

### Таблица производных

1.  $(C)' = 0$
2.  $(x)' = 1$
3.  $(x^2)' = 2x$
4.  $(\sqrt{x})' = \frac{1}{2\sqrt{x}}$
5.  $\left(\frac{1}{x}\right)' = -\frac{1}{x^2}$
6.  $(x^n)' = n \cdot x^{n-1}$
7.  $(e^x)' = e^x$
8.  $(a^x)' = a^x \cdot \ln a$

9.  $(\ln x)' = \frac{1}{x}$
10.  $(\log_a x)' = \frac{1}{x \ln a}$
11.  $(\sin x)' = \cos x$
12.  $(\cos x)' = -\sin x$
13.  $(\operatorname{tg} x)' = \frac{1}{\cos^2 x}$
14.  $(\operatorname{ctg} x)' = -\frac{1}{\sin^2 x}$
15.  $(\operatorname{sh} x)' = \left(\frac{e^x - e^{-x}}{2}\right)' = \operatorname{ch} x$

16.  $(\operatorname{ch} x)' = \left(\frac{e^x + e^{-x}}{2}\right)' = \operatorname{sh} x$
17.  $(\operatorname{arctg} x)' = \frac{1}{1+x^2}$
18.  $(\operatorname{arcctg} x)' = -\frac{1}{1+x^2}$
19.  $(\operatorname{arcsin} x)' = \frac{1}{\sqrt{1-x^2}}$
20.  $(\operatorname{arccos} x)' = -\frac{1}{\sqrt{1-x^2}}$

### Формулы дифференцирования

$$\boxed{(u \cdot v)' = u'v + uv'}$$

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

### Таблица интегралов

	$\int x^\alpha dx = \frac{x^{\alpha+1}}{\alpha+1} + C, \alpha \neq -1$	$\int dx = x + C$ $\int x dx = \frac{x^2}{2} + C$ $\int \frac{dx}{\sqrt{x}} = 2\sqrt{x} + C$ $\int \frac{dx}{x^2} = -\frac{1}{x} + C$	14	$\int \frac{dx}{x^2-1} = \frac{1}{2} \ln \left  \frac{x-1}{x+1} \right  + C$ $\int \frac{dx}{x^2-a^2} = \frac{1}{2a} \ln \left  \frac{x-a}{x+a} \right  + C$	$\int \frac{xdx}{x^2-a^2} = \frac{1}{2} \ln  x^2 - a^2  + C$
2	$\int \frac{dx}{x} = \ln x  + C$	$\int \frac{dx}{ax+b} = \frac{1}{a} \ln ax+b  + C$	15	$\int \frac{dx}{\sqrt{x^2 \pm a^2}} = \ln x + \sqrt{x^2 \pm a^2}  + C$	$\int \frac{xdx}{\sqrt{x^2 \pm a^2}} = \sqrt{x^2 \pm a^2} + C$
3	$\int e^x dx = e^x + C$	$\int e^{ax+b} dx = \frac{1}{a} e^{ax+b} + C$	16	$\int \frac{dx}{\sqrt{1-x^2}} = \operatorname{arcsin} x + C = -\operatorname{arccos} x + C$	$\int \frac{xdx}{\sqrt{a^2-x^2}} = -\sqrt{a^2-x^2} + C$

				$\int \frac{dx}{\sqrt{a^2 - x^2}} = \arcsin \frac{x}{a} + C$	
4	$\int a^x dx = \frac{a^x}{\ln a} + C$	$\int a^{bx+c} dx = \frac{a^{bx+c}}{b \ln a} + C$	17	$\int \sqrt{x^2 + k} dx = \frac{x\sqrt{x^2 + k}}{2} + \frac{k}{2} \ln  x + \sqrt{x^2 + k}  + C$	
5	$\int \sin x dx = -\cos x + C$	$\int \sin(ax+b) dx = -\frac{\cos(ax+b)}{a} + C$	18	$\int \sqrt{a^2 - x^2} dx = \frac{x\sqrt{a^2 - x^2}}{2} + \frac{a^2}{2} \arcsin \frac{x}{a} + C$	
6	$\int \cos x dx = \sin x + C$	$\int \cos(ax+b) dx = \frac{\sin(ax+b)}{a} + C$	19	$\int sh(ax+b) dx = \frac{1}{a} ch(ax+b) + C$	
7	$\int tg x dx = -\ln  \cos x  + C$	$\int tg(ax+b) dx = -\frac{1}{a} \ln  \cos(ax+b)  + C$	20	$\int ch(ax+b) dx = \frac{1}{a} sh(ax+b) + C$	
8	$\int ctg x dx = \ln  \sin x  + C$	$\int ctg(ax+b) dx = \frac{1}{a} \ln  \sin(ax+b)  + C$	21	$\int \frac{1}{sh^2(ax+b)} dx = -\frac{1}{a} cth(ax+b) + C$	
9	$\int \frac{dx}{\cos^2 x} = tg x + C$	$\int \frac{dx}{\cos^2(ax+b)} = \frac{1}{a} tg(ax+b) + C$	22	$\int \frac{1}{ch^2(ax+b)} dx = \frac{1}{a} th(ax+b) + C$	
10	$\int \frac{dx}{\sin^2 x} = -ctg x + C$	$\int \frac{dx}{\sin^2(ax+b)} = -\frac{1}{a} ctg(ax+b) + C$	23	$\int e^{ax} \cos b x dx = \frac{a \cos b x + b \sin b x}{a^2 + b^2} e^{ax} + C$	
11	$\int \frac{dx}{\cos x} = \ln \left  tg \left( \frac{x}{2} + \frac{\pi}{4} \right) \right  + C$	$\int \frac{dx}{\cos(ax+b)} = \frac{1}{a} \ln \left  tg \left( \frac{ax+b}{2} + \frac{\pi}{4} \right) \right  + C$	24	$\int e^{ax} \sin b x dx = \frac{a \sin b x - b \cos b x}{a^2 + b^2} e^{ax} + C$	
12	$\int \frac{dx}{\sin x} = \ln \left( tg \frac{x}{2} \right) + C$	$\int \frac{dx}{\sin(ax+b)} = \frac{1}{a} \ln \left( tg \frac{ax+b}{2} \right) + C$			
13	$\int \frac{dx}{x^2 + 1} = \arctg x + C$ $\int \frac{dx}{x^2 + a^2} = \frac{1}{a} \arctg \frac{x}{a} + C$	$\int \frac{xdx}{x^2 + a^2} = \frac{1}{2} \ln  x^2 + a^2  + C$			