ДОДАТКИ

Основі формули і правила диференціювання

$(Cu)' = Cu', C = \text{const}$	$(u \pm v)' = u' \pm v'$
$(uv)' = u'v + uv'$	$\left(\frac{u}{v}\right)' = \frac{u'v - uv'}{v^2}$
$\left(f(u)\right)'_x = f'_u \cdot u'_x$	$y' = y(\ln y)'$

$(C)' = 0, C = \text{const}$	$(u^{\alpha})' = \alpha u^{\alpha - 1} u'$
$(a^u)' = a^u \ln a \cdot u', a > 0$	$(e^u)' = e^u u'$
$(\log_a u)' = \frac{u'}{u \ln a}$	$(\ln u)' = \frac{u'}{u}$
$(\sin u)' = \cos u \cdot u'$	$(\cos u)' = -\sin u \cdot u'$
$(\operatorname{tg} u)' = \frac{u'}{\cos^2 u}$	$(\operatorname{ctg} u)' = -\frac{u'}{\sin^2 u}$
$(\arcsin u)' = \frac{u'}{\sqrt{1 - u^2}}$	$(\arccos u)' = -\frac{u'}{\sqrt{1 - u^2}}$
$(\operatorname{arctg} u)' = \frac{u'}{1 + u^2}$	$(\operatorname{arcctg} u)' = -\frac{u'}{1 + u^2}$
$(\operatorname{sh} u)' = \operatorname{ch} u \cdot u'$	$(\operatorname{ch} u)' = \operatorname{sh} u \cdot u'$
$(\operatorname{th} u)' = \frac{u'}{\operatorname{ch}^2 u}$	$(\operatorname{cth} u)' = -\frac{u'}{\operatorname{sh}^2 u}$

Основні формули інтегрування

$\int \frac{du}{u} = \ln\left\|u\right\| + C$	$\int u^{\alpha} du = \frac{u^{\alpha+1}}{\alpha+1} + C,$ $(\alpha \neq -1)$
$\int e^{u} du = e^{u} + C$	$\int a^{u} du = \frac{a^{u}}{\ln a} + C$
$\int \sin u du = C - \cos u$	$\int \cos u du = \sin u + C$
$\int \frac{du}{\cos^2 u} = \operatorname{tg} u + C$	$\int \frac{du}{\sin^2 u} = C - \operatorname{ctg} u$
$\int \operatorname{sh} u du = \operatorname{ch} u + C$	$\int \operatorname{ch} u du = \operatorname{sh} u + C$
$\int \frac{du}{\operatorname{ch}^2 u} = \operatorname{th} u + C$	$\int \frac{du}{\operatorname{sh}^2 u} = C - \operatorname{cth} u$
$\int \frac{du}{\sqrt{u^2 + a}} = \ln\left\|u + \sqrt{u^2 + a}\right\| + C,$ $a \neq 0$	$\int \frac{du}{\sqrt{a^2 - u^2}} = \arcsin \frac{u}{a} + C,$ $a \neq 0$
$\int \frac{du}{u^2 + a^2} = \frac{1}{a} \operatorname{arctg} \frac{u}{a} + C,$ $a \neq 0$	$\int \frac{du}{u^2 - a^2} = \frac{1}{2a} \ln\left\|\frac{u-a}{u+a}\right\| + C,$ $a \neq 0$
$\int \frac{du}{\sin u} = \ln\left\|\operatorname{tg} \frac{u}{2}\right\| + C$	$\int \frac{du}{\cos u} = \ln\left\|\operatorname{tg}\left(\frac{u}{2} + \frac{\pi}{4}\right)\right\| + C$
$\int \operatorname{tg} u du = C - \ln\left\|\cos u\right\|$	$\int \operatorname{ctg} u du = \ln\left\|\sin u\right\| + C$