

PROOF OF FORMULA 3.688.1

$$\int_0^{\pi/4} \frac{\tan^\nu x - \tan^\mu x}{\cos x - \sin x} \frac{dx}{\sin x} = \psi(\mu) - \psi(\nu)$$

The change of variable $r = \tan x$ gives

$$\int_0^{\pi/4} \frac{\tan^\nu x - \tan^\mu x}{\cos x - \sin x} \frac{dx}{\sin x} = \int_0^1 \frac{r^{\nu-1} - r^{\mu-1}}{1-r} dr.$$

This is entry **3.231.5**.