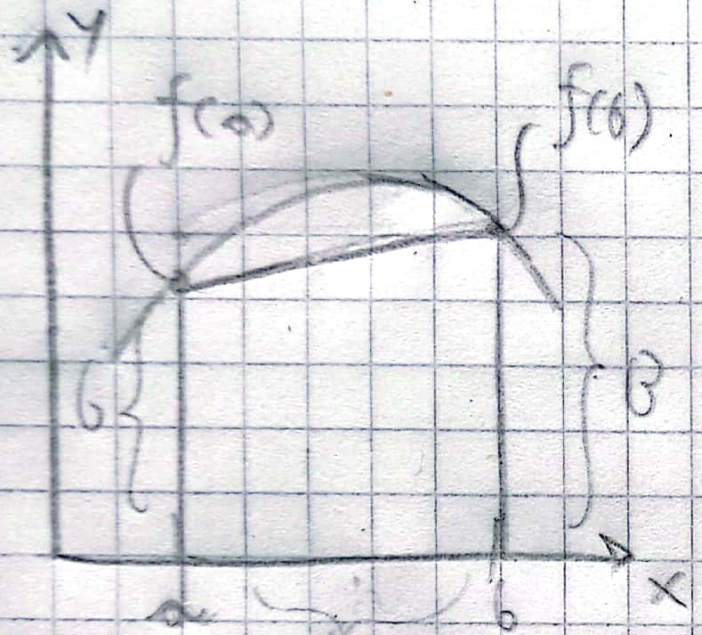
Nicolás David Negrete Oviedo. 202212661.

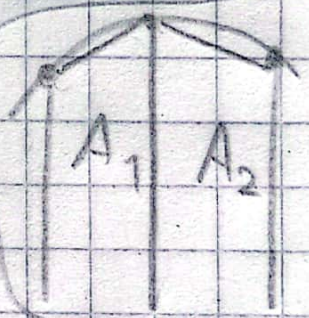
DD MM AA

P.1)



$$\int_a^b f(x)\,dx \approx A = \left(\frac{b+\beta}{2}\right)h$$

Idea detrás del método trapezoidal:



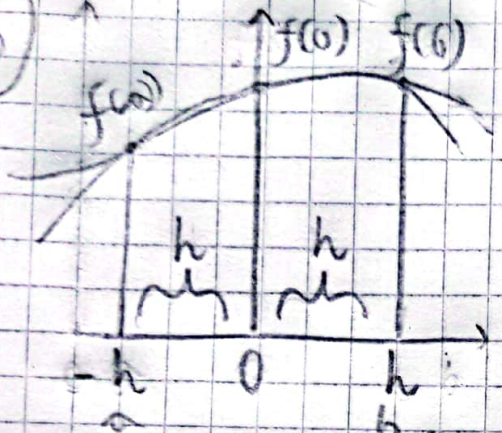
$$\rightarrow A_T = A_1 + A_2 \approx A$$

$n = 1$

$$h = \frac{b-a}{n} = b-a$$

$$A = \left(\frac{f(a)+f(b)}{2}\right)h \rightarrow \left(\frac{b+a}{2}\left(f(a)+f(b)\right)\right) \approx \int_a^b f(x)\,dx$$

P. 3)



$$\int_{-h}^{h} (Ax^2 + Bx + C)\,dx = A_r$$

$$A_r = \frac{Ax^3}{3} + \frac{Bx^2}{2} + Cx \Big|_{-h}^{h}$$

$n = 2$

$h = \frac{b-a}{n} \rightarrow \frac{b-a}{2}$

$$A_r = \frac{Ah^3}{3} + \frac{Bh^2}{2} + Ch + \frac{Ah^3}{3} - \frac{Bh^2}{2} + Ch$$

$Ax^2 + Bx + C \rightarrow Ah^2 - Bh + C = f(-h)$ ①

$\rightarrow A(0)^2 + B(0) + C = C = f(0)$

$\rightarrow Ah^2 + Bh + C = f(h)$ ②

$$A_r = \frac{2}{3}Ah^3 + 2Ch$$

① + ②: $2Ah^2 + 2C = f(-h) + f(h) \rightarrow 2Ah^2 = f(-h) + f(h) - 2C$

$= f(-h) + f(h) - 2f(0)$

$$A_r = \frac{h}{3}\left(f(-h) + f(h) - 2f(0)\right) + 2Cf(0)$$

$$= \frac{h}{3}f(-h) + \frac{h}{3}f(h) - \frac{2C}{3}f(0) + 2Cf(0) \rightarrow \frac{h}{3}\left(f(-h) + f(h) + 4f(0)\right)$$

$$\rightarrow \frac{h}{3}\left(f(a) + 4f(x_n) + f(b)\right)$$