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.