

$$1$$

$$d$$

$$\begin{array}{c} \alpha \\ \beta \\ \mathfrak{R} \\ (a\mathfrak{R}b) \\ \alpha\mathfrak{R} \\ \beta \\ x \end{array}$$

$$(x>0)-(x<0)$$

$$\begin{array}{c} x \\ -1 \\ x \end{array}$$

$$(1\!+\!z)^n=\sum_{k=0}^n\binom{n}{k}z^k\,,$$

(1.1)

$$(1\!+\!z)^n=\sum_k\binom{n}{k}z^k\,;$$

(1.2)

$k$

$$(1\!+\!z)^n=\sum_k\binom{n}{k}z^k=\sum_k\binom{n}{k+1}z^{k+1}=\sum_k\binom{n}{\lfloor n/2\rfloor-k}z^{\lfloor n/2\rfloor-k}\,;$$

(1.3)

$$(1\!+\!z)^n=\sum_{k=0}^n\binom{n}{k}z^k=\sum_{k=-1}^{n-1}\binom{n}{k+1}z^{k+1}=\sum_{k=-\lceil n/2\rceil}^{\lfloor n/2\rfloor}\binom{n}{\lfloor n/2\rfloor-k}z^{\lfloor n/2\rfloor-k}\,.$$

(1.4)

$n$

$$\sum_{k=2}^{n-1}k(k-1)(n-k)\sum_{k=0}^nk(k-1)(n-k)\,;$$

(1.5)

$n=$

$$\sum_{k\in A}f(k)+\sum_{k\in B}f(k)=\sum_{k\in A\cup B}f(k)+\sum_{k\in A\cap B}f(k)$$

$$(1.9)\qquad\qquad\qquad\sum$$

$$\sum_{k\in A}f(k)+\sum_{k\in B}f(k)=\sum_kf(k)\,[k\in A]+\sum_kf(k)\,[k\in B]=\sum_kf(k)\,([k\in A]+[k\in B])$$

$$[k\in A]+[k\in B]=[k\in A\cup B]+[k\in A\cap B]\,.$$

$$(1.10)$$

$$\sum_{j=1}^n\sum_{k=1}^jf(j,k)=\sum_{k=1}^n\sum_{j=k}^nf(j,k)\,;$$

$$(1.11)$$

$$\sum_{j,k}f(j,k)\,[1\leq j\leq n]\,[1\leq k\leq j]=\sum_{j,k}f(j,k)\,[1\leq k\leq j\leq n]=\sum_{j,k}f(j,k)\,[1\leq k\leq n]\,[k\leq j\leq n]\,,$$

$$[k\,even]=\sum_m[k=2m]and[k\,odd]=\sum_m[k=2m+1]\,;$$

$$(1.12)$$

$$\sum_kf(k)=\sum_kf(k)\,([k\,even]+[k\,odd])=\sum_{k,m}f(k)\,[k=2m]+\sum_{k,m}f(k)\,[k=2m+1]=\sum_mf(2m)+\sum_mf(2m+1)\,.(1.13)$$

$$\lg$$

$$\sum_{k\geq 1}\binom{n}{\lfloor\lg k\rfloor}=\sum_{k\geq 1}\sum_m\binom{n}{m}\,[m=\lfloor\lg k\rfloor]=\sum_{k,m}\binom{n}{m}\,[m\leq\lg k<m+1]\,[k\geq 1]=\sum_{m,k}\binom{n}{m}\,[2^m\leq k<2^{m+1}]\,[k\geq 1]=\sum_m\binom{n}{m}\,[2^m\leq n]<2^{m+1}]\,.$$

$$\prod_{P(k)}f(k)=\prod_kf(k)^{[P(k)]}\,.$$

$$(1.15)\qquad\qquad\qquad n$$

$$\prod_p p^{[p\,prime]\,[p\,divides\,n]}\,.$$

$$\delta_{ik}=\begin{cases}1,i=k\\0,i\neq k\end{cases}$$

$$(1.16)$$

$$\delta_j^k$$

$$[j=$$

$$k]$$

$$\delta_{jk}$$

$$[j=$$

$$k]$$

$$\delta_{jk}$$

$$[j=$$

$$k+$$

$$\ddot{\mathbf{O}}$$

$$^nF_m\,,^nA_m\,,and\,^nC_m$$

$$\left[ \begin{smallmatrix} n \\ n-m \end{smallmatrix} \right]$$

$$n$$

$$\left\{ \begin{smallmatrix} n+m \\ n \end{smallmatrix} \right\}$$

$$=$$

$$\left[ \begin{smallmatrix} -n \\ -n-m \end{smallmatrix} \right]$$

$$^{-n}F_m$$

$$\S$$

$$n!$$

$$\binom{n}{k}$$

$$\sum$$

$$\mathfrak{S}_{a,b}^k$$

$$\sum_{k=a}^b$$

$$(a,r)^n$$

$$a^{n|r}$$

$$\S\S$$

$$(a,d)^n=\mathfrak{S}_0^w\,^nF_w\,a^{n-w}\,d^w\,and\,a^n=\mathfrak{S}_0^r\,(-1)^r\,^{-n+r}F_r\,(a,d)^{n-r}\,d^r$$

$$v\,^nF_v=\mathfrak{S}_{0,v-1}^w\left(\begin{smallmatrix}n-w\\v+1-w\end{smallmatrix}\right)^nF_w\,,$$

$$\S n$$

$$\left[ \begin{smallmatrix} n \\ k \end{smallmatrix} \right]$$

$$1\leq$$

$$n\leq$$

$$7$$

$$\left[ \begin{smallmatrix} n \\ k \end{smallmatrix} \right]$$

$$\left\{ \begin{smallmatrix} n \\ k \end{smallmatrix} \right\}$$

$$C_n^k$$

$$\left[ \begin{smallmatrix} n \\ n-k \end{smallmatrix} \right]$$

$$n$$

$$\mathfrak{C}_n^k$$

$$\left\{ \begin{smallmatrix} n+k-1 \\ n-1 \end{smallmatrix} \right\}$$

$$-n$$

$$1-$$

$$n$$

$$C_n^k$$

$$\mathfrak{C}_n^k$$

$$n$$

$$k$$

$$C_n^k=$$

$$\mathfrak{C}_{1-n}^k$$

$$f_k(n)=$$

$$g_k(1-$$

$$n)$$