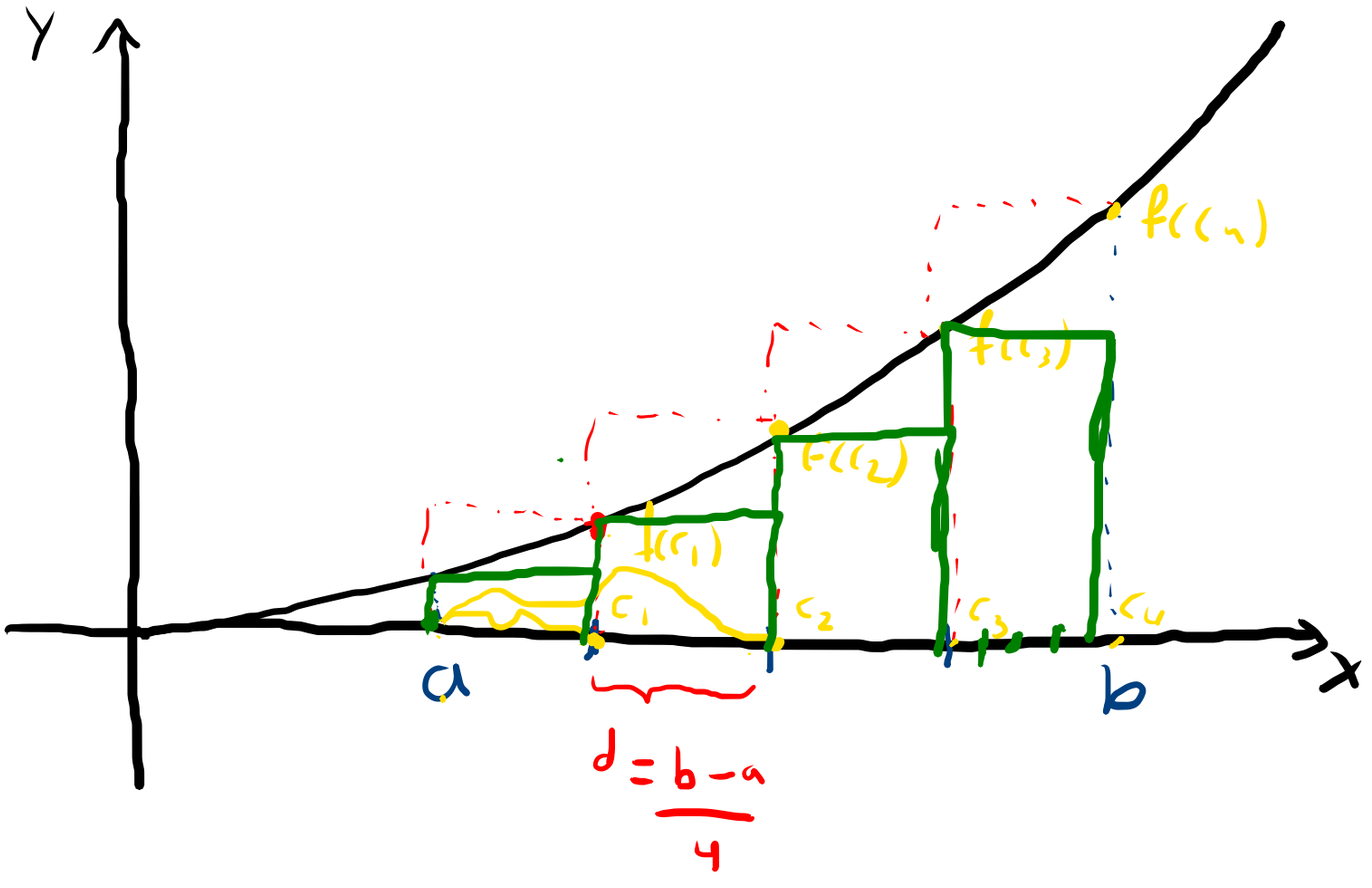
c) $$\int x^n\,dx = \frac{x^{n+1}}{n+1} + C \quad (n \neq -1)$$



$$f(x) = \operatorname{sen}(x)$$

$$\int_a^b \operatorname{sen}(x)\,dx = 0$$





$n = 4$

$d = \frac{b-a}{4}$

$c_1 = a + d$

$c_2 = a + 2d$

$c_3 = a + 3d$

$c_4 = a + 4d$

Función especial (densidad normal)

$$f(x) = \frac{1}{\sqrt{2\pi}} e^{-x^2/2}$$

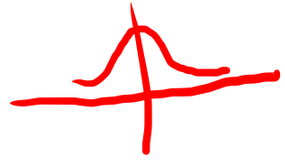
caso estándar

$$f(x) = \frac{1}{\sqrt{2\pi}\sigma} e^{-\frac{(x-\mu)^2}{2\sigma^2}}$$

caso general

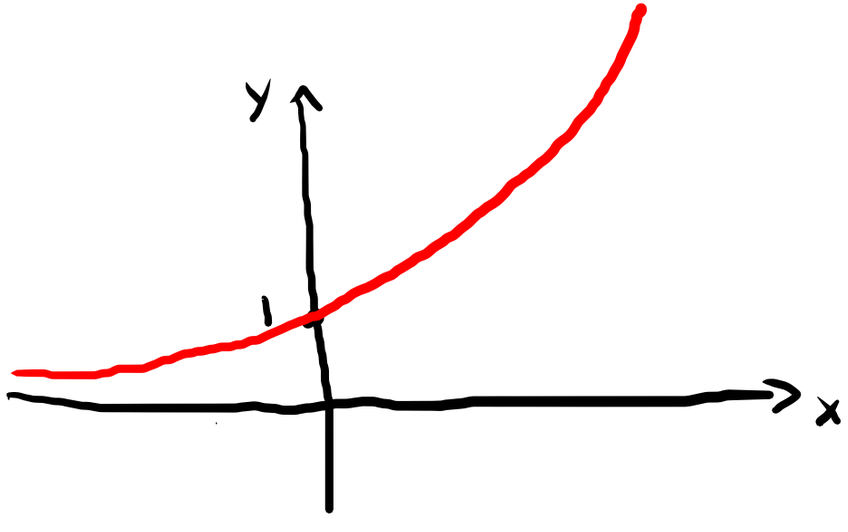
μ = media

σ^2 = varianza



Obs. $\pi = 3.1415\ldots$ $\quad e = 2.7182\ldots$

$f(x) = e^x$



$$f(-1) = e^{-1} = \frac{1}{e} \approx \frac{1}{2.71}$$