PROOF OF FORMULA 4.243

$$\int_0^1 \frac{x \ln x \, dx}{\sqrt{1-x^4}} = -\frac{\pi}{8} \ln 2$$

Let $t = x^2$ to obtain

$$\int_0^1 \frac{x \ln x \, dx}{\sqrt{1-x^4}} = \frac{1}{4} \int_0^1 \frac{\ln t \, dt}{\sqrt{1-t^2}}.$$

This last integral has the value $-\frac{1}{2}\pi \ln 2$ as verified in 4.241.7. This gives the result.