

Využití L'Hospitalova pravidla pro výpočet limit funkcí

1. $\lim_{x \rightarrow 0} \frac{\sin x}{x}$ [1]
2. $\lim_{x \rightarrow 0} \frac{e^x - 1}{x}$ [1]
3. $\lim_{x \rightarrow 0} \frac{a^x - 1}{x}$ $[\ln a, a > 0, a \neq 1]$
4. $\lim_{x \rightarrow 0} \frac{1 - \cos x}{x \sin x}$ $\left[\frac{1}{2} \right]$
5. $\lim_{x \rightarrow 1} \frac{\cos(\pi x) + 1}{(x - 1)^2}$ $\left[\frac{\pi^2}{2} \right]$
6. $\lim_{x \rightarrow 0^+} \left(\frac{1}{x} - \frac{1}{\sin x} \right)$ [0]
7. $\lim_{x \rightarrow 0} \left(\frac{1}{\sin x} - \frac{1}{e^x - 1} \right)$ $\left[\frac{1}{2} \right]$
8. $\lim_{x \rightarrow 0^+} x \ln x$ [0]
9. $\lim_{x \rightarrow +\infty} \left(1 + \frac{1}{x} \right)^x = \left[\left(1 + \frac{1}{x} \right)^x = e^{\ln(1+\frac{1}{x})^x} = e^{x \ln(1+\frac{1}{x})} \right] = e^{x \rightarrow +\infty} x \ln \left(1 + \frac{1}{x} \right)$ [e]
10. $\lim_{x \rightarrow 0} (\cos x)^{\frac{1}{x^2}}$ $\left[\frac{1}{\sqrt{e}} \right]$
11. $\lim_{x \rightarrow 0^+} \left(\frac{1}{x} \right)^{\sin x}$ [1]
12. $\lim_{x \rightarrow 0} \frac{e^x - 1}{\sin 2x}$ $\left[\frac{1}{2} \right]$
13. $\lim_{x \rightarrow 1} \frac{x - 1}{\ln x}$ [1]
14. $\lim_{x \rightarrow +\infty} \frac{e^x}{x^3}$ $[+\infty]$
15. $\lim_{x \rightarrow 0^+} \frac{\ln x}{\cotg x}$ [0]
16. $\lim_{x \rightarrow 0} \frac{x - \sin x}{x^3}$ $\left[\frac{1}{6} \right]$
17. $\lim_{x \rightarrow +\infty} x e^{-x}$ [0]
18. $\lim_{x \rightarrow +\infty} (\pi - 2 \arctg x) \ln x$ [0]
19. $\lim_{x \rightarrow 0^+} \left(\frac{1}{x} - \cotg x \right)$ [0]
20. $\lim_{x \rightarrow 0} (\cos 3x)^{\frac{1}{x^2}}$ $\left[e^{-\frac{9}{2}} \right]$

Neurčitý a určitý integrál — vzorečky

Funkce:	Funkce primitivní:	Funkce:	Funkce primitivní:
$x^m \quad (m \in \mathbb{R}, m \neq -1)$	$\frac{x^{m+1}}{m+1}$	$\frac{1}{x}$	$\ln x $
e^x	e^x	a^x	$a^x / \ln a$
$\cos x$	$\sin x$	$\sin x$	$-\cos x$
$\frac{1}{\cos^2 x}$	$\operatorname{tg} x$	$-\frac{1}{\sin^2 x}$	$\operatorname{cotg} x$
$\frac{1}{1+x^2}$	$\arctg x$		

1. $\int 4x^{-3} dx = [-2x^{-2} + C]$
2. $\int \frac{x^3 - 2x + 1}{x^3} dx = \left[x - \frac{1}{2x^2} + \frac{2}{x} + C \right]$
3. $\int \frac{50}{(5t)^3} dt = \left[-\frac{1}{5t^2} + C \right]$
4. $\int \left(\frac{1-x}{x} \right)^2 dx = \left[x - 2 \ln|x| - \frac{1}{x} + C \right]$
5. $\int (x^3 - 3x^2 + 4x - 7) dx = \left[\frac{x^4}{4} - x^3 + 2x^2 - 7x + C \right]$
6. $\int \left(1 - \frac{1}{\sqrt[3]{x}} \right)^2 dx = \left[x - 3x^{\frac{2}{3}} + 3x^{\frac{1}{3}} + C \right]$
7. $\int \sqrt{x}(1-x^2) dx = \left[\frac{2}{3}x^{\frac{3}{2}} - \frac{2}{7}x^{\frac{7}{2}} + C \right]$
8. $\int \frac{2-x^2}{x-\sqrt{2}} dx = \left[2-x^2 = (\sqrt{2}-x)(\sqrt{2}+x) \right] = \left[\sqrt{2}x - \frac{x^2}{2} + C \right]$
9. $\int (8 \cos \alpha - 3 \sin \alpha) d\alpha = [8 \sin \alpha + 3 \cos \alpha + C]$
10. $\int \left(\sin x - \frac{1}{\cos^2 x} \right) dx = [-\cos x - \operatorname{tg} x + C]$
11. $\int \frac{5 \sin^2 \Omega + 3 \cos^2 \Omega}{2 \sin^2 \Omega \cos^2 \Omega} d\Omega = \left[\frac{5}{2} \operatorname{tg} \Omega - \frac{3}{2} \operatorname{cotg} \Omega + C \right]$
12. $\int \frac{3 - 2 \operatorname{cotg}^2 x}{\cos^2 x} dx = [3 \operatorname{tg} x + 2 \operatorname{cotg} x + C]$
13. $\int e^u \left(1 + \frac{e^{-u}}{\cos^2 u} \right) du = [e^u + \operatorname{tg} u + C]$
14. $\int \frac{5}{9+9t^2} dt = \left[\frac{5}{9} \arctg t + C \right]$