

Interesting Limits

(1) $\lim_{x \rightarrow \infty} \frac{a^x}{x^\alpha}$, $a > 1$, $\alpha \in \mathbb{R}$.

(2) $\lim_{x \rightarrow \infty} \frac{\ln x}{x^\alpha}$, $\alpha > 0$.

(3) $\lim_{x \rightarrow 0} a^x$, $a > 0$.

(4) $\lim_{x \rightarrow \infty} \left(1 + \frac{1}{x}\right)^x$.

(5) $\lim_{x \rightarrow -\infty} \left(1 + \frac{1}{x}\right)^x$.

(6) $\lim_{x \rightarrow 0} (1+x)^{\frac{1}{x}}$.

(7) $\lim_{x \rightarrow 0} \frac{\ln(1+x)}{x}$.

(8) $\lim_{x \rightarrow 0} \frac{(1+x)^\alpha - 1}{x}$, $\alpha \in \mathbb{R}$.

(9) $\lim_{x \rightarrow 0} \frac{a^x - 1}{x}$, $a > 0$.

(10) $\lim_{x \rightarrow 0} (\ln x)^{\frac{1}{x}}$.

(11) $\lim_{x \rightarrow 0} (\cos x)^{\frac{1}{\sin^2 x}}$.

(12) $\lim_{x \rightarrow 0^+} (\sin x)^{\frac{1}{\ln x}}$.

(13) $\lim_{x \rightarrow 0^+} x^{\sin x}$.

(14) $\lim_{x \rightarrow \infty} (e^x - 1)^{\frac{1}{x}}$.

(15) $\lim_{x \rightarrow \infty} (\sqrt{x+2014} - \sqrt{x})$.

(16) $\lim_{x \rightarrow 0} \frac{\sin 2x + 2 \arctan 3x + 3x^2}{\ln(1+3x+\sin^2 x) + xe^x}$.

(17) $\lim_{x \rightarrow 0} \frac{\ln \cos x}{\tan x^2}$.

(18) $\lim_{x \rightarrow 0^+} \frac{\sqrt{1-e^{-x}} - \sqrt{1-\cos x}}{\sqrt{\sin x}}$.

(19) $\lim_{x \rightarrow 0} (1+x^2)^{\frac{1}{\tan x}}$.

(20) $\lim_{x \rightarrow \infty} \left(\tan \frac{\pi x}{2x+1}\right)^{\frac{1}{x}}$.

(21) $\lim_{x \rightarrow \infty} x \left(\ln\left(1 + \frac{x}{2}\right) - \ln \frac{x}{2}\right)$.

(22) $\lim_{x \rightarrow 0^+} \left(2 \sin \sqrt{x} + \sqrt{x} \sin \frac{1}{x}\right)^x$.

(23) $\lim_{x \rightarrow 0} \left(1 + xe^{-\frac{1}{x^2}} \sin \frac{1}{x^4}\right)^{e^{\left(\frac{1}{x^2}\right)}}$.

(24) $\lim_{x \rightarrow 0} \left(1 + e^{-\frac{1}{x^2}} \arctan \frac{1}{x^2} + xe^{-\frac{1}{x^2}} \sin \frac{1}{x^4}\right)^{e^{\left(\frac{1}{x^2}\right)}}$.