## PROOF OF FORMULA 3.662.1

$$
\int_{0}^{\pi / 2}(\sec x-1)^{\mu} \sin x d x=\int_{0}^{\pi / 2}(\operatorname{cosec} x-1)^{\mu} \cos x d x=\frac{\pi \mu}{\sin \pi \mu}
$$

The proof is given for the first integral. The second one is reduced to the first one by $x \mapsto \pi / 2-x$.

Let $t=\cos x$ to obtain

$$
\int_{0}^{\pi / 2}(\sec x-1)^{\mu} \sin x d x=\int_{0}^{1} t^{-\mu}(1-t)^{\mu} d t
$$

This last integral is

$$
B(1-\mu, 1+\mu)=\Gamma(1-\mu, 1+\mu)=\mu \Gamma(\mu) \Gamma(1-\mu)
$$

and this reduces to the stated answer.

