

Aufgabe:

Berechne den Flächeninhalt zwischen

$$f(x) = x^2 - 2 \text{ und } g(x) = -2x + 1$$

$$\begin{aligned} \rightarrow \text{Schnittstellen: } f(x) &= g(x) & x^2 - 2 &= -2x + 1 & | +2x | -1 \\ & & x^2 + 2x - 3 &= 0 & | \text{pq} \\ x_{1/2} &= -\frac{2}{2} \pm \sqrt{\left(\frac{2}{2}\right)^2 - (-3)} \\ &= -1 \pm \sqrt{1+3} \\ &= -1 \pm \sqrt{4} \\ &= -1 \pm 2 \rightarrow x_1 = -1 - 2 = -3 \\ & & & & x_2 = -1 + 2 = 1 \end{aligned}$$

$$\begin{aligned} \rightarrow f(x) - g(x) &= x^2 - 2 - (-2x + 1) \\ &= x^2 - 2 + 2x - 1 \\ &= x^2 + 2x - 3 \end{aligned}$$

$$\begin{aligned} \rightarrow \int_{-3}^1 x^2 + 2x - 3 \, dx &= \\ &= \left. \frac{1}{3}x^3 + x^2 - 3x \right|_{-3}^1 \\ &= \left| \frac{1}{3} \cdot 1^3 + 1^2 - 3 \cdot 1 - \left(\frac{1}{3} \cdot (-3)^3 + (-3)^2 - 3 \cdot (-3) \right) \right| \\ &= \left| \frac{1}{3} + 1 - 3 - (-9 + 9 + 9) \right| \\ &= \left| \frac{1}{3} - 2 - 9 \right| \\ &= \left| \frac{1}{3} - 11 \right| \\ &= \left| \frac{1}{3} - \frac{33}{3} \right| = \left| -\frac{32}{3} \right| = \frac{32}{3} \end{aligned}$$