$$e^x = 1+\frac{x}{1!}+\frac{x^2}{2!}+\frac{x^3}{3!}+\ldots+\frac{x^n}{n!}+\ldots, |x|<\infty,$$

$$(uv)^{(n)} = \sum_{k=0}^{n} C_n^k u^{(n-k)} v^{(k)}$$

$$\sin x = \frac{x}{1!}-\frac{x^3}{3!}+\frac{x^5}{5!}-\ldots+\frac{(-1)^{n+1}x^{2n-1}}{(2n-1)!}-\ldots, |x|<\infty,$$

$$C_n^k = \frac{n!}{(n-k)!\,k!}$$

$$(u+v)' = u'+v'$$

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

$$(c\cdot u)' = c\cdot u', c - const$$

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

$$\cos x = 1-\frac{x^2}{2!}+\frac{x^4}{4!}-\frac{x^6}{6!}+\ldots+\frac{(-1)^{n+1}x^{2n}}{(2n)!}-\ldots, |x|<\infty,$$

$$\ln(1+x) = \frac{x}{1}-\frac{x^2}{2}+\frac{x^3}{3}-\ldots+\frac{(-1)^{n+1}x^n}{n}-\ldots, x\in(-1;1],$$

$$(1+x)^\alpha = 1+\frac{\alpha}{1!}x+\frac{\alpha(\alpha-1)}{2!}x^2+\frac{\alpha(\alpha-1)(\alpha-2)}{3!}x^3+\ldots+\frac{\alpha(\alpha-1)\ldots(\alpha-n+1)x^n}{n!}+\ldots, |x|<1,$$

$$\operatorname{arctg} x = x-\frac{x^3}{3}+\frac{x^5}{5}-\frac{x^7}{7}+\cdots+\frac{(-1)^{n-1}x^{2n-1}}{2n-1}-\cdots, |x|\le 1,$$

$$\tanh(x) = -1-2\sum_{k=1}^{\infty}(-1)^k q^{2k}\quad x-\frac{x^3}{3}+\frac{2x^5}{15}$$

$$y''_{xx} = \frac{y''_{tt}x'_t - x''_{tt}y'_t}{(x'_t)^3}$$

$$\frac{1}{1-x} = 1+x+x^2+\cdots+x^n+\cdots, |x|<1,$$

$$\frac{1}{1+x} = 1-x+x^2-\cdots+(-1)^n x^n+\cdots, |x|<1,$$

$$\cos^2\alpha = \frac{1+\cos 2\alpha}{2},$$

$$\sin^2\alpha = \frac{1-\cos 2\alpha}{2}$$

$$\sin^2\alpha+\cos^2\alpha = 1$$

$$tg\,\alpha\cdot ctg\,\alpha = 1$$

$$tg^2\alpha+1 = \frac{1}{\cos^2\alpha}$$

$$ctg^2\alpha+1 = \frac{1}{\sin^2\alpha}$$

$$\frac{e^x - e^{-x}}{2}\qquad \operatorname{sh} x = x+\frac{x^3}{3!}+\frac{x^5}{5!}+\ldots+\frac{x^{2n-1}}{(2n-1)!}+\ldots, |x|<\infty,$$

$$\frac{e^x + e^{-x}}{2}\qquad \operatorname{ch} x = 1+\frac{x^2}{2!}+\frac{x^4}{4!}+\ldots+\frac{x^{2n}}{(2n)!}+\ldots, |x|<\infty,$$

$$\ln\frac{1+x}{1-x} = 2\left(x+\frac{x^3}{3}+\frac{x^5}{5}+\ldots+\frac{x^{2n-1}}{2n-1}+\ldots\right), |x|<1,$$

$$\frac{1}{(1-x)^2} = 1+2x+3x^2+\cdots+(n+1)x^n+\cdots, |x|<1$$

$$\sin 2\alpha = 2\sin\alpha\cos\alpha$$

$$\cos 2\alpha = \cos^2\alpha-\sin^2\alpha$$

$$tg\,2\alpha = \frac{2tg\,\alpha}{1-tg^2\alpha}$$

Формулы сложения и вычитания

$$\cos(\alpha+\beta) = \cos\alpha\cos\beta-\sin\alpha\sin\beta$$

$$\cos(\alpha-\beta) = \cos\alpha\cos\beta+\sin\alpha\sin\beta$$

$$\sin(\alpha+\beta) = \sin\alpha\cos\beta+\cos\alpha\sin\beta$$

$$\sin(\alpha-\beta) = \sin\alpha\cos\beta-\cos\alpha\sin\beta$$

Формулы половинного угла

$$\sin^2\frac{\alpha}{2} = \frac{1-\cos\alpha}{2}$$

$$\cos^2\frac{\alpha}{2} = \frac{1+\cos\alpha}{2}$$

$$tg^2\frac{\alpha}{2} = \frac{1-\cos\alpha}{1+\cos\alpha}$$

Формулы суммы и разности синусов и косинусов

$$\sin\alpha+\sin\beta = 2\sin\frac{\alpha+\beta}{2}\cos\frac{\alpha-\beta}{2}$$

$$\sin\alpha-\sin\beta = 2\sin\frac{\alpha-\beta}{2}\cos\frac{\alpha+\beta}{2}$$

$$\cos\alpha+\cos\beta = 2\cos\frac{\alpha+\beta}{2}\cos\frac{\alpha-\beta}{2}$$

$$\cos\alpha-\cos\beta = -2\sin\frac{\alpha+\beta}{2}\sin\frac{\alpha-\beta}{2}$$

