Taylorove formule:

1) $\ln(1+x) = x - \frac{x^2}{2} + \frac{x^3}{3} + \ldots + (-1)^{n-1}\frac{x^n}{n} + R_n(x)$

$0 \le x < 1$: $|R_n(x)| \le \frac{x^{n+1}}{n+1}$,

$-1 < x < 0$: $|R_n(x)| \le \frac{|x|^{n+1}}{(n+1)(1+x)}$.

2) $\sin x = x - \frac{x^3}{3!} + \frac{x^5}{5!} + \ldots + (-1)^{m-1}\frac{x^{2m-1}}{(2m-1)!} + R_{2m-1}(x)$

$x \in \mathbb{R}$: $|R_{2m-1}(x)| \le \frac{|x|^{2m+1}}{(2m+1)!}$.

3) $\cos x = 1 - \frac{x^2}{2} + \frac{x^4}{4!} + \ldots + (-1)^m\frac{x^{2m}}{(2m)!} + R_{2m}(x)$

$x \in \mathbb{R}$: $|R_{2m}(x)| \le \frac{|x|^{2m+2}}{(2m+2)!}$.

4) $e^x = 1 + x + \frac{x^2}{2} + \ldots + \frac{x^n}{n!} + R_n(x)$

$x \ge 0$: $|R_n(x)| \le \frac{e^x x^{n+1}}{(n+1)!}$,

$x < 0$: $|R_n(x)| \le \frac{|x|^{n+1}}{(n+1)!}$.

5) $\operatorname{arctg}(x) = x - \frac{x^3}{3} + \frac{x^5}{5} \ldots + (-1)^{m-1}\frac{x^{2m-1}}{2m-1} + R_{2m-1}(x)$

$-1 \le x \le 1$: $|R_{2m-1}(x)| \le \frac{|x|^{2m+1}}{2m+1}$.

6) $(1+x)^s = 1 + sx + \frac{s(s-1)}{2}x^2 + \ldots + \frac{s(s-1)\cdots(s-n+1)}{n!}x^n + R_n(x)$, $(s \in \mathbb{R}\setminus\mathbb{N})$

$-1 < x \le 0$, $n > s-1$: $|R_n(x)| \le \frac{|s(s-1)\cdots(s-n)|}{(n+1)!}(1+x)^{s-n-1}|x|^{n+1}$,

$0 \le x \le 1$, $n > s-1$: $|R_n(x)| \le \frac{|s(s-1)\cdots(s-n)|}{(n+1)!}x^{n+1}$.

Vrijednosti sinusa i kosinusa

φ	0	$\frac{\pi}{6}$	$\frac{\pi}{4}$	$\frac{\pi}{3}$	$\frac{\pi}{2}$
$\sin\varphi$	0	$\frac{1}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{2}$	1
$\cos\varphi$	1	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{1}{2}$	0

Adicijski teoremi

$$\begin{aligned}
\sin(x \pm y) &= \sin x \cos y \pm \cos x \sin y \\
\cos(x \pm y) &= \cos x \cos y \mp \sin x \sin y \\
\operatorname{tg}(x \pm y) &= \frac{\operatorname{tg} x \pm \operatorname{tg} y}{1 \mp \operatorname{tg} x \operatorname{tg} y} \\
\operatorname{ctg}(x \pm y) &= \frac{\operatorname{ctg} x \operatorname{ctg} y \mp 1}{\operatorname{ctg} y \pm \operatorname{ctg} x}
\end{aligned}$$

Funkcije višestrukih argumenata

$$\begin{aligned}
\sin 2x &= 2 \sin x \cos x \\
\cos 2x &= \cos^2 x - \sin^2 x \\
\operatorname{tg} 2x &= \frac{2 \operatorname{tg} x}{1 - \operatorname{tg}^2 x} \\
\operatorname{ctg} 2x &= \frac{\operatorname{ctg}^2 x - 1}{2 \operatorname{ctg} x}
\end{aligned}$$

