PROOF OF FORMULA 3.191.1

$$\int_0^a x^{\nu-1}(a-x)^{\mu-1}\,dx = a^{\mu+\nu-1}B(\mu,\nu)$$

The change of variables $x = at$ gives

$$\int_0^a x^{\nu-1}(a-x)^{\mu-1}\,dx = a^{\mu+\nu-1}\int_0^1 t^{\nu-1}(1-t)^{\mu-1}\,dt$$

and the result follows from the integral representation for the beta function

$$B(a,b) = \int_0^1 t^{a-1}(1-t)^{b-1}\,dt.$$