Block V

Integration

1. Berechnen Sie folgende Integrale:

(1) $\dfrac{-112}{5}\sqrt{3}$

(2) 0 (ungerade Funktion)

(3) $\left[x - \dfrac{x^4}{4}\right]_0^2 = 2 - 4 + 0 - 0 = -2$

(4) $\ln x + C$

(5) $-\cos x + 1$

(6) $\left[\dfrac{-1}{x} + \dfrac{1}{2x^2}\right]_{-3}^{-1} = \dfrac{10}{9}$

(7) $u = \sin x \rightsquigarrow \displaystyle\int \dfrac{1}{u}\, du = \ln|\sin x| + C$

(8)   siehe 7

(9) $u = 3x^2 - 1 \rightsquigarrow \displaystyle\int \dfrac{1}{6u}\, du = \dfrac{1}{6}\ln|3x^2 - 1| + C$

(10) $\ln|x + 1| + C$

(11) $\dfrac{1}{2}\sin(2x + 1) + C$

(12) $\displaystyle\int x\,\cos x\, dx = x\sin x - \int \sin x\, dx = x\sin x + \cos x + C$

(13) $\displaystyle\int xe^x \ dx = xe^x - \int e^x \ dx = xe^x - e^x + C$

(14) $-\dfrac{1}{3}x\cos(3x-2) + \dfrac{1}{9}\sin(3x-2) + C$

(15) $\displaystyle\left[x^2e^x\right]_0^2 - 2\int_0^2 x\ e^x \ dx = 4e^2 - 2(2e^2 - e^2) - 2 = 2(e^2 - 1)$

(16) $\displaystyle\left[\dfrac{x^2}{2}\ln x\right]_1^2 - \dfrac{1}{2}\int_1^2 x \ dx = 2\ln 2 - \dfrac{3}{4}$

(17) $e^x + C$

(18) $\dfrac{1}{2}e^x(\cos x + \sin x) + C$

(19) $-x^2\cos x + 2x\sin x + 2\cos x + C$

(20) $x^2\sin x + 2x\cos x - 2\sin x + C$