# Wzory na pochodne i całki

## Pochodne

$(a)' = 0 \quad a \in \mathbb{R}$
$(x)' = 1$
$(x^\alpha)' = \alpha \cdot x^{\alpha-1} \quad \alpha \in \mathbb{R}$
$(a^x)' = a^x \cdot lna$
$(e^x)' = e^x$
$(\log_a x)' = \frac{1}{x \cdot lna}$
$(lnx)' = \frac{1}{x}$
$(sinx)' = cosx$
$(cosx)' = -sinx$
$(tgx)' = \frac{1}{cos^2 x}$
$(ctgx)' = -\frac{1}{sin^2 x}$
$(arcsinx)' = \frac{1}{\sqrt{1-x^2}}$
$(arccosx)' = -\frac{1}{\sqrt{1-x^2}}$
$(arctgx)' = \frac{1}{1+x^2}$
$(arcctgx)' = -\frac{1}{1+x^2}$

## Własności pochodnych

$(a \cdot f(x))' = a \cdot f'(x)$
$(f(x) \pm g(x))' = f'(x) \pm g'(x)$
$(f(x) \cdot g(x))' = f'(x)g(x) + f(x)g'(x)$
$(\frac{f(x)}{g(x)})' = \frac{f'(x)g(x) - f(x)g'(x)}{g^2(x)}$
$(f(g(x)))' = f'(g(x)) \cdot g'(x)$
$(ln(f(x))' = \frac{f'(x)}{f(x)}$

## Całki

$\int dx = x + C$
$\int xdx = \frac{1}{2}x^2 + C$
$\int x^\alpha dx = \frac{1}{\alpha+1}x^{\alpha+1} + C \quad \alpha \neq -1$
$\int a^x dx = \frac{a^x}{lna} + C$
$\int e^x dx = e^x + C$
$\int log_a x dx = \frac{x \cdot lnx - x}{lna} + C$
$\int \frac{1}{x} dx = ln|x| + C$
$\int sinxdx = -cosx + C$
$\int cosxdx = sinx + C$
$\int tgxdx = -ln|cosx| + C$
$\int ctgxdx = ln|sinx| + C$
$\int \frac{dx}{x^2+a^2} = \frac{1}{a} arctg \frac{x}{a} + C$
$\int \frac{dx}{x^2-a^2} = \frac{1}{2a} ln\left|\frac{x-a}{x+a}\right| + C$
$\int \frac{dx}{\sqrt{a^2-x^2}} = arcsin\frac{x}{a} + C$
$\int \frac{dx}{\sqrt{x^2+q}} = ln\left|x + \sqrt{x^2+q}\right| + C$

## Własności całek

$\int (a \cdot f(x))dx = a \cdot \int f(x)dx$
$\int (f(x) \pm g(x))dx = \int f(x)dx \pm \int g(x)dx$
$\int \frac{f'(x)}{f(x)} dx = ln|f(x)| + C$
$\int f(x) \cdot g'(x)dx = f(x) \cdot g(x) - \int f'(x) \cdot g(x)$