

PROOF OF FORMULA 4.281.2

$$\int_1^\infty \frac{dx}{x^2 (\ln p - \ln x)} = \frac{\text{li}(p)}{p}$$

Let $t = p/x$ to obtain

$$\int_1^\infty \frac{dx}{x^2 (\ln p - \ln x)} = \frac{1}{p} \int_0^p \frac{dt}{\ln t}.$$

The last integral is the definition of the function li .