http://www.mbstudent.com/maths-examples.html

Set of derivatives of basic functions

$$\frac{df(x)}{dx} = f'(x) = f(\dot{x})$$

$$C' = 0; where\ C - constant$$

$$(x^p)' = p \cdot x^{p-1}; where\ p \in R$$

$$\left(\sqrt[n]{x}\right)' = \frac{1}{n \cdot \sqrt[n]{x^{n-1}}}$$

$$(\sin x)' = \cos x$$

$$(\cos x)' = -\sin x$$

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

$$(\cot x)' = \frac{-1}{\sin^2 x}$$

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

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

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

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

$$(\arcsin x)' = \frac{1}{\sqrt{1 - x^2}}$$

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

$$(\arctan x)' = \frac{1}{x^2 + 1}$$

$$(\mathrm{arccot}\, x)' = \frac{-1}{x^2 + 1}$$

In geometric interpretation function's derivative is tangent of angle ($\tan \sphericalangle \alpha$) by which tangent is inclined relative to the function.

Basic theorems for derivatives

If functions $f(x)$ and $g(x)$ are differentiable then functions $c \cdot f(x)\{c - constant\}$,

$f(x) + g(x), f(x) - g(x), f(x) \cdot g(x), \frac{f(x)}{g(x)}\{for\ points\ where\ g(x) \neq 0\}$ are also differentiable.

Moreover:

$$\left(c \cdot f(x)\right)' = c \cdot f'(x)$$

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

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

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

Theorems about derivative of complex function

Function $g(x)$ over function $f(x)$.

$$\left(g(x) o f(x)\right)' = g'(x) \cdot f(x) \cdot f'(x)$$