

**PROOF OF FORMULA 3.791.1**

$$\int_0^{\pi/2} \frac{x dx}{1 + \sin x} = \ln 2$$

Let  $t = \pi/2 - x$  to produce

$$\begin{aligned} \int_0^{\pi/2} \frac{x dx}{1 + \sin x} &= \int_0^{\pi/2} \frac{(\pi/2 - t) dt}{1 + \cos t} \\ &= 2 \int_0^{\pi/4} \frac{\pi/4 - s}{\cos^2 s} ds. \end{aligned}$$

Integrate by parts to obtain

$$\int_0^{\pi/2} \frac{x dx}{1 + \sin x} = 2 \int_0^{\pi/4} \tan s ds,$$

where  $t = 2s$ . This gives the result.