

### **Aufgabe 50**

Berechne und kontrolliere mittels Differenzieren.

a)  $\int -4 \cdot \cos(3x) dx$

b)  $\int 3 \cdot \sin(2x) dx$

c)  $\int -4 \cdot e^{-5x} dx$

**Lösungen:**

**Ad a)**

$$\begin{aligned} F(x) &= \int -4 \cdot \cos(3x) dx = \\ &= -4 \cdot \int \cos(3x) dx = \\ &= -4 \cdot \frac{1}{3} \cdot \sin(3x) + c = \\ &= -\frac{4}{3} \cdot \sin(3x) + c \end{aligned}$$

Probe:

$$\begin{aligned} F'(x) &= \left( -\frac{4}{3} \cdot \sin(3x) \right)' + c = \\ &= -\frac{4}{3} \cdot \cos(3x) \cdot 3 = \\ &= -4 \cdot \cos(3x) \end{aligned}$$

**Ad b)**

$$\begin{aligned} F(x) &= \int 3 \cdot \sin(2x) dx = \\ &= 3 \cdot \int \sin(2x) dx = \\ &= -3 \cdot \frac{1}{2} \cdot \cos(2x) + c = \\ &= -\frac{3}{2} \cos(2x) + c \end{aligned}$$

Probe:

$$\begin{aligned} F'(x) &= \left( -\frac{3}{2} \cdot \cos(2x) \right)' + c = \\ &= \frac{3}{2} \cdot \sin(2x) \cdot 2 = \\ &= 3 \cdot \sin(2x) \end{aligned}$$

**Ad c)**

$$\begin{aligned} F(x) &= \int -4 \cdot e^{-5x} dx = \\ &= -4 \cdot \int e^{-5x} dx = \\ &= \frac{4}{5} \cdot e^{-5x} + c \end{aligned}$$

Probe:

$$\begin{aligned} F'(x) &= \left( \frac{4}{5} \cdot e^{-5x} \right)' + c = \\ &= \frac{4}{5} \cdot e^{-5x} \cdot (-5) = \\ &= -4 \cdot e^{-5x} \end{aligned}$$