PROOF OF FORMULA 3.523.5

$$\int_0^\infty \frac{x^2\,dx}{\cosh x} = \frac{\pi^3}{8}$$

Entry 3.523.4 states that

$$\int_0^\infty \frac{x^{2n}\,dx}{\cosh x} = \left(\frac{\pi}{2}\right)^{2n+1} |E_{2n}|.$$

Take $n = 1$ and use $E_2 = -1$.