PROOF OF FORMULA 4.215.2

$$\int_0^1 \left(\ln \frac{1}{x}\right)^{-\mu} dx = \Gamma(1-\mu)$$

Let $t = \ln \frac{1}{x}$ to produce

$$\int_0^1 \left(\ln \frac{1}{x}\right)^{-\mu} dx = \int_0^\infty t^{-\mu} e^{-t}\, dt.$$

This is the standard integral representation of the gamma function.