

PROOF OF FORMULA 3.524.8

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

Entry **3.511.2** states that

$$\int_0^{\infty} \frac{\sinh ax}{\sinh bx} dx = \frac{\pi}{2b} \tan \frac{\pi a}{2b}.$$

The result now follows by differentiation.