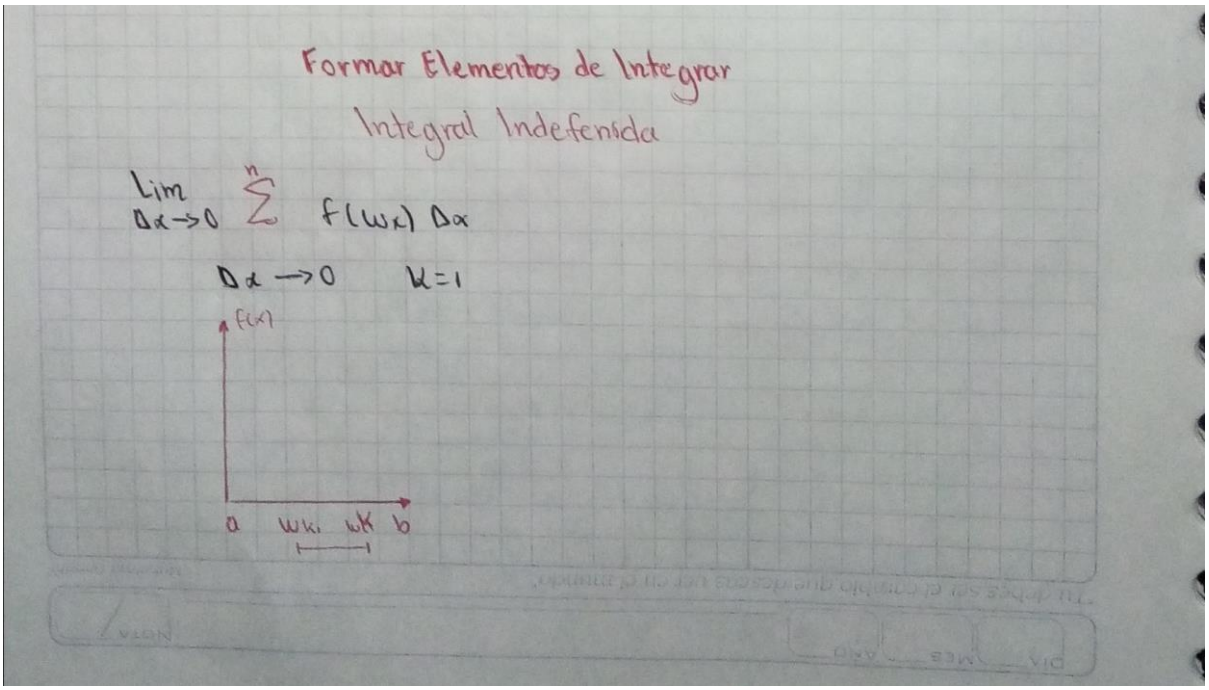
Clase 4 27/10/2020



La norma es el mayor de los Δx_n y se denota por $\|P\|$

$$A = \int_a^b f(x)\,dx = \lim_{\|P\| \to} \sum_{k=1} f(w_k)\,\Delta x$$

Ejemplo:

Evaluar $2x+3$ usando la antiderivada desde 2 hasta 4 con dos participaciones

$$\sum_{k=2}^{n} f(w_k)\,\Delta x$$

$\Delta x_1 = 1$
$\Delta x_2 = 1$
$\|P\| = 1$

$f(w_1) = 2(2)+3 = 7$

$f(w_2) = 2(3)+3 = 9$

$f(w_3) = 2(4)+3 = 11$

$\Delta x = 1$

$(7)(1) + 9(1) + (11)(1)$
$= 7 + 9 + 11$
$= 27 \rightarrow$ aproximado
$A \approx 27$

Propiedad

$$\int x^n = \frac{x^{n+1}}{n+1}$$

$$\int_2^4 (2x+3)\,dx$$

$$\int_2^4 2x\,dx + \int_2^4 3\,dx$$

$$2\int_2^4 x\,dx + 3\int_2^4 dx$$

$$2\left(\frac{x^2}{2}\right)\Big|_2^4 + 3(x)\Big|_2^4$$

como se evalua reemplazando

$$2\left[\frac{(4)^2}{2} - \frac{(2)^2}{2}\right] + 3[4-2]$$

$= 2[8-2] + 3[2]$
$= 12 + 6$
$= 18$

Evaluar

$$\int_1^4 f(x)\,dx = F(x) + c$$

$$f(x) = \left(5x - 2\sqrt{x} + \frac{32}{x^2}\right)$$

$$\int_1^4 5x - 2\sqrt{x} + \frac{32}{x^2} = 5\int_1^4 x - 2\int_1^4 \sqrt{x} + 32\int_1^4 \frac{1}{x^3}$$

$$= 5\left(\frac{x^2}{2}\right)\Big|_1^4 - 2\left(\frac{2}{3}x^{3/2}\right)\Big|_1^4 + 32\left(-\frac{1}{2x^2}\right)\Big|_1^4$$

$$= 5\left[\frac{4^2}{2} - \frac{1^2}{2}\right] - 2\left[\frac{2}{3}(4)^{3/2} - \frac{2}{3}(1)^{3/2}\right] + 32\left[-\frac{1}{2(4)^2} - \frac{1}{2(1)^2}\right]$$

$$=$$

$$\int f(x)\,dx = F(x) + c$$

con F antiderivada

$$\int x^r\,dx = \frac{x^{r+1}}{r+1} + c$$ → Regla de la Potencia

Metodo de sustitución

$$\int u^r\,du = \frac{u^{r+1}}{r+1} + c$$

donde $u = g(x)$

Ejm. $\int (2x^3+1)^7 x^2\,dx$

$u = 2x^3 + 1$

$du = 6x^2\,dx \rightarrow x^2\,dx = \frac{du}{6}$

$$\int u^7 \frac{du}{6} = \frac{u^8}{8}\,1/6$$