PROOF OF FORMULA 4.231.4

$$\int_0^1 \frac{1-x}{1+x} \ln x \, dx = 1 - \frac{\pi^2}{6}$$

The partial fraction decomposition

$$\frac{1-x}{1+x} = -1 + \frac{2}{1+x},$$

gives

$$\int_0^1 \frac{1-x}{1+x} \ln x \, dx = -\int_0^1 \ln x \, dx + 2 \int_0^1 \frac{\ln x \, dx}{1+x}.$$

Integration by parts shows that the first integral is -1. The second integral has value $-\pi^2/12$, as shown in **4.231.1**.