

PROOF OF FORMULA 4.212.1

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

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 $\text{Ei}(a)$.