

### PROOF OF FORMULA 3.523.6

$$\int_0^\infty \frac{x^3 dx}{\sinh x} = \frac{\pi^4}{8}$$

Entry **3.523.2** states that

$$\int_0^\infty \frac{x^{2n-1} dx}{\sinh ax} = \frac{2^{2n} - 1}{2n} \left(\frac{\pi}{a}\right)^{2n} |B_{2n}|.$$

The special case  $n = 2$  and  $a = 1$ , using the value  $B_4 = -1/30$  give the result.