$[c_0, c_1, c_2, c_3] \longleftrightarrow \boxed{c_0 + c_1 x + c_2 x^2 + c_3 x^3} = C(x)$

$[d_0, d_1, d_2] \longleftrightarrow d_0 + d_1 x + d_2 x^2 = D(x)$

$C(x) \cdot D(x) = c_0 \cdot d_0 + (c_0 d_1 + c_1 d_0) x + \dots = E(x) = e_0 + e_1 x + \dots$

$[\,\cdot\,, \underbrace{\sum_{i+j=k} c_i d_j x^k}, \dots]$

$\sum_{i=0}^{k} c_i d_{k-i} x^k$

$(1-x)\boxed{(1 + x + x^2 + \dots)} = 1 - x^{n+1}$

$$A(x) = \sum_{n=0}^{\infty} 1 \cdot x^n = \lim_{n \to \infty} \frac{1 - x^{n+1}}{1-x} = \boxed{\frac{1}{1-x}}$$

pro $|x| < 1$

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$f(x) = \ln(1+x) = x - \frac{1}{2}x^2 + \frac{1}{3}x^3 - \dots$

$f'|_0 = \frac{1}{1+x}\Big|_0 = 1$

$f''|_0 = \frac{-1}{(1+x)^2}\Big|_0 = -1$

$f'''|_0 = 2 \cdot \frac{1}{(1+x)^3}\Big|_0 = 2$

$\binom{r}{k} = \frac{\boxed{r \cdot (r-1) \cdot \ldots \cdot (r-k+1)}}{k!}$ ✓

$(x+y)^r = x^r y^0 \binom{r}{0} + \dots + x^{r-i} y^i \binom{r}{i} + \dots + x^0 y^r \binom{r}{r}$

$\boxed{\ln \frac{1}{1-x}} = -\ln(1-x) = \boxed{\sum_{n \geq 1} \frac{1}{n} x^n}$

$g(x) = (1+x)^r$, $g(0) = 1$, $g'(0) = r(1+x)^{r-1}\big|_0 = r$

$\frac{a_{k+1}}{a_k} = \frac{\binom{r}{k+1}}{\binom{r}{k}} x = \boxed{\frac{r-k}{k+1}} \cdot x$

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binomická věta pro $r = -n$, $n \in \mathbb{N}$

$(1+x)^{-n} = \sum_{k \geq 0} \binom{-n}{k} x^k$

$\binom{-n}{k} = \frac{(-n)(-n-1)(-n-2)\cdots(-n-k+1)}{k!}$

$= (-1)^k \frac{(n+k-1)(n+k-2)\cdot\ldots\cdot n}{k!}$

$= (-1)^k \frac{(n+k-1)!}{k!\,(n-1)!} = (-1)^k \binom{n+k-1}{n-1}$

$$\Rightarrow \boxed{(1-x)^{-n} = \sum_{k \geq 0} \binom{n+k-1}{n-1} x^k}$$ ✓

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{posloupnosti} $\Longleftrightarrow$ {mocninné řady}

$[a_0, a_1, a_2, \dots] + [b_0, b_1, b_2, \dots] \longleftrightarrow A(x) = \sum a_i x^i$, $B(x) = \sum b_i x^i$, $A(x) + B(x) = \sum (a_i + b_i) x^i$

$[\underbrace{0, \dots, 0}_{k\times}, a_0, a_1, \dots] \longleftrightarrow x^k A(x)$

$[a_k, a_{k+1}, \dots] \longleftrightarrow (A(x) - (a_0 + \dots + a_{k-1} x^{k-1}))\, x^{-k}$

$[3, 4, 5, 6, \dots] \longleftrightarrow \left(\frac{1}{(1-x)^2} - 1 - 2x\right) \cdot x^{-2}$

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$\boxed{(1, \frac{1}{2}, \frac{1}{4}, \frac{1}{8}, \frac{1}{16}, \dots)} \longleftrightarrow \boxed{\frac{1}{1 - \frac{1}{2}x}}$

$\alpha^k \cdot 1$, $\alpha = 1/2$

$(1, -\frac{1}{2}, \frac{1}{4}, -\frac{1}{8}, \frac{1}{16}, \dots) \longleftrightarrow \frac{1}{1 - \frac{1}{2}(-x)} = \boxed{\frac{1}{1 + \frac{1}{2}x}}$

$(a_0, a_1, a_2, \dots) \longleftrightarrow A(x) = \sum_{i \geq 0} a_i x^i$

$(a_0, \underbrace{0, \dots, 0}_{n-1\,\times}, a_1, 0, \dots, 0, a_2, \dots) \longleftrightarrow A(x^n) = \sum_{i \geq 0} a_i x^{ni}$

$(1, \frac{1}{2}, -\frac{1}{2}, \frac{1}{4}, \frac{1}{4}, \frac{1}{8}, -\frac{1}{8}, \frac{1}{16}, \frac{1}{16}, \dots)$ $\boxed{\frac{1}{1 + \frac{1}{2}x^2} + \left(\frac{1}{1 - \frac{1}{2}x^2} - 1\right) x^{-1}}$

$\frac{1}{1 + \frac{1}{2}x^2} \sim (1, 0, -\frac{1}{2}, 0, \dots)$ $\frac{1}{1 - \frac{1}{2}x^2} - 1 \sim (\cancel{1}\,0, \frac{1}{2}, 0, \dots)$

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$$\frac{1}{1-x} \cdot \frac{1}{1-x} = \frac{1}{(1-x)^2} = \sum_{k=0}^{\infty} \binom{k+1}{1} x^k = \sum_{k \geq 0} (k+1) x^k$$

$(1 + \dots + x^k) = \frac{1 - x^{k+1}}{1-x}$

$$\binom{72}{2} - \binom{41}{2} - \binom{31}{2} - \binom{21}{2} = 1061.$$

na řešitele aspoň 10:

$(x^{10} + \dots + x^{30}) = x^{10}(x + \dots + x^{20})$

$\boxed{x^{30}}(1 + \dots + x^{20})(1 + \dots + x^{30})(1 + \dots + x^{40})$

$\binom{42}{2} - \binom{11}{2} = \frac{42 \cdot 41}{2} - \frac{11 \cdot 10}{2}$

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