(12)

Hence

$$\frac{(t)_\infty}{(abt/c)_\infty}\sum_{n=0}^{\infty}\frac{(a)_n(b)_n t^n}{(q)_n(c)_n} = \sum_{n=0}^{\infty}\frac{(c/a)_n(c/b)_n\left(\frac{abt}{c}\right)^n}{(c)_n(q)_n}$$

$$\cdot\sum_{j=0}^{\infty}\frac{\left(\frac{c}{ab}\right)_j\left(\frac{abt}{c}\right)^j}{(q)_j}\sum_{n=0}^{\infty}\frac{(a)_n(b)_n t^n}{(q)_n(c)_n} = \sum_{N=0}^{\infty}\frac{\left(\frac{c}{a}\right)_N\left(\frac{c}{b}\right)_N\left(\frac{abt}{c}\right)^N}{(c)_N(q)_N}$$

Comparing coeff of t^N on both sides:

$j+n=N$

$$\sum_{n=0}^{N}\frac{(a)_n(b)_n\left(\frac{c}{ab}\right)_{N-n}\left(\frac{ab}{c}\right)^{N-n}}{(q)_n(c)_n(q)_{N-n}} = \frac{\left(\frac{c}{a}\right)_N\left(\frac{c}{b}\right)_N\left(\frac{ab}{c}\right)^N}{(c)_N(q)_N}$$

We multiply both side by $\frac{(q)_N}{\left(\frac{c}{ab}\right)_N}\frac{c^N}{a^Nb^N}$

to obtain

$$\sum_{n=0}^{N}\frac{(a)_n(b)_n}{(q)_n(c)_n}\frac{(q)_N}{(q)_{N-n}}\frac{\left(\frac{c}{ab}\right)_{N-n}}{\left(\frac{c}{ab}\right)_N}\left(\frac{c}{ab}\right)^n = \frac{\left(\frac{c}{a}\right)_N\left(\frac{c}{b}\right)_N}{(c)_N(q)_N}$$

$$(a)_n = (1-a)(1-aq)\cdots(1-aq^{n-1})$$

$$= (-a)(1-a^{-1})(-aq)(1-a^{-1}q^{-1})\cdots(-aq^{n-1})(1-a^{-1}q^{1-n})$$

$$= (-a)^n q^{n(n-1)/2}\left(\frac{q^{1-n}}{a}\right)_n$$

$$\frac{(x)_{N-n}}{(x)_N} = \frac{1}{(1-xq^{N-n})\cdots(1-xq^{N-1})} = \frac{1}{(xq^{N-n})_n}$$