Derivatives & Antiderivatives

General Rules

$(af)'(x) = af'(x)$	$\int af(x)\mathrm{d}x = a\int f(x)\mathrm{d}x$
$(f(x)+g(x))' = f'(x)+g'(x)$	$\int f(x)+g(x)\mathrm{d}x = \int f(x)\mathrm{d}x + \int g(x)\mathrm{d}x$
$(f(x)g(x))' = f'(x)g(x)+f(x)g'(x)$	...
$\left(\frac{f(x)}{g(x)}\right)' = \frac{f'(x)g(x)-f(x)g'(x)}{g(x)^2}$	...
$(f(g(x)))' = f'(g(x))g'(x)$	...

Above: a is a constant, and $f(x)$ and $g(x)$ functions of x.

Elementary Functions

$f(x)$	$f'(x)$	$\int f(x)\mathrm{d}x$
a	0	$ax+C$
x	1	$\frac{x^2}{2}+C$
x^α	$\alpha x^{\alpha-1}$	$\frac{x^{\alpha+1}}{\alpha+1}+C\ (\alpha\neq-1)$ $\ln\lvert x\rvert+C\ (\alpha=-1)$
$\ln x$	$\frac{1}{x}$	$\ldots+C$
e^x	e^x	e^x+C
$\sin x$	$\cos x$	$-\cos x+C$
$\cos x$	$-\sin x$	$\sin x+C$
$\tan x$	$\frac{1}{\cos^2 x} = 1+\tan^2 x$	$\ldots+C$
$\arcsin(x)$	$\frac{1}{\sqrt{1-x^2}}$	$\ldots+C$
$\arccos(x)$	$\frac{-1}{\sqrt{1-x^2}}$	$\ldots+C$
$\arctan(x)$	$\frac{1}{1+x^2}$	$\ldots+C$

Above: a and α are constant, and C the antiderivative constant.