Integral Indefinida - Función exponencial

ByteePlanet

Solución

$$\int -\frac{2}{e^x} + \frac{e^{-4x}}{e^x}\,dx$$

$$= -2\int \frac{1}{e^x}\,dx + \int \frac{e^{-4x}}{e^x}\,dx$$

$$= -2\int e^{-x}\,dx + \int e^{-4x}\left(e^{-x}\right)dx$$

$$= -2\int e^{-x}\,dx + \int e^{-5x}\,dx$$

Cambio de variable

$u_1 = -x$ $\qquad$ $u_2 = -5x$

$du_1 = -1\,dx$ $\qquad$ $du_2 = -5\,dx$

$dx = -du$ $\qquad$ $dx = -\frac{du}{5}$

$$= -2\int e^{u}\cdot -du + \int e^{u}\cdot -\frac{du}{5}$$

$$= 2\int e^{u}\,du - \frac{1}{5}\int e^{u}\,du$$

$$= 2\left(e^{u}\right) - \frac{1}{5}\left(e^{u}\right) + C$$

$$= 2e^{-x} - \frac{1}{5}e^{-5x} + C$$

$$* \int e^{u}\,du = e^{u}$$