Hausaufgaben 11.

Integration mit Substitution 1. Typ

1)

$$\int \cos(4x-5)\,dx$$

$$\left(\tfrac{1}{4}\sin(4x-5)+C\right)$$

2)

$$\int \frac{dx}{(2x-3)^5}$$

$$\left(-\tfrac{1}{8(2x-3)^4}+C\right)$$

3)

$$\int \frac{x\,dx}{\sqrt{x^2+1}}$$

$$\left(\sqrt{x^2+1}+C\right)$$

4)

$$\int x\sin(x^2+2)dx$$

$$\left(-\tfrac{1}{2}\cos(x^2+2)+C\right)$$

5)

$$\int \frac{\sqrt[3]{\operatorname{tg} x}}{\cos^2 x}\,dx$$

$$\left(\tfrac{3}{4}\sqrt[3]{\operatorname{tg}^4 x}+C\right)$$

6)

$$\int \frac{3x-1}{x^2+9}\,dx$$

$$\left(\tfrac{3}{2}\ln(x^2+9)-\tfrac{1}{3}\operatorname{arctg}\tfrac{x}{3}+C\right)$$

Integration mit Substitution 2. Typ

7)

$$\int \frac{1}{\sqrt{9x^2-6x+2}}\,dx$$

$$\left(\tfrac{1}{3}\operatorname{arsh}(3x-1)+C\right)$$

8)

$$\int \sqrt{15+2x-x^2}\,dx$$

$$\left(8\arcsin\tfrac{x-1}{4}+\tfrac{x-1}{2}\sqrt{15+2x-x^2}+C\right)$$

Partielle Integration

9)

$$\int (x^2-1)\sin 3x\,dx$$

$$\left(-\tfrac{1}{3}(x^2-1)\cos 3x+\tfrac{2}{9}x\sin 3x+\tfrac{2}{27}\cos 3x+C\right)$$

10)

$$\int x^3 e^{-x^2}\,dx$$

$$\left(-\tfrac{1}{2}(x^2+1)e^{-x^2}+C\right)$$

11)

$$\int \ln^3 x\,dx$$

$$\left(x\ln^3 x-3x\ln^2 x+6x\ln x-6x+C\right)$$

Integration rationaler Funktionen

12)

$$\int \frac{x-2}{x^2-7x+12}\,dx$$

$$(-\ln|x-3|+2\ln|x-4|+C)$$

13)

$$\int \frac{x^5+x^4-8}{x^3-4x}\,dx$$

$$(\tfrac{x^3}{3}+\tfrac{x^2}{2}+4x+2\ln|x|-3\ln|x+2|+5\ln|x-2|+C)$$

14)

$$\int \frac{x}{2x^2-3x-2}\,dx$$

$$(\tfrac{1}{10}\ln(x-2)^4|2x+1|+C)$$

15)

$$\int \frac{x^2}{1-x^4}\,dx$$

$$(\tfrac{1}{4}\ln\left|\tfrac{1+x}{1-x}\right|-\tfrac{1}{2}\mathrm{arctg}x+C)$$