DÉRIVÉES USUELLES ET DIFFÉRENTIELLES

DÉRIVÉES FONDAMENTALES

Notations : $u = u(x)$ et $u' = u'(x) = \frac{du}{dx}$

Fonction	Dérivée 1	Dérivée 2	Différentielle
$y = u(x)$	$y' = u'(x)$	$\frac{dy}{dx} = \frac{du}{dx}$	$dy = du = u'\,dx$
$y = u^n(x)$	$y' = n\ u'\ u^{n-1}$	$\frac{dy}{dx} = n\,u^{n-1}\frac{du}{dx}$	$dy = n\,u^{n-1}\,du$
$y = \frac{1}{u}$	$y' = -\frac{u'}{u^2}$	$\frac{dy}{dx} = -\frac{1}{u^2}\frac{du}{dx}$	$dy = -\frac{1}{u^2}du$
$y = u(x) + v(x)$	$y' = u' + v'$	$\frac{dy}{dx} = \frac{du}{dx} + \frac{dv}{dx}$	$dy = du + dv$
$y = u(x)\ v(x)$	$y' = u'v + v'u$	$\frac{dy}{dx} = v\frac{du}{dx} + u\frac{dv}{dx}$	$dy = vdu + udv$
$y = \frac{u(x)}{v(x)}$	$y' = \frac{u'v - v'u}{v^2}$	$\frac{dy}{dx} = \frac{1}{v^2}\left(v\frac{du}{dx} - u\frac{dv}{dx}\right)$	$dy = \frac{vdu - udv}{v^2}$
$y = u(v(x))$	$y' = v'\ u'(v)$	$\frac{dy}{dx} = \frac{dv}{dx}\frac{du}{dv}$	$y = u'(v)dv$
$y = Ln(x)$	$y' = \frac{1}{x}$	$\frac{dy}{dx} = \frac{1}{x}$	$dy = \frac{dx}{x}$
$y = Ln(u(x))$	$y' = \frac{u'}{u}$	$\frac{dy}{dx} = \frac{1}{u}\frac{du}{dx}$	$dy = \frac{1}{u}du$

DÉRIVÉES REMARQUABLES

$y = e^x$	$y' = e^x$	$\frac{dy}{dx} = e^x$	$dy = e^x\,dx$
$y = e^{u(x)}$	$y' = u'\ e^u$	$\frac{dy}{dx} = e^u\frac{du}{dx}$	$dy = e^u\,du$
$y = \sin(x)$	$y' = \cos(x)$	$\frac{dy}{dx} = \cos(x)$	$dy = \cos(x)\,dx$
$y = \cos(x)$	$y' = -\sin(x)$	$\frac{dy}{dx} = -\sin(x)$	$dy = -\sin(x)\,dx$
$y = \arcsin(x)$	$y' = \frac{1}{\sqrt{1-x^2}}$	$\frac{dy}{dx} = \frac{1}{\sqrt{1-x^2}}$	$dy = \frac{dx}{\sqrt{1-x^2}}$
$y = \arccos(x)$	$y' = -\frac{1}{\sqrt{1-x^2}}$	$\frac{dy}{dx} = -\frac{1}{\sqrt{1-x^2}}$	$dy = -\frac{dx}{\sqrt{1-x^2}}$
$y = \arctan(x)$	$y' = \frac{1}{1+x^2}$	$\frac{dy}{dx} = \frac{1}{1+x^2}$	$dy = \frac{dx}{1+x^2}$

CONSÉQUENCES

$y = x^n$	$y' = n\,x^{n-1}$	$\frac{dy}{dx} = n\,x^{n-1}$	$dy = n\,x^{n-1}\,dx$
$y = a = \text{constante} = a\,x^0$	$y' = 0$	$\frac{dy}{dx} = 0$	$dy = 0$
$y = x = x^1$	$y' = 1$	$\frac{dy}{dx} = 1$	$dy = dx$
$y = \sqrt{x} = x^{1/2}$	$y' = \frac{1}{2}x^{-1/2} = \frac{1}{2\sqrt{x}}$	$\frac{dy}{dx} = \frac{1}{2\sqrt{x}}$	$dy = \frac{dx}{2\sqrt{x}}$
$y = \sqrt{u(x)}$	$y' = \frac{u'}{2\sqrt{u}}$	$\frac{dy}{dx} = \frac{u'}{2\sqrt{u}}$	$dy = \frac{du}{2\sqrt{u}}$
$y = Ln(u(x))$	$y' = \frac{u'}{u}$	$\frac{dy}{dx} = \frac{u'}{u}$	$dy = \frac{du}{u}$
$y = \tan(x)$	$y' = 1 + \tan^2(x) = \frac{1}{\cos^2(x)}$	$\frac{dy}{dx} = 1 + \tan^2(x) = \frac{1}{\cos^2(x)}$	$dy = (1+\tan^2(x))dx = \frac{dx}{\cos^2(x)}$