

PROOF OF FORMULA 3.524.12

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

According to entry 3.524.4

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

The result follows by computing the derivative.