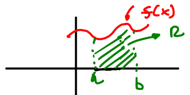
INTEGRAL DEFINIDA:

f(x) ES CONTINUA

INTERVALO ACOTADO [a,b]



$$\int_a^b f(x)\,dx = \boxed{\lim_{n\to\infty} \frac{b-a}{n} \sum_{k=1}^{n} f\left(a + k\left(\frac{b-a}{n}\right)\right)}$$

SEGUNDO TEOREMA FUNDAMENTAL DEL CALCULO:

F(x) ES UNA ANTIDERIVADA DE f(x)

ENTONCES:

$$\int_a^b f(x)\,dx = F(b) - F(a)$$

$$\int_1^2 x\,dx \Leftrightarrow \int x\,dx = \frac{x^2}{2}\Big|_1^2 \Leftrightarrow \frac{(2^2)}{2} - \frac{1^2}{2}$$

$$\Leftrightarrow \frac{4}{2} - \frac{1}{2} = \boxed{\frac{3}{2}\,[u^2]}$$

PROPIEDADES DE LA INTEGRAL DEFINIDA:

1) $\int_a^b [f(x) + g(x)]\,dx = \int_a^b f(x) + \int_a^b g(x)\,dx$

2) $\int_a^b k\,f(x)\,dx = k \cdot \int_a^b f(x)\,dx$

3) $\int_{a\,b}^{b\,a} f(x)\,dx = -\int_b^a f(x)\,dx$

4) SI f ES PAR ENTONCES f(-x) = f(x)

$$\int_{-a}^{a} f(x)\,dx = \boxed{2}\int_0^a f(x)\,dx$$

SIMETRÍA

COORDENADAS POLARES

POLARES CURVAS

$$\int_1^3 x\sqrt{x^2+1}\,dx = \int x\sqrt{x^2+1}\,dx$$

$U = x^2+1$

$dU = 2x\,dx$

$\frac{dU}{2} = x\,dx$

$$= \int \frac{dU}{2}\sqrt{U}$$

$$= \frac{1}{2}\int \sqrt{U}\,dU = \frac{1}{\cancel{2}}\,\frac{\cancel{2}}{3}\cdot u^{3/2}$$

$$= \frac{1}{3}\cdot u^{3/2}$$

DESHACER EL CAMBIO DE VARIABLE ①

QUEDARSE CON EL U ② PROPIEDAD CAMBIO DE VARIABLE

① $\frac{1}{3}\cdot(x^2+1)^{3/2}\Big|_1^3$

$(x^2+1)^{3/2}$

$\sqrt{x} = x^{\frac{1}{2}}$

$$= \frac{1}{3}\left[\sqrt{(x^2+1)^3}\right]\Big|_1^3 = \frac{1}{3}\left[\sqrt{(3^2+1)^3} - \sqrt{(1^2+1)^3}\right]$$

$$= \boxed{\frac{1}{3}\cdot\left[\sqrt{(10)^3} - \sqrt{(2)^3}\right]}\ [u^2]$$

$a = 1 \quad b = 3$

$x = 1 \quad x = 3$

② $U = x^2+1$

$U = 1^2+1$

$\boxed{U = 2}$

$U = 3^2+1$

$U = 9+1$

$U = 10$

$$\frac{1}{3}\cdot u^{3/2}\Big|_2^{10} = \frac{1}{3}\cdot\left(\sqrt{U^3}\right)\Big|_2^{10} = \frac{1}{3}\cdot\left(\sqrt{10^3} - \sqrt{2^3}\right)$$

$[u^2]$