PROOF OF FORMULA 4.261.9

$$\int_0^1 \frac{\ln^2 x\, dx}{\sqrt{1-x^2}} = \frac{\pi}{2}\left(\ln^2 2 + \frac{\pi^2}{12}\right)$$

The change of variable $x = \sin t$ yields

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

The value of this integral appears as entry 4.224.7.