

PROOF OF FORMULA 3.524.10

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

Entry **3.524.2** states that

$$\int_0^\infty x^4 \frac{\sinh ax}{\sinh bx} dx = \frac{\pi}{2b} \left(\frac{d}{da} \right)^4 \tan \frac{\pi a}{2b}.$$

The result follows by computing the derivative.