

**PROOF OF FORMULA 3.524.20**

$$\int_0^{\infty} x^2 \frac{\cosh ax}{\cosh bx} dx = \left(\frac{\pi}{2b}\right)^3 \sec \frac{\pi a}{2b} \left(2 \sec^2 \frac{\pi a}{2b} - 1\right)$$

Entry 3.524.6 states that

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

The result follows by computing the derivative.