$\mathbf{G(x)}$	a_k
$(1+x)^n = \sum_{k=0}^{n} C(n,k)x^k =$ $1+C(n,1)x+C(n,2)x^2+\cdots+x^n$	$C(n,k)$
$(1+ax)^n = \sum_{k=0}^{n} C(n,k)a^k x^k =$ $1+C(n,1)ax+C(n,2)a^2x^2+$ $\cdots+a^n x^n$	$C(n,k)a^k$
$(1+x^r)^{n/r} = \sum_{k=0}^{n/r} C(n,k)x^{rk} =$ $1+C(n,1)x^r+C(n,2)x^{2r}+$ $\cdots+x^n$	$C(n,k/r)$ if $r \mid k$; 0 otherwise
$\frac{1-x^{n+1}}{1-x} = \sum_{k=0}^{n} x^k =$ $1+x+x^2+\cdots+x^n$	1 if $k \leq n$; 0 otherwise
$\frac{1}{1-x} = \sum_{k=0}^{\infty} x^k = 1+x+x^2+\cdots$	1
$\frac{1}{1-ax} = \sum_{k=0}^{\infty} a^k x^k =$ $1+ax+a^2x^2+\cdots$	a^k
$\frac{1}{1-x^r} = \sum_{k=0}^{\infty} x^{rk} =$ $1+x^r+x^{2r}+\cdots$	1 if $r \mid k$; 0 otherwise
$\frac{1}{(1-x)^2} = \sum_{k=0}^{\infty}(k+1)x^k =$ $1+2x+3x^2+\cdots$	$k+1$
$\frac{1}{(1-x)^r} =$ $\sum_{k=0}^{\infty} C(n+k-1,k)x^k =$ $1+C(n,1)x+C(n+1,2)x^2+\cdots$	$C(n+k-1,k) = C(n+k-1,n-1)$
$\frac{1}{(1+x)^n} =$ $\sum_{k=0}^{\infty} C(n+k-1,k)(-1)^k x^k =$ $1-C(n,1)x+C(n+1,2)x^2-\cdots$	$(-1)^k C(n+k-1,k) = (-1)^k C(n+k-1,n-1)$
$\frac{1}{(1-ax)^r} =$ $\sum_{k=0}^{\infty} C(n+k-1,k)a^k x^k = 1+$ $C(n,1)ax+C(n+1,2)a^2x^2+\cdots$	$C(n+k-1,k)a^k = C(n+k-1,n-1)a^k$ 1
$e^x = \sum_{k=0}^{\infty} \frac{x^k}{k!} =$ $1+x+\frac{x^2}{2!}+\frac{x^3}{3!}+\cdots$	$\frac{1}{k!}$
$\ln(1+x) = \sum_{k=1}^{\infty} \frac{(-1)^{k+1}x^k}{k} =$ $x-\frac{x^2}{2}+\frac{x^3}{3}-\frac{x^4}{4}+\cdots$	$\frac{(-1)^{k+1}}{k}$

Table 1: Useful Generating Functions.