

**PROOF OF FORMULA 3.524.2**

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

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.