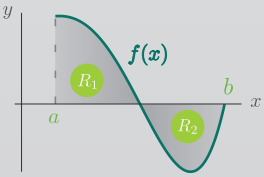
UAB

càlcul integral

Integral definida



$$\int_a^b f(x)\,dx$$
$$= \lim_{n\to\infty} \frac{b-a}{n} \sum_{k=1}^{n} f\left(a + k\frac{b-a}{n}\right)$$
$$= \text{àrea}(R_1) - \text{àrea}(R_2)$$

Propietats

$$\int_a^b (\alpha f(x) + \beta g(x))\,dx = \alpha \int_a^b f(x)\,dx + \beta \int_a^b g(x)\,dx$$

$$\int_a^b f(x)\,dx = \int_a^c f(x)\,dx + \int_c^b f(x)\,dx$$

Regla de Barrow

$$F(x) = \int f(x)\,dx + C \Leftrightarrow F'(x) = f(x)$$

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

Càlcul de primitives

$$\int f(x)^n f'(x)\,dx = \frac{f(x)^{n+1}}{n+1} + C$$

$$\int e^{f(x)} f'(x)\,dx = e^{f(x)} + C$$

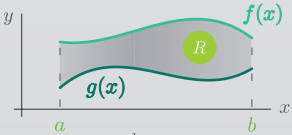
$$\int \frac{f'(x)}{f(x)}\,dx = \log f(x) + C$$

$$\int \cos(f(x)) f'(x)\,dx = \sin(f(x)) + C$$

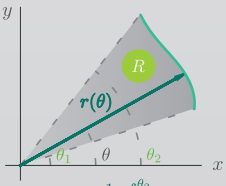
$$\int f'(x) g(x)\,dx = f(x) g(x) - \int f(x) g'(x)\,dx$$

$$\int f(x)\,dx = \int f(\varphi(t))\varphi'(t)\,dt, x = \varphi(t)$$

Àrees planes

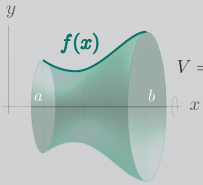


$$\text{àrea}(R) = \int_a^b (f(x) - g(x))\, dx$$

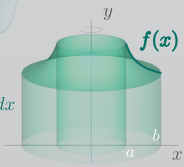


$$\text{àrea}(R) = \frac{1}{2}\int_{\theta_1}^{\theta_2} r(\theta)^2\, d\theta$$

Volums de revolució

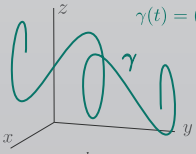


$$V = \pi \int_a^b f(x)^2\, dx$$



$$V = 2\pi \int_a^b x f(x)\, dx$$

Longitud de corbes



$$\gamma(t) = (x(t), y(t), z(t))$$

$$a \leq t \leq b$$

$$L(\gamma) = \int_a^b \sqrt{x'(t)^2 + y'(t)^2 + z'(t)^2}\, dt$$

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