Tablica derivacija

$c' = 0 \qquad (c \in \mathbb{R}$ konstanta$)$

$x' = 1$

$(x^n)' = nx^{n-1} \qquad (n \in \mathbb{Z})$

$(x^a)' = ax^{a-1} \qquad (a \in \mathbb{R},\ x > 0)$

$(\sqrt{x})' = \dfrac{1}{2\sqrt{x}} \qquad (x > 0)$

$(\sin x)' = \cos x$

$(\cos x)' = -\sin x$

$(\operatorname{tg} x)' = \dfrac{1}{\cos^2 x}$

$(\operatorname{ctg} x)' = -\dfrac{1}{\sin^2 x}$

$(\arcsin x)' = \dfrac{1}{\sqrt{1-x^2}} \qquad (|x| < 1)$

$(\arccos x)' = -\dfrac{1}{\sqrt{1-x^2}} \qquad (|x| < 1)$

$(\operatorname{arctg} x)' = \dfrac{1}{1+x^2}$

$(\operatorname{arcctg} x)' = -\dfrac{1}{1+x^2}$

$(a^x)' = a^x \ln a \qquad (a > 0)$

$(e^x)' = e^x$

$(\log_a x)' = \dfrac{1}{x \ln a} \qquad (a > 0,\ a \neq 1,\ x > 0)$

$(\ln x)' = \dfrac{1}{x} \qquad (x > 0)$

$(\operatorname{sh} x)' = \operatorname{ch} x$

$(\operatorname{ch} x)' = \operatorname{sh} x$

$(\operatorname{th} x)' = \dfrac{1}{\operatorname{ch}^2 x}$

$(\operatorname{cth} x)' = -\dfrac{1}{\operatorname{sh}^2 x}$

$(\operatorname{Arsh} x)' = \dfrac{1}{\sqrt{1+x^2}}$

$(\operatorname{Arch} x)' = \dfrac{1}{\sqrt{x^2-1}} \qquad (x > 1)$

$(\operatorname{Arth} x)' = \dfrac{1}{1-x^2} \qquad (|x| < 1)$

$(\operatorname{Arcth} x)' = \dfrac{1}{1-x^2} \qquad (|x| > 1)$

Pravila deriviranja

$(u(x) \pm v(x))' = u'(x) \pm v'(x)$

$(c \cdot u(x))' = c \cdot u'(x)$

$(u(x) \cdot v(x))' = u'(x)v(x) + u(x)v'(x)$

$$\left(\frac{u(x)}{v(x)}\right)' = \frac{u'(x)v(x) - u(x)v'(x)}{v(x)^2}$$

$$\left(\frac{1}{v(x)}\right)' = -\frac{v'(x)}{v(x)^2}$$

$$\Big(f(g(x))\Big)' = f'(g(x)) \cdot g'(x)$$

Derivacije višeg reda

$(a^x)^{(n)} = a^x \ln^n a \qquad (a > 0)$

$(\sin x)^{(n)} = \sin\left(x + \frac{n\pi}{2}\right)$

$(\cos x)^{(n)} = \cos\left(x + \frac{n\pi}{2}\right)$

$$(\operatorname{sh} x)^{(n)} = \begin{cases} \operatorname{sh} x, & n \text{ paran} \\ \operatorname{ch} x, & n \text{ neparan} \end{cases}$$

$$(\operatorname{ch} x)^{(n)} = \begin{cases} \operatorname{ch} x, & n \text{ paran} \\ \operatorname{sh} x, & n \text{ neparan} \end{cases}$$

$(x^m)^{(n)} = m(m-1)\cdots(m-n+1)x^{m-n} \ (m \in \mathbb{Z})$

$(u \cdot v)^{(n)}(x) = \sum_{k=0}^{n} \binom{n}{k} u^{(k)}(x) \cdot v^{(n-k)}(x)$

Tablica integrala

$$\int dx = x + C$$

$$\int x^a\, dx = \frac{x^{a+1}}{a+1} + C \qquad (a \neq -1)$$

$$\int \frac{dx}{x} = \ln|x| + C$$

$$\int e^x\, dx = e^x + C$$

$$\int a^x\, dx = \frac{a^x}{\ln a} + C \qquad (a > 0,\ a \neq 1)$$

$$\int \cos x\, dx = \sin x + C$$

$$\int \sin x\, dx = -\cos x + C$$

$$\int \frac{dx}{\cos^2 x} = \operatorname{tg} x + C$$

$$\int \frac{dx}{\sin^2 x} = -\operatorname{ctg} x + C$$

$$\int \operatorname{ch} x\, dx = \operatorname{sh} x + C$$

$$\int \operatorname{sh} x\, dx = \operatorname{ch} x + C$$

$$\int \frac{dx}{\operatorname{ch}^2 x} = \operatorname{th} x + C$$

$$\int \frac{dx}{\operatorname{sh}^2 x} = -\operatorname{cth} x + C$$

$$\int \frac{dx}{\sqrt{1-x^2}} = \arcsin x + C$$

$$\int \frac{dx}{1+x^2} = \operatorname{arctg} x + C$$

$$\int \frac{dx}{\sqrt{1+x^2}} = \operatorname{Arsh} x + C = \ln\left(x + \sqrt{1+x^2}\right) + C$$

