

**PROOF OF FORMULA 3.524.4**

$$\int_0^\infty x^{2m+1} \frac{\sinh ax}{\cosh bx} dx = \frac{\pi}{2b} \left( \frac{d}{da} \right)^{2m+1} \left( \sec \frac{\pi a}{2b} \right)$$

Entry **3.511.4** states that

$$\int_0^\infty \frac{\cosh ax}{\cosh bx} dx = \frac{\pi}{2b} \sec \left( \frac{\pi a}{2b} \right).$$

The result follows by differentiating  $2m + 1$  times with respect to  $a$ .