Integral Definida - Cambio de variable

Bit Planet

Solución

$$\int_0^1 x(x^2+1)^3\,dx$$

u

$u = x^2+1$

$du = 2x^1 + \emptyset\,dx = 2x\,dx$

$du = 2x\,dx$

$\frac{du}{2x} = dx$

$= \int_0^1 x(u)^3 \frac{du}{2x}$

$= \int_0^1 \frac{x(u)^3}{2x}\,du$

$= \int_0^1 \frac{(u)^3}{2}\,du$

$= \frac{1}{2}\int_0^1 u^3\,du$

$= \frac{1}{2}\frac{u^4}{4}\Big|_0^1 = \frac{1}{8}(u^4)\Big|_0^1$

$= \frac{1}{8}(x^2+1)^4\Big|_0^1 = \frac{1}{8}\left((1^2+1)^4 - (0+1)^4\right)$

$= \frac{1}{8}\left((1+1)^4 - 1^4\right) = \frac{1}{8}(2^4 - 1) = \frac{1}{8}(16-1)$

$= \frac{1}{8}(15) = \frac{15}{8}$

* $\frac{d}{dx}x^n = nx^{n-1}$
* $\frac{d}{dx}c = \emptyset$
* $\int x^n = \frac{x^{n+1}}{n+1}$
* $u = x^2+1$