PROOF OF FORMULA 3.352.6

$$\int_0^\infty \frac{e^{-\mu x}}{a - x} dx = e^{-\mu a} \operatorname{Ei}(\mu a)$$

The exponential integral is defined by

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

The change of variable $t = x - a$ gives

$$\int_0^\infty \frac{e^{-\mu x}}{a - x} dx = -e^{-\mu a} \int_{-a}^\infty \frac{e^{-\mu t}}{t} dt.$$

The change of variable $s = \mu t$ produces the result.

Note. The parameters are restricted to $a < 0$ and $\mu > 0$.