PROOF OF FORMULA 3.313.2

$$\int_{-\infty}^{\infty} \frac{e^{-\mu x}\, dx}{(1+e^{-x})^{\nu}} = B(\mu, \nu - \mu)$$

Let $t = e^{-x}$ to obtain

$$\int_{-\infty}^{\infty} \frac{e^{-\mu x}\, dx}{(1+e^{-x})^{\nu}} = \int_{0}^{\infty} \frac{t^{\mu-1}\, dt}{(1+t)^{\nu}}$$

The result follows from the integral representation

$$B(a, b) = \int_{0}^{\infty} \frac{t^{a-1}\, dt}{(1+t)^{a+b}},$$

with $a = \mu$ and $b = \nu - \mu$.