

1. $\lim_{x \rightarrow \frac{\pi}{2}} \frac{\cos(3x)}{\cos(x)} \rightarrow -3$
2. $\lim_{x \rightarrow 2} \frac{x^3 - 8}{x^2 - 4} \rightarrow 3$
3. $\lim_{x \rightarrow \infty} \frac{\ln(x)}{x^2} \rightarrow 0$
4. $\lim_{x \rightarrow 0} \frac{2^x - 4^x}{3^x - 6^x} \rightarrow 1$
5. $\lim_{x \rightarrow 1} \frac{\cos\left(\frac{\pi}{2}x\right)}{1 - \sqrt{x}} \rightarrow \pi$
6. $\lim_{x \rightarrow 0} \frac{\ln(\cos(4x))}{x \operatorname{tg}(2x)}$
7. $\lim_{x \rightarrow 0} \frac{e^x + e^{-x} - 2}{1 - \cos(2x)} \rightarrow \frac{1}{2}$
8. $\lim_{x \rightarrow 0} \frac{\ln(2 - e^{3x})}{\ln(2 - e^{5x})} \rightarrow \frac{3}{5}$
9. $\lim_{x \rightarrow 0} \frac{\ln(e^x - \cos(x))}{\ln(\sin(x))} \rightarrow 1$
10. $\lim_{x \rightarrow 0} \frac{\ln(\cos(2x))}{\sin(2x)} \rightarrow 0$
11. $\lim_{x \rightarrow 0} \frac{x - \operatorname{atan}(x)}{x^3} \rightarrow \frac{1}{3}$
12. $\lim_{x \rightarrow 0} \frac{e^{2x} - 1}{a \sin(3x)} \rightarrow \frac{2}{3}$
13. $\lim_{x \rightarrow 5} \frac{\sqrt[3]{x} - \sqrt[3]{5}}{\sqrt{x} - \sqrt{5}} \rightarrow \frac{2}{15} \cdot 5^{\frac{5}{6}}$
14. $\lim_{x \rightarrow 0} \frac{e^x - e^{-x} - 2x}{x - \sin(x)} \rightarrow 2$
15. $\lim_{x \rightarrow 0} \frac{e^x - e^{-x}}{\ln(1+x)} \rightarrow 2$
16. $\lim_{x \rightarrow \infty} \frac{\pi - 2 \operatorname{atan}(x)}{\frac{3}{e^x - 1}} \rightarrow \frac{2}{3}$
17. $\lim_{x \rightarrow 0} \frac{e^{3x} - 3x - 1}{\sin(5x)^2} \rightarrow \frac{9}{50}$
18. $\lim_{x \rightarrow \frac{\pi}{4}} \frac{\operatorname{ctan}(x) - 1}{\sin(4x)}$
19. $\lim_{x \rightarrow 0} \frac{\ln(1 + \sin(2x))}{\sin(3x)} \rightarrow \frac{2}{3}$
20. $\lim_{x \rightarrow 0} \frac{5^x - 1}{\ln(1+x)} \rightarrow \ln(5)$
21. $\lim_{x \rightarrow 0} \frac{1 - \cos(2x)}{\cos(5x) - \cos(3x)} \rightarrow \frac{-1}{4}$

$$22 \quad \lim_{x \rightarrow 0} \frac{\sqrt{9+x}-3}{3 \arctan(2x)} \rightarrow \frac{1}{36}$$

$$23 \quad \lim_{x \rightarrow 0} \frac{\sin(3x) \sin(5x)}{(x-x^3)^2} \rightarrow 15$$

$$24 \quad \lim_{x \rightarrow 0} \frac{(x - \arctan(x)) \cdot (1 + \cos(x)^2)}{5x^3 \cos(x)^2} \rightarrow \frac{2}{15}$$

$$25 \quad \lim_{x \rightarrow 0} \frac{(x - \sin(x)) \cdot (1 + \sin(x)^2)}{(e^x - e^{-x} - 2x)e^x} \rightarrow \frac{1}{2}$$

$$26 \quad \lim_{x \rightarrow 0} \left(\frac{1}{\sin(x)} - \frac{1}{x} \right) \rightarrow 0$$

$$27 \quad \lim_{x \rightarrow 0} \left(\arctan(x) - \frac{1}{x} \right)$$

$$28 \quad \lim_{x \rightarrow 1} \left(\frac{x}{x-1} - \frac{1}{\ln(x)} \right) \rightarrow \frac{1}{2}$$

$$29 \quad \lim_{x \rightarrow \infty} \left[x \left(1 - e^{\frac{1}{x}} \right) \right] \rightarrow -1$$

$$30 \quad \lim_{x \rightarrow \infty} (x^5 e^{-x}) \rightarrow 0$$

$$31 \quad \lim_{x \rightarrow 0} \left[(e^x + e^{-x} - 2) \arctan(x) \right] \rightarrow 0$$

