

Mathe 3 Übungsblatt 1

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Aufgabe 1

(i)

$$\begin{aligned}\int_{-1}^2 \left(\frac{3}{2}x^2 + 2x - 5 \right) dx &= \left[\frac{1}{2}x^3 + x^2 - 5x \right]_{-1}^2 \\ &= \left(\frac{1}{2} \cdot 2^3 + 2^2 - 5 \cdot 2 \right) - \left(\frac{1}{2} \cdot (-1)^3 + (-1)^2 - 5 \cdot (-1) \right) = (4 + 4 - 10) - (-0.5 + 1 + 5) = -7.5\end{aligned}$$

(ii)

$$\begin{aligned}\int_{-100}^{100} \sinh(x) dx &= [\cosh(x)]_{-100}^{100} = \cosh(100) - \cosh(-100) \\ \text{da } \cosh(100) &= \cosh(-100), \quad \int_{-100}^{100} \sinh(x) dx = 0\end{aligned}$$

(iii)

$$\begin{aligned}\int_{-1}^1 (|x| + 1) dx &= \int_{-1}^0 (-x + 1) dx + \int_0^1 (x + 1) dx \\ &= \left[-\frac{1}{2}x^2 + x \right]_{-1}^0 + \left[\frac{1}{2}x^2 + x \right]_0^1 \\ &= \left(\left(-\frac{1}{2}0^2 + 0 \right) - \left(-\frac{1}{2}(-1)^2 + (-1) \right) \right) + \left(\left(-\frac{1}{2}1^2 + 1 \right) - \left(-\frac{1}{2}0^2 + 0 \right) \right) \\ &= \frac{3}{2} + \frac{3}{2} = 3\end{aligned}$$

(iv)