

PROOF OF FORMULA 4.295.6

$$\int_1^{\infty} \frac{\ln(1+x^2)}{1+x^2} dx = \frac{\pi}{2} \ln 2 + G$$

The change of variables $t = 1/x$ gives

$$\int_1^{\infty} \frac{\ln(1+x^2)}{1+x^2} dx = \int_0^1 \frac{\ln(1+t^2)}{1+t^2} dt - 2 \int_0^1 \frac{\ln t}{1+t^2} dt.$$

Entry 4.295.5 gives

$$\int_1^{\infty} \frac{\ln(1+t^2)}{1+t^2} dt = \frac{\pi}{2} \ln 2 - G,$$

and entry 4.232.11 gives

$$\int_0^1 \frac{\ln t}{1+t^2} dt = -G.$$

The result follows by combining these evaluations.