

**PROOF OF FORMULA 3.527.10**

$$\int_0^\infty x^{2m} \frac{\cosh ax}{\sinh^2 ax} dx = \frac{(2^{2m} - 1)}{a} \left(\frac{\pi}{a}\right)^{2m} |B_{2m}|$$

Entry **3.527.9** states that

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

Put  $\mu = 2m + 1$  and use the relation

$$\zeta(2m) = \frac{2^{2m-1}\pi^{2m}}{(2m)!} |B_{2m}|.$$