

PROOF OF FORMULA 3.527.13

$$\int_0^{\infty} x^2 \frac{\cosh ax}{\sinh^2 ax} dx = \frac{\pi^2}{2a^3}$$

In the proof of entry 3.527.9 we have established the formula

$$\int_0^{\infty} x^{\mu-1} \frac{\cosh ax}{\sinh^2 ax} dx = \frac{2\Gamma(\mu)\zeta(\mu-1)}{a^{\mu}}(1-2^{1-\mu}).$$

The current formula is the special case $\mu = 3$.