

Exercicis de càlcul de límits. Regla de l'Hôpital

1. $\lim_{x \rightarrow \frac{\pi}{4}} \frac{e^{\sin x} - e^{\cos x}}{\sin x - \cos x}$ (sol: $\sqrt[4]{e}$)
2. $\lim_{x \rightarrow +\infty} \frac{\ln x}{x^k}$ ($k > 0$) (sol: 0)
3. $\lim_{x \rightarrow 2} \frac{3x^2 + 2x - 16}{x^2 - x - 2}$ (sol: $\frac{13}{4}$)
4. $\lim_{x \rightarrow 0} \frac{3x^3 - x}{\sin x}$ (sol: -1)
5. $\lim_{x \rightarrow 1} \frac{x-1}{\sqrt{x}-1}$ (sol: 2)
6. $\lim_{x \rightarrow +\infty} \frac{e^x}{x^n}$ ($n \in \mathbb{N}$) (sol: $+\infty$)
7. $\lim_{x \rightarrow +\infty} \frac{\ln x}{e^x}$ (sol: 0)
8. $\lim_{x \rightarrow 0^+} x^2 \cdot \ln x$ (sol: 0)
9. $\lim_{x \rightarrow +\infty} e^{-x} \cdot x^2$ (sol: 0)
10. $\lim_{x \rightarrow +\infty} x \cdot \ln \left(\frac{x+3}{x-3} \right)$ (sol: 6)
11. $\lim_{x \rightarrow 0} \frac{\ln(\cos 3x)}{\ln(\cos 2x)}$ (sol: $\frac{9}{4}$)
12. $\lim_{x \rightarrow 0} \left(\frac{1}{x} - \frac{1}{e^x - 1} \right)$ (sol: $\frac{1}{2}$)
13. $\lim_{x \rightarrow 0} x^x$ (sol: 0)
14. $\lim_{x \rightarrow 0} x^{\frac{1}{\ln x}}$ (sol: e)
15. $\lim_{x \rightarrow 0} \frac{x - \tan x}{x - \sin x}$ (sol: -2)
16. $\lim_{x \rightarrow 1} \frac{\sqrt{x^2 + x - 2}}{x - 1}$ (sol: $+\infty$)
17. $\lim_{x \rightarrow +\infty} x \cdot \left(5^{\frac{1}{x}} - 1 \right)$ (sol: $\ln 5$)
18. $\lim_{x \rightarrow 0} \frac{1 - e^{2x}}{\ln(1+x)}$ (sol: -2)
19. $\lim_{x \rightarrow 0} \left(\frac{1}{x} - \frac{1}{\ln(x+1)} \right)$ (sol: $-\frac{1}{2}$)
20. $\lim_{x \rightarrow 1} \left(\frac{x}{x-1} - \frac{1}{\ln x} \right)$ (sol: $\frac{1}{2}$)
21. $\lim_{x \rightarrow +\infty} x \cdot \sin \left(\frac{a}{x} \right)$ (sol: a)
22. $\lim_{x \rightarrow +\infty} x^{\frac{1}{x}}$ (sol: 1)
23. $\lim_{x \rightarrow +\infty} \left(1 + \frac{3}{x} \right)^{2x}$ (sol: e^6)