PROOF OF FORMULA 3.636.3

$$\int_0^{\pi/2} \frac{\tan^{2\mu} x}{\cos x} \, dx = \int_0^{\pi/2} \frac{\cot^{2\mu} x}{\sin x} \, dx = \frac{\Gamma(\mu + 1/2)\,\Gamma(-\mu)}{2\sqrt{\pi}}$$

Observe that
$$\int_0^{\pi/2} \frac{\tan^{2\mu} x}{\cos x} \, dx = \int_0^{\pi/2} \sin^{2\mu} x \, \cos^{-2\mu-1} x \, dx = \frac{1}{2} B(\mu + 1/2, -\mu).$$

The result follows from

$$B(x, y) = \frac{\Gamma(x)\,\Gamma(y)}{\Gamma(x + y)}.$$