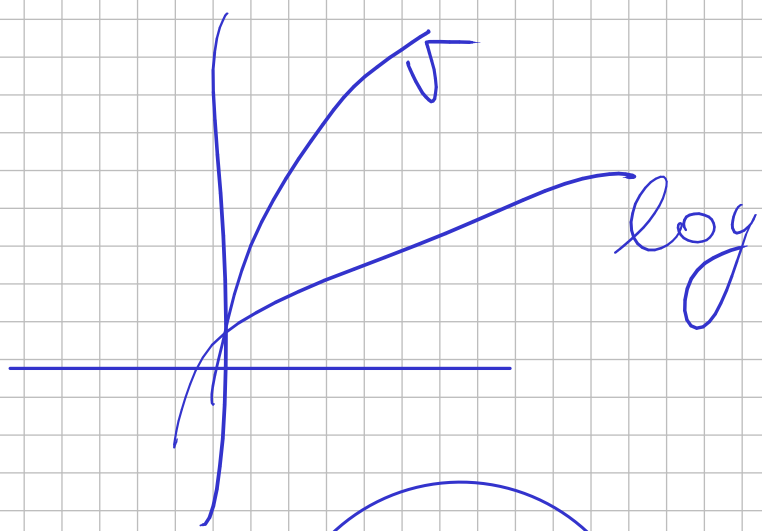
$$\sqrt{\log n} = \Theta(\log(\sqrt{n}))$$



$$n \log n = O(n^2)$$

$<$

$$\frac{\sqrt{n^3 + \log n}}{\sqrt{n}} = O(n)$$

$$\frac{\sqrt{n^3 + \log n}}{n\sqrt{n}} = \frac{\frac{1}{2\sqrt{n^3 + \log n}}}{\sqrt{n^3}}$$

$n \to \infty$

$$\frac{\sqrt{n^3}}{2\sqrt{n^3 + \log n}} = x \in \mathbb{R}$$

$$\sqrt[4]{\log n} = O(\log(\log n))$$

$f_n \qquad g_n$

$$3^n = o\left((2^2)^n\right) \quad 4^n$$

$$3^n = o\left(4^n\right)$$

$$3^n = o\left(4^n\right) \qquad (2^2)^n$$

$$\left(\frac{3}{4}\right)^n \xrightarrow{n \to +\infty} 0 \qquad 2^{2n}$$

$$2^n = \Theta\left(2^{n+\log n}\right)$$

$$2^n = \Theta\left(2^n \cdot 2^{\log n}\right)$$

$$2^{n+2} \geq \omega\left(2^{\frac{n}{2}}\right)$$

$$2^n \cdot 4 \leq \omega\left(\sqrt{2^n}\right)$$

$$\lim_{n} \frac{2^n}{n^2\sqrt{2}} = \frac{1}{n^2} \cdot \frac{2^n}{2^{\frac{n}{2}}} =$$

$$= \frac{2^{\frac{n}{2}}}{n^2} = \rightarrow +\infty$$

$$\frac{\sqrt{1^n}}{n^2} \to \frac{\dfrac{n}{\log n}}{\dfrac{n+3}{\log^3 n}} =$$

$$\frac{n}{\log n} = \omega\left(\frac{n+3}{\log^3 n}\right)$$

$$\frac{n}{\cancel{\log n}} \cdot \frac{\log^5 n}{n+3} = \frac{\cancel{n} \cdot \log^2 n}{\cancel{n}\left(1+\frac{3}{n}\right)} \to +\infty$$

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$$n^{\frac{1}{5}} \log n + \sqrt{\log n} = o\left(n^{\frac{1}{4}}\right)$$

$$5\sqrt{n} \cdot \log n = o\left(\sqrt[5]{n}\right)$$

$$2^{\sqrt{\log n}} = o\left(n^{\frac{1}{2}}\right)$$

$$\frac{n}{\log n} = \omega\left(\frac{n^{\frac{1}{3}}}{\log^3 n}\right)$$

$$2^n = \Theta\left(2^n + \log n\right)$$

$$\frac{m^3+\log m}{\sqrt{m}} = \Theta\left(m^{\frac{5}{2}}\right)$$

$$\Theta\left(\sqrt[2]{m^5}\right)$$

$$\frac{m^3+\log m}{\sqrt{m}\cdot\sqrt{m^5}} = \frac{m^3+\log m}{\sqrt{m^6}}$$

$$= \frac{m^3+\log m}{m^3} =$$

$$\frac{\cancel{m^3}\left(1+\frac{\log n}{\to 0\, n^3}\right)}{\cancel{m^3}} = 1$$