Formule pretvorbe

$$\sin x \cos y = \tfrac{1}{2}(\sin(x+y) + \sin(x-y))$$

$$\cos x \cos y = \tfrac{1}{2}(\cos(x+y) + \cos(x-y))$$

$$\sin x \sin y = \tfrac{1}{2}(\cos(x-y) - \cos(x+y))$$

$$\sin x + \sin y = 2 \sin \tfrac{x+y}{2} \cos \tfrac{x-y}{2}$$

$$\sin x - \sin y = 2 \cos \tfrac{x+y}{2} \sin \tfrac{x-y}{2}$$

$$\cos x + \cos y = 2 \cos \tfrac{x+y}{2} \cos \tfrac{x-y}{2}$$

$$\cos x - \cos y = -2 \sin \tfrac{x+y}{2} \sin \tfrac{x-y}{2}$$

Funkcije polovičnih argumenata

$$\begin{aligned}
\sin^2 \tfrac{x}{2} &= \frac{1 - \cos x}{2} \\
\cos^2 \tfrac{x}{2} &= \frac{1 + \cos x}{2}
\end{aligned}$$

Neke važne formule

$$\begin{aligned}
\sin^2 x &= \frac{\operatorname{tg}^2 x}{1 + \operatorname{tg}^2 x} \\
\cos^2 x &= \frac{1}{1 + \operatorname{tg}^2 x} \\
\sin x &= \frac{2 \operatorname{tg} \frac{x}{2}}{1 + \operatorname{tg}^2 \frac{x}{2}} \\
\cos x &= \frac{1 - \operatorname{tg}^2 \frac{x}{2}}{1 + \operatorname{tg}^2 \frac{x}{2}}
\end{aligned}$$

Tablica derivacija

$f(x)$	$f'(x)$	$f(x)$	$f'(x)$
x^a	ax^{a-1}	$\ln x$	$\frac{1}{x}$
$\sin x$	$\cos x$	$\log_a x$	$\frac{1}{x \ln a}$
$\cos x$	$-\sin x$	$\operatorname{sh} x$	$\operatorname{ch} x$
$\operatorname{tg} x$	$\frac{1}{\cos^2 x}$	$\operatorname{ch} x$	$\operatorname{sh} x$
$\operatorname{ctg} x$	$-\frac{1}{\sin^2 x}$	$\operatorname{th} x$	$\frac{1}{\operatorname{ch}^2 x}$
$\arcsin x$	$\frac{1}{\sqrt{1-x^2}}$	$\operatorname{cth} x$	$-\frac{1}{\operatorname{sh}^2 x}$
$\arccos x$	$-\frac{1}{\sqrt{1-x^2}}$	$\operatorname{arsh} x$	$\frac{1}{\sqrt{1+x^2}}$
$\operatorname{arctg} x$	$\frac{1}{1+x^2}$	$\operatorname{arch} x$	$\frac{1}{\sqrt{x^2-1}}$
$\operatorname{arcctg} x$	$-\frac{1}{1+x^2}$	$\operatorname{arth} x$	$\frac{1}{1-x^2}$
e^x	e^x	$\operatorname{arcth} x$	$\frac{1}{1-x^2}$
a^x	$a^x \ln a$		

Tablica integrala

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

$$\int x^\alpha dx = \frac{x^{\alpha+1}}{\alpha+1} + C, \alpha \in \mathbf{R} \setminus \{-1\}$$

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

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

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

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

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

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

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

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

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

$$\int \frac{dx}{\sqrt{x^2+A}} = \ln|x + \sqrt{x^2+A}| + C,\ A \neq 0$$

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

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

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

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

$$\int \frac{dx}{\sin x} = \ln|\operatorname{tg} \tfrac{x}{2}| + C$$

$$\int \frac{dx}{\cos x} = \ln|\operatorname{tg}(\tfrac{x}{2} + \tfrac{\pi}{4})| + C.$$

Tablica limesa

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

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

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

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

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

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

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

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

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

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

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

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