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Tutoría TIP "Cálculo Diferencial e Integral"

Integración por partes

$$\int \frac{\mathrm{Ln}x}{x^2}dx$$

$$= \int x^{-2}\mathrm{Ln}x dx$$

$$u = \mathrm{Ln}x$$

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

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

$$dv = x^{-2}dx$$

$$\int dv = \int x^{-2}dx$$

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

$$\int udv = uv - \int vdu$$

$$\int \mathrm{Lnx} \cdot x^{-2}dx = \mathrm{Lnx} \cdot \left(-\frac{1}{x}\right) - \int -\frac{1}{x} \cdot \frac{1}{x}dx$$

$$= -\frac{\mathrm{Lnx}}{\mathrm{x}} + \int \frac{1}{x^2}dx$$

$$= -\frac{\mathrm{Lnx}}{\mathrm{x}} + \int x^{-2}dx$$

$$= -\frac{\mathrm{Lnx}}{\mathrm{x}} + \frac{x^{-1}}{-1} + C$$

$$= -\frac{\mathrm{Lnx}}{\mathrm{x}} - \frac{1}{x} + C$$

$$\int \frac{\mathrm{Ln}x}{x^2}dx = \frac{-\mathrm{Lnx} - 1}{\mathrm{x}} + C$$

$$\int xe^{5x}dx$$

$$u = x$$

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

$$du = dx$$

$$dv = e^{5x}dx$$

$$\int dv = \int e^{5x}dx$$

$$v = \frac{e^{5x}}{5}$$

$$\int udv = uv - \int vdu$$

$$\int x \cdot e^{5x}dx = x \cdot \frac{e^{5x}}{5} - \int \frac{e^{5x}}{5} \cdot dx$$

$$= \frac{xe^{5x}}{5} - \frac{1}{5}\int e^{5x} \cdot dx$$

$$= \frac{xe^{5x}}{5} - \frac{1}{5} \cdot \frac{e^{5x}}{5} + C$$

$$= \frac{xe^{5x}}{5} - \frac{e^{5x}}{25} + C$$

$$= \frac{5xe^{5x} - e^{5x}}{25} + C$$

$$\int xe^{5x}dx = \frac{e^{5x} \cdot (5x - 1)}{25} + C$$