1. $c' = 0,\ c = \text{const}$
2. $\left(x^n\right)' = nx^{n-1}$
3. $\left(a^x\right)' = a^x \cdot \ln a$
4. $\left(e^x\right)' = e^x$
5. $\left(\log_a x\right)' = \dfrac{1}{x \ln a}$
6. $\left(\ln x\right)' = \dfrac{1}{x}$
7. $\left(\sin x\right)' = \cos x$
8. $\left(\cos x\right)' = -\sin x$
9. $\left(\sqrt{x}\right)' = \dfrac{1}{2\sqrt{x}}$
10. $\left(\operatorname{tg} x\right)' = \dfrac{1}{\cos^2 x}$
11. $\left(\operatorname{ctg} x\right)' = -\dfrac{1}{\sin^2 x}$
12. $\left(\arcsin x\right)' = \dfrac{1}{\sqrt{1-x^2}}$
13. $\left(\arccos x\right)' = -\dfrac{1}{\sqrt{1-x^2}}$
14. $\left(\operatorname{arctg} x\right)' = \dfrac{1}{1+x^2}$
15. $\left(\operatorname{arcctg} x\right)' = -\dfrac{1}{1+x^2}$
16. $\left(\operatorname{sh} x\right)' = \operatorname{ch} x$
17. $\left(\operatorname{ch} x\right)' = \operatorname{sh} x$
18. $\left(\operatorname{th} x\right)' = \dfrac{1}{\operatorname{ch}^2 x}$
19. $\left(\operatorname{th} x\right)' = -\dfrac{1}{\operatorname{sh}^2 x}$

Шпаргалка

Формулы приведения

$$\sin\left(\frac{\pi}{2}+x\right)=\cos x \qquad \cos\left(\frac{\pi}{2}+x\right)=-\sin x$$

$$\sin\left(\pi+x\right)=-\sin x \qquad \cos\left(\pi+x\right)=-\cos x$$

$$\sin\left(\frac{3\pi}{2}+x\right)=-\cos x \qquad \cos\left(\frac{3\pi}{2}+x\right)=\sin x$$

$$\sin\left(2\pi+x\right)=\sin x \qquad \cos\left(2\pi+x\right)=\cos x$$

Производные

$$x^{a\,\prime}=ax^{a-1} \qquad \sin x'=\cos x \qquad \arcsin x'=\frac{1}{\sqrt{1-x^2}}$$

$$a^{x\,\prime}=a^x\ln a \qquad \cos x'=-\sin x \qquad \arccos x'=\frac{-1}{\sqrt{1-x^2}}$$

$$e^{x\,\prime}=e^x \qquad \operatorname{tg} x'=\frac{1}{\cos^2 x} \qquad \operatorname{arctg} x'=\frac{1}{1+x^2}$$

$$\ln x'=\frac{1}{x} \qquad \operatorname{ctg} x'=\frac{-1}{\sin^2 x} \qquad \operatorname{arcctg} x'=\frac{-1}{1+x^2}$$

$$\log_a x=\frac{1}{x\ln a}$$

Эквивалентность при $x \to 0$	Равенство при $x \to 0$
$\sin x \sim x$	$\sin x = x + o(x)$
$\operatorname{sh} x \sim x$	$\operatorname{sh} x = x + o(x)$
$\operatorname{tg} x \sim x$	$\operatorname{tg} x = x + o(x)$
$\arcsin x \sim x$	$\arcsin x = x + o(x)$
$\operatorname{arctg} x \sim x$	$\operatorname{arctg} x = x + o(x)$
$1 - \cos x \sim x^2/2$	$1 - \cos x = x^2/2 + o(x^2)$
$\operatorname{ch} x - 1 \sim x^2/2$	$\operatorname{ch} x - 1 = x^2/2 + o(x^2)$
$e^x - 1 \sim x$	$e^x - 1 = x + o(x)$
$\ln(1+x) \sim x$	$\ln(1+x) = x + o(x)$
$(1+x)^\alpha - 1 \sim \alpha x$	$(1+x)^\alpha = 1 + \alpha x + o(x)$
$a^x - 1 \sim x \ln a$	$a^x = 1 + x \ln a + o(x),\ a > 0,\ a \neq 1$

