Grundableitungen

f	f'	f	f'
x^n	nx^{n-1}	$\operatorname{arccos} x$	$\frac{-1}{\sqrt{1-x^2}}$
$\frac{1}{x^n}$	$\frac{-n}{x^{n+1}}$	$\arctan x$	$\frac{1}{1+x^2}$
$\sqrt{x}$	$\frac{1}{2\sqrt{x}}$	$\operatorname{arccot} x$	$\frac{-1}{1+x^2}$
$\sqrt[n]{x}$	$\frac{1}{n\sqrt[n]{x^{n-1}}}$	$\sinh x$	$\cosh x$
e^x	e^x	$\cosh x$	$\sinh x$
$\ln x$	$\frac{1}{x}$	$\tanh x$	$\frac{1}{\cosh^2 x}$
a^x	$a^x \ln a$	$\coth x$	$\frac{-1}{\sinh^2 x}$
x^x	$x^x(1+\ln x)$	$\operatorname{arsinh} x$	$\frac{1}{\sqrt{x^2+1}}$
$\sin x$	$\cos x$	$\operatorname{arcosh} x$	$\frac{1}{\sqrt{x^2-1}}, \quad x > 1$
$\cos x$	$-\sin x$	$\operatorname{artanh} x$	$\frac{1}{1-x^2}, \quad \lvert x\rvert < 1$
$\tan x$	$\frac{1}{\cos^2 x}$	$\operatorname{arcoth} x$	$\frac{1}{1-x^2}, \quad \lvert x\rvert > 1$
$\cot x$	$\frac{-1}{\sin^2 x}$		
$\arcsin x$	$\frac{1}{\sqrt{1-x^2}}$		
$\int g\, dx$	g	$\int g\, dx$	g

Aus: Merziger et al., Formeln und Hilfen zur höheren Mathematik, ISBN:978-3-9239-2336-6, Binomi Verlag 2010

Grundintegrale zur Vorlesung Mathematik I/1

Es sei $a \in I\!R$ ein beliebiger, konstanter Parameter.

1. $\int x^a \,\mathrm{d}x = \dfrac{x^{a+1}}{a+1} + C \quad (a \neq -1)$
2. $\int e^x \,\mathrm{d}x = e^x + C$
3. $\int a^x \,\mathrm{d}x = \frac{1}{\ln a} a^x + C$
4. $\int \frac{1}{x+a} \,\mathrm{d}x = \ln|x+a| + C$
5. $\int \frac{1}{x^2+a^2} \,\mathrm{d}x = \frac{1}{a} \arctan(\frac{x}{a}) + C$
6. $\int \sqrt{x^2+a^2} \,\mathrm{d}x = \begin{cases} \frac{1}{2}\left(x\sqrt{x^2+a^2} + a^2 \operatorname{arsinh}(\frac{x}{a})\right) + C \\ \frac{1}{2}\left(x\sqrt{x^2+a^2} + a^2 \ln|x + \sqrt{x^2+a^2}|\right) + C \end{cases}$
7. $\int \frac{1}{\sqrt{x^2+a^2}} \,\mathrm{d}x = \operatorname{arsinh}(\frac{x}{a}) + C$
8. $\int \frac{1}{\sqrt{x^2-a^2}} \,\mathrm{d}x = \operatorname{arcosh}(\frac{x}{a}) + C$
9. $\int \frac{1}{\sqrt{a^2-x^2}} \,\mathrm{d}x = \arcsin(\frac{x}{a}) + C$

10. $\int \frac{Bx+C}{x^2+px+q} \,\mathrm{d}x = \frac{B}{2} \ln|x^2+px+q| + (C - \frac{Bp}{2}) \int \frac{1}{x^2+px+q} \,\mathrm{d}x$
11. $\int \frac{1}{x^2+px+q} \,\mathrm{d}x = \frac{2}{\sqrt{4q-p^2}} \arctan \frac{2x+p}{\sqrt{4q-p^2}} + C \quad$ nur für $4q - p^2 > 0$
12. $\int \frac{Bx+C}{(x^2+px+q)^\beta} \,\mathrm{d}x = -\frac{B}{2(\beta-1)} \frac{1}{(x^2+px+q)^{\beta-1}} + (C - \frac{Bp}{2}) \int \frac{1}{(x^2+px+q)^\beta} \,\mathrm{d}x$
13. $\int \frac{1}{(x^2+px+q)^\beta} \,\mathrm{d}x = \frac{1}{(\beta-1)(4q-p^2)} \frac{2x+p}{(x^2+px+q)^{\beta-1}} + \frac{4\beta-6}{(\beta-1)(4q-p^2)} \int \frac{1}{(x^2+px+q)^{\beta-1}} \,\mathrm{d}x$

14. $\int \sin(x) \,\mathrm{d}x = -\cos(x) + C$
15. $\int \cos(x) \,\mathrm{d}x = \sin(x) + C$
16. $\int \frac{1}{\cos^2(x)} \,\mathrm{d}x = \int (1 + \tan^2(x)) \,\mathrm{d}x = \tan(x) + C$
17. $\int \sinh(x) \,\mathrm{d}x = \cosh(x) + C$
18. $\int \cosh(x) \,\mathrm{d}x = \sinh(x) + C$
19. $\int \frac{1}{\cosh^2(x)} \,\mathrm{d}x = \tanh(x) + C$
20. $\int \frac{1}{\sin^2(x)} \,\mathrm{d}x = \int (1 + \cot^2(x)) \,\mathrm{d}x = -\cot(x) + C$

21. $\int f'(x) f(x) \,\mathrm{d}x = \frac{1}{2} f^2(x) + C$
22. $\int \frac{f'(x)}{f(x)} \,\mathrm{d}x = \ln|f(x)| + C$