

FORMULA 3.458.2

$$\begin{aligned} \int_{-\infty}^{\infty} \frac{x e^x dx}{(a + e^x)^{\nu+1}} &= \frac{1}{\nu a^\nu} [\ln a - \gamma - \psi(\nu)] \\ &= \frac{1}{\nu a^\nu} \left[\ln a - \sum_{k=1}^{\nu-1} \frac{1}{k} \right] \quad \text{if } \nu \in \mathbb{N} \end{aligned}$$