PROOF OF FORMULA 4.212.2

$$\int_0^1 \frac{dx}{a - \ln x} = -e^a \mathrm{Ei}(-a)$$

Let $t = a - \ln x$ to obtain

$$\int_0^1 \frac{dx}{a - \ln x} = -e^a \int_{-\infty}^{-a} \frac{e^t}{t}\, dt.$$

The integral is the function $\mathrm{Ei}(-a)$.