

# ТАБЛИЦА ПРОИЗВОДНЫХ

Правила дифференцирования	Основные элементарные функции	Если $y = f(u)$ , $u = \varphi(x)$ , то $y'_x = y'_u \cdot u'_x$ - производная сложной функции	Если $y = f(x)$ , то $dy = f'(x)dx$ - дифференциал функции
1. $(C)' = 0$ ; <i>C-постоянная.</i>	1. $(x^n)' = n \cdot x^{n-1}$ , 1.1 $(\sqrt{x})' = \frac{1}{2\sqrt{x}}$ ; 1.2 $\left(\frac{1}{x}\right)' = -\frac{1}{x^2}$ ;	1. $(u^\alpha)' = \alpha \cdot u^{\alpha-1} \cdot u'$ , 1.1 $(\sqrt{u})' = \frac{u'}{2\sqrt{u}}$ ; 1.2 $\left(\frac{1}{u}\right)' = -\frac{u'}{u^2}$ ;	1. $d(x^\alpha) = \alpha \cdot x^{\alpha-1} dx$ , 1.1 $d(\sqrt{x}) = \frac{dx}{2\sqrt{x}}$ ; 1.2 $d\left(\frac{1}{x}\right) = -\frac{dx}{x^2}$ ;
2. $(x)' = 1$	2. $(\log_a x)' = \frac{1}{x \cdot \ln a}$ , 2.1 $(\ln x)' = \frac{1}{x}$	2. $(\log_a u)' = \frac{u'}{u \cdot \ln a}$ , 2.1 $(\ln u)' = \frac{u'}{u}$ ;	2. $d(\log_a x) = \frac{dx}{x \cdot \ln a}$ , 2.1 $d(\ln x) = \frac{dx}{x}$
3. $(u + v - w)' = u' + v' - w'$ ;	3. $(a^x)' = a^x \cdot \ln a$ , 3.1 $(e^x)' = e^x$	3. $(a^u)' = a^u \cdot \ln a \cdot u'$ , 3.1 $(e^u)' = e^u \cdot u'$ ;	3. $d(a^x) = a^x \cdot \ln a dx$ , 3.1 $d(e^x) = e^x dx$
4. $(u \cdot v)' = u'v + uv'$ , 4.1 $(Cu)' = C \cdot u'$ ; <i>C-постоянная</i>	4. $(\sin x)' = \cos x$	4. $(\sin u)' = \cos u \cdot u'$ ;	4. $d(\sin x) = \cos x dx$
5. $\left(\frac{u}{v}\right)' = \frac{u'v - uv'}{v^2}$ ,	5. $(\cos x)' = -\sin x$	5. $(\cos u)' = -\sin u \cdot u'$ ;	5. $d(\cos x) = -\sin x dx$
	6. $(tgx)' = \frac{1}{\cos^2 x}$	6. $(tgu)' = \frac{u'}{\cos^2 u}$ ;	6. $d(tgx) = \frac{dx}{\cos^2 x}$
	7. $(ctgx)' = -\frac{1}{\sin^2 x}$	7. $(ctgu)' = -\frac{u'}{\sin^2 u}$ ;	7. $d(ctgx) = -\frac{dx}{\sin^2 x}$
	8. $(\arcsin x)' = \frac{1}{\sqrt{1-x^2}}$	8. $(\arcsin u)' = \frac{u'}{\sqrt{1-u^2}}$ ;	8. $d(\arcsin x) = \frac{dx}{\sqrt{1-x^2}}$
	9. $(\arccos x)' = -\frac{1}{\sqrt{1-x^2}}$	9. $(\arccos u)' = -\frac{u'}{\sqrt{1-u^2}}$	9. $d(\arccos x) = -\frac{dx}{\sqrt{1-x^2}}$
	10. $(\operatorname{arctg} x)' = \frac{1}{1+x^2}$	10. $(\operatorname{arctg} u)' = \frac{u'}{1+u^2}$ ;	10. $d(\operatorname{arctg} x) = \frac{dx}{1+x^2}$
	11. $(\operatorname{arcctg} x)' = -\frac{1}{1+x^2}$	11. $(\operatorname{arcctg} u)' = -\frac{u'}{1+u^2}$ ;	11. $d(\operatorname{arcctg} x) = -\frac{dx}{1+x^2}$