

PROOF OF FORMULA 4.227.13

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

Write the integral as

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

The result now follows from entries 4.225.2 and 4.224.2 that give

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

and

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

respectively.