PROOF OF FORMULA 4.251.3

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

The \( \beta \)-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 \( a \).