PROOF OF FORMULA 3.511.1

$$\int_0^\infty \frac{dx}{\cosh x} = \frac{\pi}{2}$$

The change of variables $s = e^x$ gives

$$\int_0^\infty \frac{dx}{\cosh x} = 2\int_1^\infty \frac{ds}{s^2+1}.$$

This integral is elementary and is computed by the change of variables $s = \tan\theta$ to obtain

$$\begin{aligned}\int_1^\infty \frac{ds}{s^2+1} &= 2\left(\tan^{-1}(\infty) - \tan^{-1} 1\right) \\ &= \frac{\pi}{2}.\end{aligned}$$