Test correction

Ans 3). $C(x) = \sum_{n \geq 0} c_n x^n$ $c_n = \sum_{k=0}^{n} 3^k (n-k+1)$

$C(x) = A(x)\, B(x)$

$c(n) = \sum_{k=0}^{n} a_k\, b_{n-k}$

$a_k = 3^k$ $b_{n-k} = n-k+1$

$\downarrow$ $\downarrow$

$a_n = 3^n$ $b_n = n+1$

$A(x) = \sum_{n \geq 0} 3^n x^n$ $B(x) = \sum_{n \geq 0} (n+1) x^n$

$= \frac{1}{(1-3x)}$ $= \frac{1}{(1-x)^2}$

$C(x) = \frac{1}{(1-3x)(1-x)^2}$

So from we set $c_n = \left(\sum_{n \geq 0} 3^n x^n\right)\left(\sum_{n \geq 0} (n+1) x^n\right)$

$= (3^n)\,(n+1)$ Ans.