Шпаргалка

Тригонометрические формулы

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

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

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

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

$$\sin\alpha\sin\beta=\frac{1}{2}\left(\cos(\alpha-\beta)-\cos(\alpha+\beta)\right)$$

$$\cos\alpha\cos\beta=\frac{1}{2}\left(\cos(\alpha-\beta)+\cos(\alpha+\beta)\right)$$

$$\sin\alpha\cos\beta=\frac{1}{2}\left(\sin(\alpha+\beta)+\sin(\alpha-\beta)\right)$$

$$\sin 2x=2\sin x\cos x$$

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

$$\sin 3x=3\sin x-4\sin^3x$$

$$\cos 3x=4\cos^3x-3\cos x$$

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

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

Свойства логарифмов

$$a^b=e^{\ln a^b}$$

$$\log_a b=\frac{\ln b}{\ln a}$$

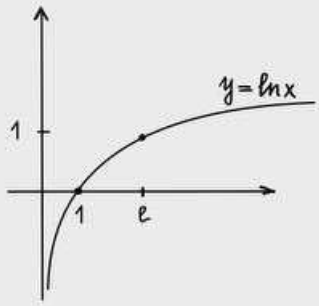
$$\ln a^b=b\ln a$$

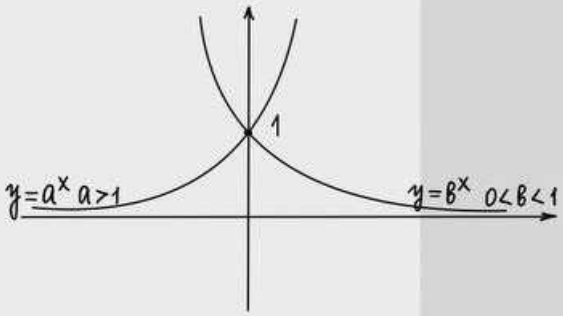
$$\ln(xy)=\ln x+\ln y$$

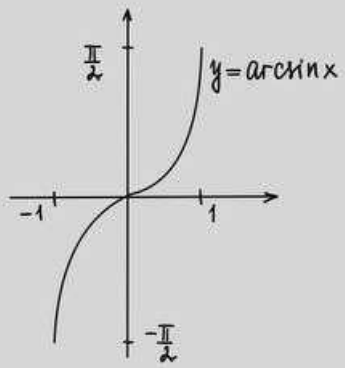
$$a=\ln e^a$$

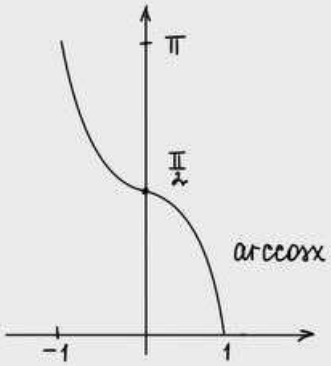
$$\ln\frac{x}{y}=\ln x-\ln y$$

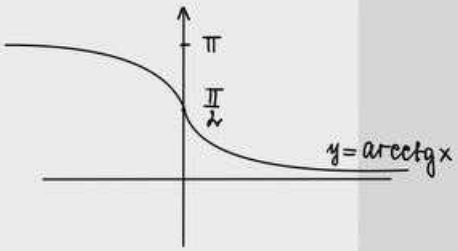
Графики











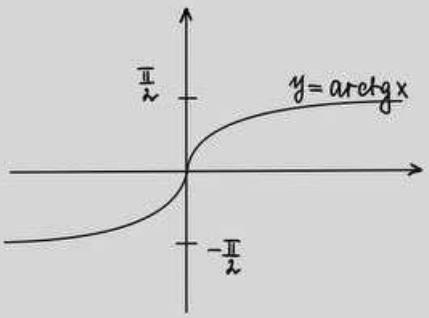


Таблица эквивалентных бесконечно малых функций ($x \to 0$)

$$\sin x \sim x$$

$$\operatorname{tg} x \sim x$$

$$\arcsin x \sim x$$

$$\operatorname{arctg} x \sim x$$

$$1 - \cos x \sim \frac{x^2}{2}$$

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

$$\log_a(1+x) \sim \frac{x}{\ln a}$$

$$(1+x)^n - 1 \sim nx$$

$$a^x - 1 \sim x \ln a$$

$$\sqrt[m]{1+x} - 1 \sim \frac{x}{m}$$

$$e^x - 1 \sim x$$

квадрат суммы	$(a+b)^2 = a^2 + 2ab + b^2$
квадрат разности	$(a-b)^2 = a^2 - 2ab + b^2$
разность квадратов	$a^2 - b^2 = (a+b)(a-b)$
куб суммы	$(a+b)^3 = a^3 + 3a^2b + 3ab2 + b^3$
куб разности	$(a-b)^3 = a^3 - 3a^2b + 3ab2 - b^3$
сумма кубов	$a^3 + b^=(a+b)(a^2 - ab + b^2)$
разность кубов	$a^3 - b^3 = (a-b)(a^2 + ab + b^2)$