PROOF OF FORMULA 3.553.2

$$\int_0^\infty \frac{\sinh^2(x/2)}{\cosh x}\,\frac{e^{-x}}{x}\,dx = \frac{1}{2}\ln\left(\frac{4}{\pi}\right)$$

The change of variables $t = e^{-x}$ gives

$$\int_0^\infty \frac{\sinh^2(x/2)}{\cosh x}\,\frac{e^{-x}}{x}\,dx = -\frac{1}{2}\int_0^1 \frac{(1-t)^2}{1+t^2}\,\frac{dt}{\ln t}.$$

This integral has value $\ln \pi/4$ and it appears as entry 4.267.2.