$$32 \quad \lim_{x \rightarrow 0} (x \ln(x)^3) \rightarrow 0$$

$$33 \quad \lim_{x \rightarrow 0} \left(x^2 \cdot e^{\frac{1}{x^2}} \right) \rightarrow \infty$$

$$34 \quad \lim_{x \rightarrow \pi} \left[(\pi - x) \cdot \tan\left(\frac{x}{2}\right) \right] \rightarrow 2$$

$$35 \quad \lim_{x \rightarrow 1} [(x-1) \arctan[\pi(x-1)]] \rightarrow 0$$

$$36 \quad \lim_{x \rightarrow \infty} \left(x \sin\left(\frac{2}{x}\right) \right) \rightarrow 2$$

$$37 \quad \lim_{x \rightarrow 1+0} (\ln(x) \ln(x-1)) \rightarrow 0$$

$$38 \quad \lim_{x \rightarrow \infty} x \left(\ln\left(\frac{x+1}{x}\right) \right)$$

$$39 \quad \lim_{x \rightarrow 1+0} \left(\frac{1}{\ln(x)} - \frac{x}{\ln(x)} \right) \rightarrow -1$$

$$40 \quad \lim_{x \rightarrow 0} \left(\frac{1}{\arctan(x)} - \frac{1}{x} \right) \rightarrow 0$$

$$41 \quad \lim_{x \rightarrow 1} \left[\frac{1}{2(1-\sqrt{x})} - \frac{1}{3(1-\sqrt[3]{x})} \right] \rightarrow \frac{1}{12}$$

$$42 \quad \lim_{x \rightarrow \frac{\pi}{2}} \left(\frac{x}{\arctan(x)} - \frac{\pi}{2 \cos(x)} \right)$$

$$43 \quad \lim_{x \rightarrow 0} \left(\frac{1}{x^2} - \arctan(x)^2 \right) \rightarrow \infty$$

$$44 \quad \lim_{x \rightarrow \infty} \left(2 - \cos\left(\frac{1}{x}\right) \right)^{x^2} \rightarrow e^{\frac{1}{2}}$$

$$45 \quad \lim_{x \rightarrow \infty} \cos\left(\frac{5}{x}\right)^x \rightarrow 1$$

$$46 \quad \lim_{x \rightarrow 0} x^{\sin(x)} \rightarrow 1$$

$$47 \quad \lim_{x \rightarrow 0} \sin(x)^{\tan(x)} \rightarrow 1$$

$$48 \quad \lim_{x \rightarrow 0} x^{\frac{1}{\ln(e^x - 1)}} \rightarrow e$$

$$49 \quad \lim_{x \rightarrow \infty} x^{\frac{1}{x}} \rightarrow 1$$

$$50 \quad \lim_{x \rightarrow \infty} \left(x + 2^x \right)^{\frac{1}{x}} \rightarrow 2$$

$$51 \quad \lim_{x \rightarrow 0} \tan(x)^{\frac{1}{\ln(x)}} \rightarrow \frac{1}{e}$$

$$52 \quad \lim_{x \rightarrow 1} x^{\frac{1}{1-x}} \rightarrow e^{-1}$$

$$53 \quad \lim_{x \rightarrow \infty} \left(1 + \frac{1}{x^2} \right)^x \rightarrow 1$$

$$54 \quad \lim_{x \rightarrow 0} \cos(2x)^{\frac{3}{x^2}} \rightarrow e^{-6}$$

$$55 \quad \lim_{x \rightarrow 0} \left(e^x + x \right)^{\frac{1}{x}} \rightarrow e^2$$

$$56 \quad \lim_{x \rightarrow 3} \left(2 - \frac{x}{3} \right)^{\tan\left(\frac{\pi x}{6}\right)} \rightarrow e^{\frac{2}{\pi}}$$

$$57 \quad \lim_{x \rightarrow 0} \left(\frac{\sin(x)}{x} \right)^{\frac{1}{x^2}} \rightarrow e^{\frac{-1}{6}}$$

$$58 \quad \lim_{x \rightarrow 0} x^{\frac{5}{1+\ln(x)}} \rightarrow e^5$$

$$59 \quad \lim_{x \rightarrow \infty} \left(\frac{x}{x+1} \right)^x \rightarrow e^{-1}$$

$$60 \quad \lim_{x \rightarrow \infty} \left(\frac{x-1}{x+3} \right)^{x+2} \rightarrow e^{-4}$$

$$61 \quad \lim_{x \rightarrow \infty} \left(\frac{\frac{x^2}{x^2+2}}{\frac{x^2}{x^2-2}} \right)^{x^2} \rightarrow e^4$$

$$62 \quad \lim_{x \rightarrow 0} \left[\frac{\left(\frac{1}{(1+x)^x} \right)^{\frac{1}{x}}}{e} \right]^{\frac{1}{x}} \rightarrow e^{\frac{-1}{2}}$$