$$\int \frac{dx}{\sqrt{x^2-1}} = \operatorname{Arch} x + C = \ln\left|x + \sqrt{x^2-1}\right| + C$$

$$\int \frac{dx}{\sqrt{a^2-x^2}} = \arcsin\frac{x}{a} + C \qquad (a > 0)$$

$$\int \frac{dx}{a^2+x^2} = \frac{1}{a}\operatorname{arctg}\frac{x}{a} + C \qquad (a > 0)$$

$$\int \frac{dx}{\sqrt{a^2+x^2}} = \ln\left(x + \sqrt{a^2+x^2}\right) + C \qquad (a > 0)$$

$$\int \frac{dx}{\sqrt{x^2-a^2}} = \ln\left|x + \sqrt{x^2-a^2}\right| + C \qquad (a > 0)$$

$$\int \frac{dx}{a^2-x^2} = \frac{1}{2a}\ln\left|\frac{x+a}{x-a}\right| + C \qquad (a > 0)$$

Tablica limesa

$$\lim_{x\to 0}\frac{\sin x}{x}=1 \qquad \lim_{x\to 0}\frac{\operatorname{sh} x}{x}=1$$

$$\lim_{x\to 0}\frac{1-\cos x}{x^2}=\frac{1}{2} \qquad \lim_{x\to 0}\frac{\operatorname{ch} x-1}{x^2}=\frac{1}{2}$$

$$\lim_{x\to 0}(1+x)^{\frac{1}{x}}=e \qquad \lim_{x\to\pm\infty}\left(1+\frac{1}{x}\right)^x=e$$

$$\lim_{x\to 0}\frac{e^x-1}{x}=1 \qquad \lim_{x\to 0}\frac{\ln(1+x)}{x}=1$$

$$\lim_{x\to 0}\frac{a^x-1}{x}=\ln a \quad (a>0) \qquad \lim_{x\to 0}\frac{(1+x)^a-1}{x}=a \quad (a\in\mathbb{R})$$

$$\lim_{x\to +\infty}\frac{x^p}{a^x}=0 \quad (p\in\mathbb{R},\ a>1)$$

$$\lim_{x\to\pm\infty}\frac{a_m x^m+a_{m-1}x^{m-1}+\cdots+a_1x+a_0}{b_n x^n+b_{n-1}x^{n-1}+\cdots+b_1x+b_0}=\begin{cases}\frac{a_m}{b_n} & \text{kada je } m=n\\ 0 & \text{kada je } m<n\\ \pm\infty & \text{kada je } m>n\end{cases}$$

$(m,n\in\mathbb{N}_0,\quad a_0,\ldots,a_m,b_0,\ldots,b_n\in\mathbb{R},\quad a_m,b_n\neq 0)$

Limesi oblika $\lim\limits_{x\to c}\varphi(x)^{\psi(x)}$

Neka je $\lim\limits_{x\to c}\varphi(x)=A,\ 0<A\le+\infty,\ \lim\limits_{x\to c}\psi(x)=B,\ -\infty\le B\le+\infty,$ pri čemu je $-\infty\le c\le+\infty$.

1° Ako je $B\in\mathbb{R}$, onda vrijedi

$$\lim_{x\to c}\varphi(x)^{\psi(x)}=A^B$$

2° Ako je $A\neq 1,\ B=\pm\infty$, onda vrijedi

$$\lim_{x\to c}\varphi(x)^{\psi(x)}=\begin{cases}+\infty & \text{kada je } A<1,\ B=-\infty\\ 0 & \text{kada je } A<1,\ B=+\infty\\ 0 & \text{kada je } A>1,\ B=-\infty\\ +\infty & \text{kada je } A>1,\ B=+\infty\end{cases}$$

3° Ako je $A=1,\ B=\pm\infty$, onda se limes računa po formuli

$$\lim_{x\to c}\varphi(x)^{\psi(x)}=e^{\lim_{x\to c}(\varphi(x)-1)\psi(x)}$$