## PROOF OF FORMULA 3.625.1

$$\int_0^{\pi/4} \frac{\sin^{2n-1} x \, \cos^p 2x}{\cos^{2p+2n+1} x} \, dx = \frac{1}{2} B(n, p+1) = \frac{(n-1)!}{2(p+n)(p+n-1)\cdots(p+1)}$$

The change of variables $t = \tan x$ gives

$$\int_0^{\pi/4} \frac{\sin^{2n-1} x \, \cos^p 2x}{\cos^{2p+2n+1} x} \, dx = \int_0^1 t^{2n-1}(1-t^2)^p \, dt.$$

The result now follows via $v = t^2$.