PROOF OF FORMULA 4.251.3

$$\int_0^1 \frac{x^{a-1}\,\ln x}{1+x}\,dx = \beta'(a)$$

The β-function is defined by the integral representation

$$\beta(a) = \int_0^1 \frac{x^{a-1}\,dx}{1+x}.$$

Now differentiate with respect to the parameter a.