$$2^{n+2} = \Theta\left(2^{\frac{n}{2}}\right)$$

$$2^n \cdot 4 \overset{\nearrow}{=} \Theta\left(\sqrt{2^n}\right)$$

$$2^{2n} = \Theta\left(4^n + n^2\right)$$

$$\frac{4^n}{4^n + n^2} -$$

$$m + m^2 \log^2 m \overset{>}{=} O(m^2 \log m) \quad F$$

$$\frac{m + m^2 \log^2 m}{m^2 \log m} =$$

$$= \frac{m}{m^2 \log m} + \frac{\cancel{m^2} \log^2 m}{\cancel{m^2 \log m}}$$

$$= \underbrace{\frac{m}{m^2 \log m}}_{\to 0} + \underbrace{\log m}_{\to \infty} = \infty$$

$$2^{2n} = \omega\left(2^{1.9n}\right)$$

$$2n > 1{,}9n$$

$$\underset{>0}{\log^4 n} = o\left(\underset{>0}{\sqrt[9]{n}}\right)$$

$$2^n = \Theta\left(2^n + \left(\frac{3}{2}\right)^n\right)$$

$$\frac{\cancel{2^n}\,1}{\cancel{2^n}\left(1+\left(\frac{3}{4}\right)^n\right)} = 1$$

$$\frac{3}{4} \leq 1$$

$$\frac{\left(\frac{3}{2}\right)^n}{2^n} = \left(\frac{3}{4}\right)^n$$

$$n^2 \stackrel{?}{=} \Omega\left(\frac{n^2}{\log^{2001} n}\right)$$

$$\cancel{n^2} \cdot \frac{\log^{n} n}{\cancel{n^2}}$$

$$2^n = O\left(2^n + n^2\right)$$

$$\frac{\cancel{2^n}}{\cancel{2^n}\left(1 + \underbrace{\frac{n^2}{2^n}}_{\to 0}\right)} \underset{n \to +\infty}{=} 1$$

$$\frac{n\sqrt{n+\log n}}{\sqrt{n^3+3}} = \Theta(\log n)$$

$$\frac{n\sqrt{n+\log n}}{\log(n)\sqrt{n^3+3}} = \frac{n\sqrt{n}}{\log n\,\sqrt{n^3}} = \frac{\cancel{\sqrt{n^3}}}{\log\,\cancel{\sqrt{n^3}}}$$

$$2^n = \Theta(2^n \cdot 2^8)$$

$$n + n\sqrt{n}\log^2 n \overset{?}{=} o(n^{1.8})$$

$$\sqrt{n^3}\log^2 n < n^{1.8}$$

$$n^{\frac{3}{2}} = n^{1,5} \cdot \log n \log n$$

$$\frac{n^{1,5}\log^2 n}{n^{1,8}} = \frac{\log^2 n}{n^{0.3}} \to 0$$

$$\left(\frac{7}{3}\right)^n \overset{?}{=} \omega(2^n)$$

$$\left(\frac{7}{6}\right)^n \to +\infty$$

$$\frac{7}{3} > 2$$

$$n\sqrt{n}\log^2 n$$

$$\frac{\cancel{n^{\frac{3}{2}}}\log^2 n}{\cancel{n^{\frac{3}{2}}}}$$

$$\left(\frac{5}{3}\right)^n = o\left(2^n\right)$$

$$\frac{5}{3} < 2$$

$$\log^3(n) = \Theta(\log n)$$

$$\frac{\log^3\cancel{(n)}}{\cancel{\log(n)}} \xrightarrow{n \to +\infty} +\infty$$

$$\log^3 n = o(\sqrt[4]{n})$$

$$\frac{\frac{n}{n}}{\log\log\log(n)} = \frac{\cancel{n}}{\cancel{n}\log\log\log(n)}$$

$$\sqrt{n^4}$$

$$\frac{n^{\frac{3}{2}}\sqrt{n}+\log n}{\sqrt{n}\sqrt{n^3}} \underset{n\to+\infty}{=} \frac{n^2}{n^2}$$

$$\sqrt{n^4}$$

$$2^n = o\left(2^n \sqrt{\log n}\right)$$

$$\frac{\cancel{2^n}}{\cancel{2^n}\sqrt{\log n}} \overset{n \to +\infty}{=} 0$$

$$n + \sqrt{n} = \Theta\left(n - \sqrt{n}\right)$$

$$\frac{n+\sqrt{n}}{n-\sqrt{n}} = \frac{\cancel{n}\overbrace{\left(1 + \cancel{\frac{1}{\sqrt{n}}}\right)}^{1}}{\cancel{n}\underbrace{\left(1 - \cancel{\frac{1}{\sqrt{n}}}\right)}_{1}} = 1$$

$$2^n = \Theta\left(2^{2n}\right)$$

$$2^n = \Theta\left(4^n\right)$$

$$\frac{n^{\frac{3}{2}}\sqrt{n+\log n}}{\sqrt{n^3+3}} = \Theta(\sqrt{n})$$

$$\sim$$

$$\frac{\sqrt{n^3}\sqrt{n}}{\sqrt{3}\sqrt{n}} = \frac{\sqrt{n^4}}{\sqrt{n^4}} = \frac{n^2}{n^2} = 1$$

$$2^{n+2} = \Theta(2^n)$$

$$2^n \cdot \cancel{2} = \Theta(2^n)$$