FORMULA 3.411.3

The original formula is

$$\int_0^\infty \frac{x^{\nu-1}\,dx}{e^{\mu x}+1} = \frac{1-2^{1-\nu}}{\mu^\nu}\Gamma(\nu)\zeta(\nu)$$

The change of variables $t = \mu x$ and replacing ν by a gives the new form (going back to x as the integration variable)

$$\int_0^\infty \frac{x^{a-1}\,dx}{e^x+1} = (1-2^{1-a})\Gamma(a)\zeta(a)$$