

Основни граници

$$\lim_{x \rightarrow 0} \frac{\sin x}{x} = 1$$

$$\lim_{t(x) \rightarrow 0} \frac{\operatorname{tg} t(x)}{t(x)} = 1$$

$$\lim_{x \rightarrow 0} \frac{a^x - 1}{x} = \ln a$$

$$\lim_{t(x) \rightarrow 0} \frac{\sin t(x)}{t(x)} = 1$$

$$\lim_{x \rightarrow 0} \frac{\operatorname{arctg} x}{x} = 1$$

$$\lim_{x \rightarrow 0} \frac{e^x - 1}{x} = 1$$

$$\lim_{x \rightarrow 0} \frac{\arcsin x}{x} = 1$$

$$\lim_{x \rightarrow 0} \frac{\ln(1+x)}{x} = 1$$

$$\lim_{x \rightarrow \infty} \left(1 + \frac{1}{x}\right)^x = e$$

$$\lim_{x \rightarrow 0} \frac{\operatorname{tg} x}{x} = 1$$

$$\lim_{x \rightarrow 0} \frac{(1+x)^p - 1}{x} = p$$

$$\lim_{x \rightarrow 0} (1+x)^{\frac{1}{x}} = e$$

$$\ln(1+x) \sim x + o(x)$$

$$\sin x \sim x + o(x)$$

Основни производни

$$(\operatorname{const})' = 0$$

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

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

$$(x^n)' = nx^{n-1}$$

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

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

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

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

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

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

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

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

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

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

Производни от n-ти ред

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

$$(a^x)^{[n]} = a^x \ln^n a$$

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

$$(x^a)^{[n]} : \quad 0 < a < n \Rightarrow 0 \quad a = n \Rightarrow n! \quad a > n \Rightarrow a(a-1)(a-2) \dots (a-n+1)x^{a-n}$$

$$a < 0 \Rightarrow (-1)^n a(a+1)(a+2) \dots (a+n-1) \frac{1}{x^{a+n}}$$

Формула на Лайбниц

$$(f(x) * g(x))^{[n]} = \sum_{k=0}^n \binom{n}{k} f(x)^{[n-k]} g(x)^{[k]}$$

Таблчини неопределени интеграли

$$\begin{array}{lll} \int e^x dx = e^x + c & \int \frac{1}{\cos^2 x} dx = \operatorname{tg} x + c & \int \frac{1}{1+x^2} dx = \operatorname{arctg} x + c \\ \int x^n dx = \frac{x^{n+1}}{n+1} + c \quad n \neq -1 & \int -\frac{1}{\sin^2 x} dx = \operatorname{ctg} x + c & \int -\frac{1}{1+x^2} dx = \operatorname{arctg} x + c \\ \int \sin x dx = -\cos x + c & \int \frac{1}{\sqrt{1-x^2}} dx = \operatorname{arcsin} x + c & \int \frac{1}{x} dx = \ln |x| + c \\ \int \cos x dx = \sin x + c & \int -\frac{1}{\sqrt{1-x^2}} dx = \operatorname{arccos} x + c & \int \frac{1}{\sqrt{x^2 \pm a^2}} dx = \ln \left| x + \sqrt{x^2 \pm a^2} \right| + c \end{array}$$

Интегриране по части

$$\int f(x) d(g(x)) = f(x) * g(x) - \int g(x) d(f(x))$$