

**PROOF OF FORMULA 3.524.18**

$$\int_0^{\infty} x^5 \frac{\cosh ax}{\sinh bx} dx = 8 \left( \frac{\pi}{2b} \sec \frac{\pi a}{2b} \right)^6 \left( 15 - 15 \cos^2 \frac{\pi a}{2b} + 2 \cos^4 \frac{\pi a}{2b} \right)$$

Entry **3.524.8** states that

$$\int_0^{\infty} x^5 \frac{\cosh ax}{\sinh bx} dx = \frac{\pi}{2b} \left( \frac{d}{da} \right)^5 \tan \frac{\pi a}{2b}.$$

The result comes from computing the derivative.