$$\arccos x = \frac{\pi}{2}-\arcsin x = \frac{\pi}{2}-\sum_{n=0}^{\infty}\frac{(2n)!}{4^n(n!)^2(2n+1)}x^{2n+}$$

$$\arcsin x = x+\frac{x^3}{6}+\frac{3x^5}{40}+\cdots = \sum_{n=0}^{\infty}\frac{(2n)!}{4^n(n!)^2(2n+1)}x^{2n+1}$$

$$\frac{d}{dx}(x^x) = x^x(\log(x)+1)$$

$$\tan(x) = x+\frac{x^3}{3}+\frac{2x^5}{15}$$

$$C' = 0$$

$$(tgx)' = \frac{1}{\cos^2 x}$$

$$(x^p)^{(n)} = p(p-1)(p-2)\ldots(p-n+1)x^{p-n}$$

$$x' = 1$$

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

$$(a^{kx+b})^{(n)} = k^n a^{kx+b}\ln^n a$$

$$(\sqrt{x})' = \frac{1}{2\sqrt{x}}$$

$$(\arcsin x)' = \frac{1}{\sqrt{1-x^2}}$$

$$(e^{kx+b})^{(n)} = k^n e^{kx+b}$$

$$(a^x)' = a^x\ln a$$

$$(\arccos x)' = -\frac{1}{\sqrt{1-x^2}}$$

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

$$(x^\alpha)' = \alpha\cdot x^{\alpha-1}, x\in$$

$$(arctg\,x)' = \frac{1}{1+x^2}$$

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

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

$$(arcctg\,x)' = -\frac{1}{1+x^2}$$

$$((ax+b)^p)^{(n)} = a^n p(p-1)(p-2)\ldots(p-n+1)(ax+b)^{p-n}$$

$$(\log_a x)' = \frac{1}{x\cdot\ln a}$$

$$(sh\,x)' = ch\,x$$

$$(\log_a|x|)^{(n)} = \frac{(-1)^{n-1}(n-1)!}{x^n\ln a}$$

$$(\ln x)' = \frac{1}{x}$$

$$(ch\,x)' = sh\,x$$

$$(\ln|x|)^{(n)} = \frac{(-1)^{n-1}(n-1)!}{x^n}$$

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

$$(th\,x)' = \frac{1}{ch^2 x}$$

$$(\alpha u(x)+\beta v(x))^{(n)} = \alpha u^{(n)}(x)+\beta^{(n)}v(x)$$

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

$$(cth\,x)' = -\frac{1}{sh^2 x}$$

$$\lim_{x\to 0}\frac{o(x^n)}{x^n}=0;$$

0!= 1   C из (-1) по k = (-1)^k

$x^{n+1}=o(x^n)$;

$o(x^m)=o(x^n)$, если $m\geqslant n$;

$x^m\cdot o(x^n)=o(x^{m+n})$;

$o(x^m)\cdot o(x^n)=o(x^{m+n})$;

$(o(x^n))^m=o(x^{m\cdot n})$;

$o(x^m)\pm o(x^n)=o(x^p)$, где $p=\min(m,n)$;

$o(c\cdot x^n)=c\cdot o(x^n)=o(x^n)$, где $c\neq 0$ – пос

$o(x^n+o(x^n))=o(x^n)$.

В сумме не должно быть той же степени t, что есть вне суммы
Не забыть f(0)!!! В Тейлоре

$\log_a xy=\log_a x+\log_a y$;

$\log_a \frac{x}{y}=\log_a x-\log_a y$;

$\log_a x^p = p\log_a x$;

$\log_{a^z} x=\frac{1}{z}\log_a x$;

$\log_a x=\frac{\log_b x}{\log_b a}$;

$a^{\log_a b}=b$.

$$C_{-1}^{k}=\frac{(-1)(-1-1)\cdot\ldots\cdot(-1-k+1)}{k!}=$$

$$=\frac{(-1)(-2)\ldots(-n)}{n!}=(-1)^k$$

$$C_{-\frac{1}{2}}^{k}=\frac{\left(-\frac{1}{2}\right)\left(-\frac{3}{2}\right)\cdot\ldots\cdot\left(-\frac{1}{2}-k+1\right)^{=-\frac{2k-1}{2}}}{k!}=$$

$$=\frac{(-1)^k 1\cdot 3\cdot\ldots(2k-1)}{k!\cdot 2^k}=\frac{(-1)^k(2k-1)!!}{k!\,2^k}$$

2-йной факт