

PROOF OF FORMULA 4.251.5

$$\int_0^1 \frac{x^{2n} \ln x \, dx}{1+x} = -\frac{\pi^2}{12} + \sum_{j=1}^{2n} \frac{(-1)^{j-1}}{j^2}$$

Let $t = -\ln x$ to obtain

$$\int_0^1 \frac{x^{2n} \ln x \, dx}{1+x} = -\int_0^\infty \frac{te^{-2nt} \, dt}{1+e^t}.$$

This integral is evaluated in **3.411.12**.