Aufgabe 85

Berechne das bestimme Integral $\int_a^b f(x)\,dx$.

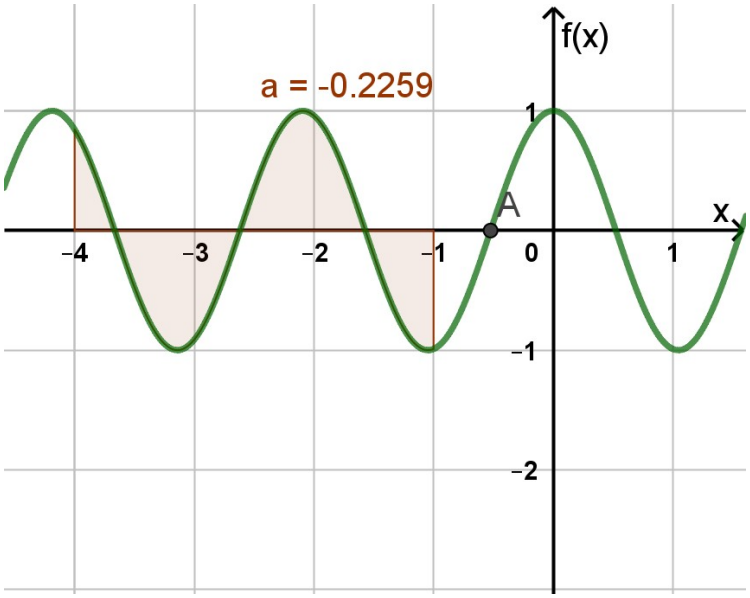
a) $\int_{-4}^{-1} \left(\cos(3x)\right)\,dx$

b) $\int_{-\pi}^{\pi} \left(-2 \cdot \sin(2t)\right)\,dt$

c) $\int_{-1}^{-1} \left(-3 \cdot e^{2x}\right)\,dx$

Lösungen:

Ad a)



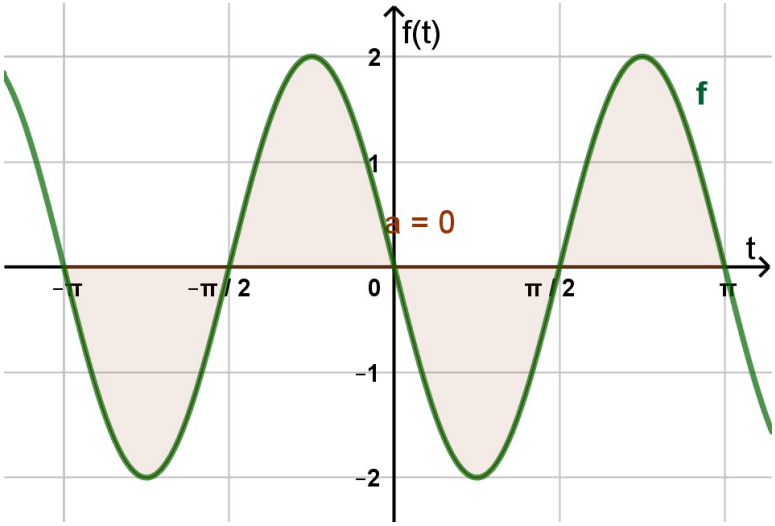
$$\int_{-4}^{1} \left(\cos(3x)\right) dx = \frac{1}{3} \cdot \sin(3x) \Big|_{-4}^{1} =$$

$$= \frac{1}{3} \cdot \left[\sin(-3) - \sin(-12)\right] =$$

$$= \frac{1}{3} \cdot \left[-0{,}1411 - 0{,}5366\right] =$$

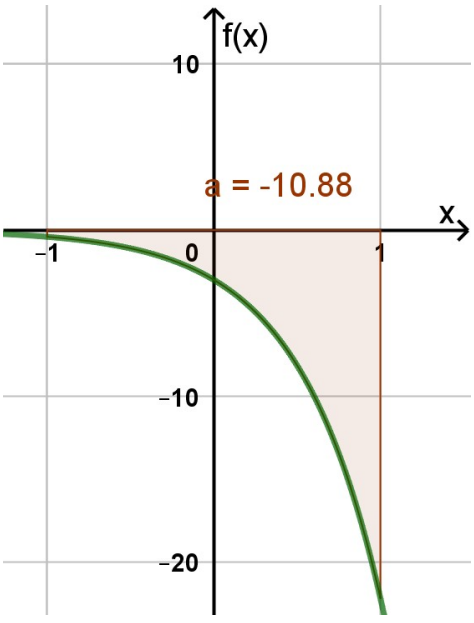
$$= \mathbf{-0{,}2259}$$

Ad b)



$$\begin{aligned}\int_{-\pi}^{\pi}\left(-2\cdot\sin(2t)\right)dt &= 2\cdot\cos(2t)\Big|_{-\pi}^{\pi} &=\\ &= 2\cdot\left[\cos(\pi)-\cos(-\pi)\right] &=\\ &= 2\cdot\left[-1-(-1)\right] &=\\ &= \mathbf{0}\end{aligned}$$

Ad c)



$$\int_{-1}^{1}\left(-3\cdot e^{2x}\right)dt = -3\cdot e^{2x}\Big|_{-1}^{1} =$$

$$= -\frac{3}{2}\cdot\left[e^{2}-e^{-2}\right] =$$

$$= -\frac{3}{2}\cdot\left[7{,}3891-0{,}1353\right] =$$

$$= \mathbf{-10{,}88}$$