

Integraltabelle für rationale-, exponential- und Logarithmusfunktionen

Einige unbestimmte Integrale	
1. $\int x^n dx = \frac{1}{n+1} x^{n+1} + C \quad n \in \mathbb{R} \setminus \{-1\}$	2. $\int \frac{1}{x} dx = \ln x + C \quad x \neq 0$
3. $\int e^x dx = e^x + C$	4. $\int a^x dx = \frac{a^x}{\ln(a)} + C \quad a > 0; a \neq 1$
5. $\int (ax+b)^n dx = \frac{(ax+b)^{n+1}}{a(n+1)} + C \quad n \neq -1$	6. $\int \frac{1}{ax+b} dx = \frac{1}{a} \ln ax+b $
7. $\int x(ax+b)^n dx = \frac{a(n+1)x-b}{a^2(n+1)(n+2)} (ax+b)^{n+1} + C \quad n \neq -1; -2$	
8. $\int \frac{x}{ax+b} dx = \frac{x}{a} - \frac{b}{a^2} \ln ax+b + C$	9. $\int \frac{1}{x(ax+b)} dx = -\frac{1}{b} \ln \left \frac{ax+b}{x} \right + C$
10. $\int \frac{1}{x^2(ax+b)} dx = -\frac{1}{bx} + \frac{a}{b^2} \ln \left \frac{ax+b}{x} \right + C$	11. $\int e^{ax} dx = \frac{1}{a} e^{ax} + C$
12. $\int x \cdot e^{ax} dx = \frac{1}{a^2} (ax-1) e^{ax} + C$	13. $\int x^2 \cdot e^{ax} dx = \left(\frac{x^2}{a} - \frac{2x}{a^2} + \frac{2}{a^3} \right) e^{ax} + C$
14. $\int \ln(x) dx = x \cdot \ln(x) - x + C \quad x > 0$	15. $\int [\ln(x)]^2 dx = x \cdot [\ln(x)]^2 - 2x \cdot \ln(x) + 2x + C \quad x > 0$
16. $\int x^n \ln(x) dx = x^{n+1} \left(\frac{\ln(x)}{n+1} - \frac{1}{(n+1)^2} \right) + C \quad x > 0; n \neq -1$	17. $\int \frac{[\ln(x)]^n}{x} dx = \frac{[\ln(x)]^{n+1}}{n+1} + C \quad x > 0; n \neq -1$
18. $\int \frac{1}{x \cdot \ln(x)} = \ln \ln(x) + C \quad x > 1$	19. $\int \frac{1}{x \cdot [\ln(x)]^n} = -\frac{1}{(n-1) [\ln(x)]^{n-1}} + C \quad x > 1; n \neq 1$
Einige bestimmte Integrale	
1. $\int_0^1 \frac{1}{\sqrt{1-x^2}} dx = \frac{\pi}{2}$	2. $\int_0^\infty \frac{1}{(1+x)\sqrt{x}} dx = \pi$
3. $\int_a^b \frac{1}{\sqrt{(x-a)(b-x)}} dx = \pi$	4. $\int_0^a \frac{1}{\sqrt{a^2-x^2}} dx = \frac{\pi}{2}$
5. $\int_0^\infty \frac{1}{a^2+x^2} dx = \frac{\pi}{2a}$	6. $\int_0^\infty e^{-x^2} dx = \frac{1}{2} \sqrt{\pi}$
7. $\int_0^1 \frac{x}{\sqrt{1-x^2}} dx = 1$	8. $\int_0^a \frac{x^2}{\sqrt{ax-x^2}} dx = \frac{3}{8} a^2 \pi$
9. $\int_0^\infty \frac{1}{(1-x)\sqrt{x}} dx = 0$	10. $\int_0^{2b} \sqrt{2bx-x^2} dx = -\frac{b^2 \pi}{2}$
11. $\int_{-1}^1 a^x dx = \frac{a^2-1}{a \cdot \ln(a)} \quad a > 0$	12. $\int_0^\infty e^{-x} x^n dx = n! \quad n \in \mathbb{N}$

$13. \int_0^{\infty} e^{-x^2} dx = \frac{1}{2} \sqrt{\pi}$	$14. \int_0^{\infty} \frac{x}{e^x + 1} dx = \frac{\pi^2}{12}$
$15. \int_0^{\infty} \frac{x}{e^x - 1} dx = \frac{\pi^2}{6}$	$16. \int_0^1 \frac{\ln(x)}{x+1} dx = -\frac{\pi^2}{12}$
$17. \int_0^1 \frac{\ln(x)}{x-1} dx = \frac{\pi^2}{6}$	$18. \int_0^1 \frac{\ln(x+1)}{x^2+1} dx = \frac{\pi}{8} \cdot \ln(2)$
$19. \int_0^1 \frac{\ln(x)}{x^2-1} dx = \frac{\pi^2}{8}$	

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