

# Aufgabe mit trigonometrischen Fkt

$$a) \quad \begin{aligned} f(x) &= a \cdot \sin(x) + b \cdot \cos(x) \\ f'(x) &= a \cdot \cos(x) - b \cdot \sin(x) \end{aligned}$$

$$f(\bar{x}) = 1 \quad \text{Punkt} \quad (1)$$

$$f'(\bar{x}) = 2 \quad \text{waag. Tangente} \quad (2)$$

aus (1):

$$\begin{aligned} f(\bar{x}) &= a \cdot \sin(\bar{x}) + b \cdot \cos(\bar{x}) \\ &= 0 + b \cdot \cos(\bar{x}) \\ &= b \cdot (-1) \\ &= -b = 1 \end{aligned}$$

$$\Rightarrow b = -1$$

aus (2):

$$\begin{aligned} f'(\bar{x}) &= a \cdot \cos(\bar{x}) - (-1) \cdot \sin(\bar{x}) \\ &= -a - 0 = 2 \end{aligned}$$

$$\Rightarrow a = -2$$

$$\underline{\underline{f(x) = -2\sin(x) - \cos(x)}}$$

$$\begin{aligned} b) \quad f(x) &= a \cdot \sin(x) + b \cdot \cos(x) \\ f'(x) &= a \cdot \cos(x) - b \cdot \sin(x) \end{aligned}$$

$$f'(\pi/4) = 0 \quad \text{Extremum bei } x = \pi/4$$

$$f(0) = -1 \quad \text{Schnittpunkt y-Achse}$$

aus (2):

$$\begin{aligned} f(0) &= a \cdot \sin(0) + b \cdot \cos(0) \\ &= 0 + b = -1 \end{aligned}$$

$$\Leftrightarrow b = -1$$

aus (1):

$$\begin{aligned} f'(\pi/4) &= a \cdot \cos(\pi/4) - b \cdot \sin(\pi/4) \\ &= a \cos(\pi/4) + \sin(\pi/4) \\ &= a \cos(\pi/4) + \sin(\pi/4) = 0 \end{aligned}$$

$$\Leftrightarrow a = -1$$

$$\underline{\underline{f(x) = -\sin(x) - \cos(x)}}$$