PROOF OF FORMULA 3.352.5

$$\int_a^\infty \frac{e^{-\mu x}}{b-x}\,dx = e^{-\mu b}\,\mathrm{Ei}[(b-a)\mu]$$

The exponential integral is defined by

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

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

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

Let $s = \mu t$ to produce the result.