

## PROOF OF FORMULA 2.325.2

$$\int \frac{e^{ax}}{x^2} dx = -\frac{e^{ax}}{x} + a\text{Ei}(ax)$$

The exponential integral is defined by

$$\text{Ei}(x) = \int_{-\infty}^x \frac{e^t}{t} dt$$

for  $x < 0$  and by its principal value for  $x > 0$ . Formula 2.324.2 has the expression

$$\int \frac{e^{ax} dx}{x^m} = -\frac{e^{ax}}{(m-1)!} \sum_{k=1}^{m-1} \frac{a^{k-1} (m-k-1)!}{x^{m-k}} + \frac{a^{m-1}}{(m-1)!} \text{Ei}(ax).$$

This formula, with  $m = 2$ , gives the present one.