

**PROOF OF FORMULA 3.524.22**

$$\int_0^{\infty} x^6 \frac{\cosh ax}{\cosh bx} dx = \left( \frac{\pi}{2b} \sec \frac{\pi a}{2b} \right)^7 \left( 720 - 840 \cos^2 \frac{\pi a}{2b} + 182 \cos^4 \frac{\pi a}{2b} - \cos^6 \frac{\pi a}{2b} \right)$$

Entry 3.524.6 states that

$$\int_0^{\infty} x^6 \frac{\cosh ax}{\cosh bx} dx = \frac{\pi}{2b} \left( \frac{d}{da} \right)^6 \sec \frac{\pi a}{2b}.$$

The result is now obtained by computing the derivative.