1. $f \asymp g \longrightarrow$ всяко $k \in \mathbb{R}^+$ $f^k \asymp g^k$

2. $f \prec g \longrightarrow$ всяко $\underline{a \in \mathbb{R}_{>1}}$ $a^f \prec a^g$

3. $\underset{\log_a,\ a>1}{\underline{\lg}} \circ f \prec \lg \circ g \longrightarrow \underline{f \prec g}$

$\not\longleftarrow$

$n \prec n^2$ $\quad \lg n$ vs $\lg(n^2)$

$\cancel{\succ, \prec}$ $\quad \Theta = 2\lg n$

$n^2 \asymp n^2 + n$, 2^{n^2} vs 2^{n^2+n} $\lg(n)^{\pi}$ $\lg(n)^{\lg n}$

con$_3$ log pol ex

$\sqrt{2}^{\lg(n)}$, $\lfloor \lg(n) \rfloor !$, $\lg \lfloor n \rfloor !$, 2^{2^n}, $n^{\log_n(2)}$, $\left(\frac{3}{2}\right)^n$,

$\left(\frac{2}{3}\right)^n$, $n2^n$, $4^{\lg(n)}$, $\lfloor n+1 \rfloor !$, $\lfloor n \rfloor !$, $\sqrt{\lg(n)}$,

$2^{\sqrt{2\lg(n)}}$, $n^{\lg(\lg(n))}$, $\ln(n)$, $2^{\lg(n)}$, $\lg n^{\lg n}$, n^n, $(n+1)^n$

$$\sqrt{2}^{\lg(n)} = \left(2^{\frac{1}{2}}\right)^{\lg n} = 2^{\frac{1}{2}\lg n} = 2^{\log_2(\sqrt{n})} = n^{1/2}$$

$$\lfloor \lg n \rfloor ! \asymp \sqrt{2\lfloor \lg n \rfloor} \cdot \left(\frac{\lfloor \lg n \rfloor}{e}\right)^{\lfloor \lg n \rfloor}$$

$$2^{2^n}$$

$$n^{\log_n(2)} = 2 \asymp 1$$

$$a^{\log_a x} = x$$

$$\left(\frac{3}{2}\right)^n \nearrow$$

$$> 1$$

$$\left(\frac{2}{3}\right)^n = \frac{2}{3} \cdot \frac{2}{3} \cdots \searrow \quad < 1$$

$$n \in \mathbb{R}_+ \longrightarrow < \left(\frac{2}{3}\right)^0 = 1$$

$$n 2^n$$

$$\lg(n)! \asymp \lfloor n \rfloor \lg \lfloor n \rfloor$$

$$4^{\lg(n)} = (2^2)^{\lg n} = 2^{2\lg n} = 2^{\lg n^2} = n^2$$

$\lfloor n+1 \rfloor !$ | $\lfloor n \rfloor !$ | $\sqrt{lg(n)} = lg(n)^{\frac{1}{2}}$ | n^n

$2^{\sqrt{2^{lg n}}} = 2^{\sqrt{n}} = 2^{n^{1/2}}$ | $n^{lg(lg n)}$ | $\frac{(n+1)^n}{n^n} \asymp$

$\lim \left(\frac{n+1}{n}\right)^n = \lim \left(1+\frac{1}{n}\right)^n = e \in \mathbb{R}_+$ | $ln(n) \asymp lg(n)$

$lg_2(n) = \frac{ln(n)}{ln 2}$

$2^{lg(n)} = n$ | $(lg n)^{lg n}$ $\|$ $(lg_2(n))^{lg_2(n)}$ | $a = lg n$ | $a^{log_b(c)} = c^{log_b(a)}$

$\{ n^{log_2(log_2(n))}$

$\left(\frac{2}{3}\right)^n \quad 1$

$n^{\log_n(2)} \quad 2$

$\lfloor \lg n \rfloor!, \sqrt{\lg(n)}, \ln(n), (\lg n)^{\lg n}, n^{\lg(\lg n)}$

$\sqrt{2}^{\lg n}, \lg(\lfloor n \rfloor!), 4^{\lg n}, 2^{\lg(n)},$

$2^{2^n}, \left(\frac{3}{2}\right)^n, 2^{\sqrt{2^{\lg n}}}, n2^n$ | $\lfloor n+1 \rfloor!, \lfloor n \rfloor!, n^n, (n+1)^n$

V

$\lfloor \lg n \rfloor ! \asymp \dfrac{\sqrt{\lfloor \lg n \rfloor}\, \lfloor \lg n \rfloor^{\lfloor \lg n \rfloor}}{e^{\lfloor \lg n \rfloor}}$ | $\sqrt{\lfloor \lg n \rfloor}\left(\dfrac{\lfloor \lg n \rfloor}{e}\right)^{\lfloor \lg n \rfloor}$

$1/2$

$\sqrt{\lg n} = \lg n$

$\ln(n) \asymp \lg n$

$\sqrt{\lg n} < \ln(n) < \lfloor \lg n \rfloor !$

$n^{\lg(\lg n)} = \lg n^{\lg n}$

$\lg f < \lg g \rightarrow f < g$!!!

$\lg(\lg n)$	$\lg \lfloor \lg n \rfloor !$

$$\lg\left(\sqrt{\lfloor \lg n \rfloor} \cdot \lfloor \lg n \rfloor^{\lfloor \lg n \rfloor} \cdot e^{-\lfloor \lg n \rfloor}\right) =$$

$$= \lfloor \lg n \rfloor \cdot \lg \lfloor \lg n \rfloor$$

$$\frac{1}{2}\lg(\lfloor \lg n \rfloor) + \lfloor \lg n \rfloor \cdot \lg(\lfloor \lg n \rfloor) - \lfloor \lg n \rfloor \log_2(e)$$

$$= \lg \lfloor \lg n \rfloor + \lfloor \lg n \rfloor \cdot \lg \lfloor \lg n \rfloor - \lfloor \lg n \rfloor$$

$$\lg(\lg n) \quad \text{vs} \quad \lfloor \lg n \rfloor \cdot \lg(\lfloor \lg n \rfloor)$$

$$\lg(\lg n) < \lg(\lfloor \lg n \rfloor !) \rightarrow \lg n < \lfloor \lg n \rfloor !$$

$$\lg(\lfloor \lg n \rfloor !) \asymp \lfloor \lg n \rfloor \cdot \lg(\lfloor \lg n \rfloor) \quad !!!$$

$\updownarrow$ vs

$$\lg\left(\lg n^{\lg n}\right) = \lg n \cdot \lg(\lg n) \not\rightarrow \asymp$$

)(

$$f(n) = \lfloor \lg n \rfloor \asymp \lg(n)$$

$$(\lg n)^{\lg n} \asymp f^{f} \quad \text{vs} \quad \lfloor \lg n \rfloor! \asymp \lfloor f \rfloor!$$

$$\boxed{n^{n} \text{ vs } \lfloor n \rfloor!} \Longrightarrow \lfloor \lg n \rfloor! < \lg n^{\lg n}$$

$$\sqrt{\lg n} < \ln(n) < \lfloor \lg n \rfloor! < \lg n^{\lg n} = n^{\lg(\lg n)}$$