



Cálculo

Formulário 1

2019'20

Funções importantes

(Omitem-se os domínios das funções.)

$$\operatorname{sen}^2 x + \cos^2 x = 1$$

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

$$1 + \operatorname{cotg}^2 x = \frac{1}{\operatorname{sen}^2 x}$$

$$\operatorname{sen}(-x) = -\operatorname{sen} x \quad (\text{a função é ímpar})$$

$$\cos(-x) = \cos x \quad (\text{a função é par})$$

$$\operatorname{sen}\left(\frac{\pi}{2} - x\right) = \cos x$$

$$\cos\left(\frac{\pi}{2} - x\right) = \operatorname{sen} x$$

$$\cos(x + y) = \cos x \cos y - \operatorname{sen} y \operatorname{sen} x$$

$$\operatorname{sen}(x + y) = \operatorname{sen} x \cos y + \operatorname{sen} y \cos x$$

$$\cos x - \cos y = -2 \operatorname{sen} \frac{x-y}{2} \operatorname{sen} \frac{x+y}{2}$$

$$\operatorname{sen} x - \operatorname{sen} y = 2 \operatorname{sen} \frac{x-y}{2} \cos \frac{x+y}{2}$$

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

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

$$\operatorname{sh} x = \frac{e^x - e^{-x}}{2}$$

$$\operatorname{ch} x = \frac{e^x + e^{-x}}{2}$$

$$\operatorname{ch}^2 x - \operatorname{sh}^2 x = 1$$

$$\operatorname{ch} x + \operatorname{sh} x = e^x$$

$$\operatorname{th}^2 x + \frac{1}{\operatorname{ch}^2 x} = 1$$

$$\operatorname{coth}^2 x - \frac{1}{\operatorname{sh}^2 x} = 1$$

$$\operatorname{sh}(-x) = -\operatorname{sh} x \quad (\text{a função é ímpar})$$

$$\operatorname{ch}(-x) = \operatorname{ch} x \quad (\text{a função é par})$$

$$\operatorname{sh}(x + y) = \operatorname{sh} x \operatorname{ch} y + \operatorname{sh} y \operatorname{ch} x$$

$$\operatorname{ch}(x + y) = \operatorname{ch} x \operatorname{ch} y + \operatorname{sh} y \operatorname{sh} x$$

x	0	$\frac{\pi}{6}$	$\frac{\pi}{4}$	$\frac{\pi}{3}$	$\frac{\pi}{2}$
$\operatorname{sen} x$	0	$\frac{1}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{2}$	1
$\cos x$	1	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{1}{2}$	0

$$\operatorname{sen}(\arccos x) = \sqrt{1 - x^2}$$

$$\operatorname{tg}(\arccos x) = \frac{\sqrt{1 - x^2}}{x}$$

$$\cos(\operatorname{arcsen} x) = \sqrt{1 - x^2}$$

$$\operatorname{tg}(\operatorname{arcsen} x) = \frac{x}{\sqrt{1 - x^2}}$$



Regras de derivação

(Omitem-se os domínios das funções e considera-se a uma constante apropriada.)

$$a' = 0$$

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

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

$$(a^x)' = a^x \ln a$$

$$(e^x)' = e^x$$

$$\operatorname{sen}' x = \cos x$$

$$\operatorname{tg}' x = \frac{1}{\cos^2 x}$$

$$\operatorname{sh}' x = \operatorname{ch} x$$

$$\operatorname{th}' x = \frac{1}{\operatorname{ch}^2 x}$$

$$\operatorname{arcsen}' x = \frac{1}{\sqrt{1-x^2}}$$

$$\operatorname{arctg}' x = \frac{1}{1+x^2}$$

$$\operatorname{argsh}' x = \frac{1}{\sqrt{1+x^2}}$$

$$\operatorname{argth}' x = \frac{1}{1-x^2}$$

$$(g \circ u)'(x) = g'(u(x)) u'(x)$$

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

$$(x^a)' = a x^{a-1}$$

$$\log'_a x = \frac{1}{x \ln a}$$

$$(\ln x)' = \frac{1}{x}$$

$$\cos' x = -\operatorname{sen} x$$

$$\operatorname{cotg}' x = -\frac{1}{\operatorname{sen}^2 x}$$

$$\operatorname{ch}' x = \operatorname{sh} x$$

$$\operatorname{coth}' x = -\frac{1}{\operatorname{sh}^2 x}$$

$$\operatorname{arccos}' x = \frac{-1}{\sqrt{1-x^2}}$$

$$\operatorname{arccotg}' x = \frac{-1}{1+x^2}$$

$$\operatorname{argch}' x = \frac{1}{\sqrt{x^2-1}}$$

$$\operatorname{argcoth}' x = \frac{1}{1-x^2}$$

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