

PROOF OF FORMULA 4.227.9

$$\int_0^{\pi/4} \ln(1 + \tan x) dx = \frac{\pi}{8} \ln 2$$

Write the integral as

$$\int_0^{\pi/4} \ln(1 + \tan x) dx = \int_0^{\pi/4} \ln(\cos x + \sin x) dx - \int_0^{\pi/4} \ln \cos x dx.$$

The result now follows from the evaluations

$$\int_0^{\pi/4} \ln(\cos x + \sin x) dx = -\frac{\pi}{8} \ln 2 + \frac{G}{2}$$

and

$$\int_0^{\pi/4} \ln \cos x dx = -\frac{\pi}{4} \ln 2 + \frac{G}{2}$$

given in entries **4.225.2** and **4.224.5**, respectively.