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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

$$\mathrm{tg}\,\alpha \cdot \mathrm{ctg}\,\alpha = 1$$

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

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

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

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

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

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

Формулы суммы и разности синусов и косинусов

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

$$C' = 0$$

$$x' = 1$$

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

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

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

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

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

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

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

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

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

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

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

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

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

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

$$(\mathrm{sh}\, x)' = \mathrm{ch}\, x$$

$$(\mathrm{ch}\, x)' = \mathrm{sh}\, x$$

$$(\mathrm{th}\, x)' = \frac{1}{\mathrm{ch}^2 x_1}$$

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

$\lim\limits_{x \to 0} \dfrac{o(x^n)}{x^n} = 0;$ **0**!= 1 С из (-1) по k = (-1)^k

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

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

$o(x^m) = o(x^n)$, 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

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

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

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

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

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

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

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

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

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

$-\frac{1}{2}-k+1 = -\frac{2k-1}{2}$

2-йной факт