Derivatives

Basic derivati	ves			
Simp	le functions	Compos	sed functions	
у	y'	у	y'	
k	0			
X	1			
x ⁿ	nx^{n-1}	u ⁿ	nu ^{n–1} u′	
\sqrt{x}	$\frac{1}{2\sqrt{x}}$	\sqrt{u}	$\frac{u'}{2\sqrt{u}}$	
$\sqrt[n]{x}$	$\frac{1}{n\sqrt[n]{x^{n-1}}}$	√√u	$\frac{u'}{n\sqrt[n]{u^{n-1}}}$	
$\frac{1}{x}$	$\frac{-1}{x^2}$	$\frac{1}{u}$	$\frac{-u'}{u^2}$	
e^{x}	e^{x}	e^u	e ^u u'	
a ^x	$a^{x} \ln(a)$	a ^u	$a^u \ln(a)u'$	
x ^x	$xx^{x-1} + x^x \ln(x)$	u ^v v	$u^{v-1}u' + u^v \ln(u)v'$	
ln(x)	$\frac{1}{x}$	ln(u)	$\frac{u'}{u}$	
$\log_a(x)$	$\frac{1}{x}\log_a(e)$	$\log_a(u)$	$\frac{u'}{u}\log_a(e)$	
sin(x)	cos(x)	sin(u)	$\cos(u)u'$	
$\cos(x)$	- sin(x)	cos(u)	$-\sin(u)u'$	
tan(x)	$\frac{1}{\cos(x)^2}$	tan(u)	$\frac{u'}{\cos(u)^2}$	
$\cot(x)$	$\frac{-1}{\sin(x)^2}$	$\cot(u)$	$\frac{-u'}{\sin(u)^2}$	
sec(x)	$\frac{\sin(x)}{\cos(x)^2}$	sec(u)	$\frac{\sin(u)}{\cos(u)^2}u'$	
CSC(x)	$\frac{-\cos(x)}{\sin(x)^2}$	CSC(u)	$\frac{-\cos(x)}{\sin(x)^2}$	
arcsin(x)	$\frac{1}{\sqrt{1-x^2}}$	arcsin(u)	$\frac{u'}{\sqrt{1-u^2}}$	
arccos(x)	$\frac{-1}{\sqrt{1-x^2}}$	arccos(u)	$\frac{-u'}{\sqrt{1-u^2}}$	
arctan(x)	$\frac{1}{1+x^2}$	arctan(u)	$\frac{u'}{1+u^2}$	
arccot(x)	$\frac{-1}{1+x^2}$	arccot(u)	$\frac{-u'}{1+u^2}$	
arcsec(x)	$\frac{1}{x\sqrt{x^2-1}}$	arcsec(u)	$\frac{u'}{u\sqrt{u^2-1}}$	
arccsc(x)	$\frac{-1}{x\sqrt{x^2-1}}$	arccsc(u)	$\frac{-u'}{u\sqrt{u^2-1}}$	

Derivative rules

Sum

$$(f(x) + g(x))' = f'(x) + g'(x)$$

Difference

$$(f-g)'(x) = f'(x) - g'(x)$$

Product

$$(fg)'(x) = f'(x)g(x) + f(x)g'(x)$$

Quotient

$$\left(\frac{f(x)}{g(x)}\right)' = \frac{f'(x)g(x) - f(x)g'(x)}{g(x)^2}$$

Chain rule

$$(f(g))'(x) = f'(g(x))g'(x)$$

Inverse

$$f^{-1}'(x) = \frac{1}{f'(x)}$$