

## Conditions

integration from 0 to 1  
of  $(m^{m-1}((1-x)^n-1)/((a+x)^{m+n}))$

## Solution

$$\int \frac{m^{m-1} ((1-x)^n - 1)}{(a+x)^{m+n}} dx =$$

$$\frac{1}{m+n-1} m^{m-1} \left(\frac{1-x}{a+1}\right)^{-n} (a+x)^{-m-n+1} \left( \left(\frac{1-x}{a+1}\right)^n - (1-x)^n {}_2F_1\left(-m-n+1, -n; -m-n+2; \frac{a+x}{a+1}\right) \right) + \text{constant}$$

$$\frac{m^{m-1} (a+x)^{-m-n+1}}{m+n-1} - \frac{1}{m+n-1} m^{m-1} (a+1)^n$$

$$(a+x)^{-m-n+1} {}_2F_1\left(-m-n+1, -n; -m-n+2; \frac{a+x}{a+1}\right)$$

$$\exp\left(-2i\pi n \left[ \frac{\arg(a+1)}{2\pi} - \frac{\arg(1-x)}{2\pi} + \frac{1}{2} \right]\right) + \text{constant}$$