

**PROOF OF FORMULA 4.212.5**

$$\int_0^1 \frac{\ln x \, dx}{(a + \ln x)^2} = 1 + (1 - a)e^{-a}\text{Ei}(a)$$

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

$$\int_0^1 \frac{\ln x \, dx}{(a + \ln x)^2} = e^{-a} \left( \int_{-\infty}^a \frac{e^t}{t} dt - a \int_{-\infty}^a \frac{e^t}{t^2} dt \right).$$

The first integral is  $\text{Ei}(a)$ . The second integral follows from 2.325.2 that states

$$\int \frac{e^{ax}}{x^2} dx = -\frac{e^{ax}}{x} + a\text{Ei}(ax).$$