

República Bolivariana de Venezuela
Ministerios Para El Poder Popular Para La Educación
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Coro-Estado Falcón

Taller de matemáticas

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$$\begin{aligned}
 \int x^2 e^x dx & \quad u = x^2 \quad dv = \\
 & \quad du = 2x dx \quad v = \\
 & = x^2 e^x - \int e^x x 2x dx \\
 & = x^2 e^x - 2x \int e^x x dx \\
 & = x^2 e^x - 2x \int x e^x dx \\
 & = x^2 e^x - 2(x e^x - \int e^x dx) \\
 & = x^2 e^x - 2(x e^x - e^x) \\
 & = x^2 e^x - 2x e^x + 2e^x + C
 \end{aligned}$$

Ejercicio 1

a) $\int x^2 \cdot 2^x dx$

$u = 2x^2$ $dv = \cos 3x dx$
 $du = 4x dx$ $v = \sin 3x$

b) $\int \frac{2x^2}{u} \frac{\cos 3x}{dv} dx$

$2x^2$
 \uparrow
 I L A T E
 \downarrow
 $\cos 3x$

$u = x$ $dv = \sin 3x dx$
 $du = dx$ $v = -\cos 3x$

$$\int 2x^2 \cos 3x = 2x^2 \sin 3x - 4 \int \sin 3x \cdot x dx$$

$$= 2x^2 \sin 3x - 4 \left(x \cdot (-\cos 3x) - \int -\cos 3x dx \right)$$

$$= 2x^2 \sin 3x - 4 \left(-x \cos 3x + \sin 3x \right) + C$$

$$= 2x^2 \sin 3x + 4x \cos 3x - 2 \sin 3x + C$$

Ejercicio 2

c) $\int \frac{z^3}{dv} \ln z dz$

$u = \ln z$ $dv = z^3 dz$
 $du = \frac{1}{z} dz$ $v = \frac{z^4}{4}$

I L A T E
 \downarrow
 $\frac{z^4}{4}$
 \downarrow
 $\ln z$

$$\int z^3 \ln z dz = \ln z \cdot \frac{z^4}{4} - \int \frac{z^4}{4} \cdot \frac{1}{z} dz$$

$$= \frac{1}{4} x^3 \ln |x| - \frac{1}{4} \int x^3 dx$$

$$= \frac{1}{4} x^3 \ln |x| - \frac{1}{4} \frac{x^4}{4} + C$$

$$= \frac{1}{4} x^3 \ln |x| - \frac{1}{16} x^4 + C$$

Ejercicio 3

$$\int \frac{\ln(x)}{x^2} dx$$

$$\int \ln(x) \times \frac{1}{x^2} dx$$

$$u = \ln(x)$$

$$dv = \frac{1}{x^2} dx$$

$$du = \frac{1}{x} dx$$

$$dv = \frac{1}{x^2} dx$$

$$du = \frac{1}{x} dx$$

$$v = -\frac{1}{x}$$

$$\ln(x) \times \left(-\frac{1}{x}\right) - \int -\frac{1}{x} \times \frac{1}{x} dx$$

$$\ln(x) \times \left(-\frac{1}{x}\right) + \int \frac{1}{x} \times \frac{1}{x} dx$$

$$\ln(x) \times \left(-\frac{1}{x}\right) + \int \frac{1}{x^2} dx$$

$$\ln(x) \times \left(-\frac{1}{x}\right) - \frac{1}{x}$$

$$-\frac{\ln(x) + 1}{x}$$

$$-\frac{\ln x + 1}{x} + C, \quad C \in \mathbb{R}$$

Ejercicio 4