

S 281 Nr. 1

$$c) \quad E: \vec{x} = \begin{pmatrix} 2 \\ 1 \\ -2 \end{pmatrix} + v \begin{pmatrix} 5 \\ 5 \\ -1 \end{pmatrix} + s \begin{pmatrix} -1 \\ 0 \\ 0 \end{pmatrix} ; A(2|4|13)$$

E in Koordinatenform umwandeln, \vec{n} berechnen

$$\begin{pmatrix} n_1 \\ n_2 \\ n_3 \end{pmatrix} \cdot \begin{pmatrix} 5 \\ 5 \\ -1 \end{pmatrix} = 0 \quad \wedge \quad \begin{pmatrix} n_1 \\ n_2 \\ n_3 \end{pmatrix} \cdot \begin{pmatrix} -1 \\ 0 \\ 0 \end{pmatrix} = 0 \Rightarrow \begin{array}{l} 5n_1 + 5n_2 - n_3 = 0 \\ -n_1 = 0 \end{array} \Rightarrow n_1 = 0$$

$$\text{Wähle } n_2 = 1 \Rightarrow n_3 = 5 \Rightarrow \underline{\underline{\vec{n} = \begin{pmatrix} 0 \\ 1 \\ 5 \end{pmatrix}}}$$

$$E: \left[\begin{pmatrix} x_1 \\ x_2 \\ x_3 \end{pmatrix} - \begin{pmatrix} 2 \\ 1 \\ -2 \end{pmatrix} \right] \cdot \begin{pmatrix} 0 \\ 1 \\ 5 \end{pmatrix} = 0 \Rightarrow E: x_2 + 5x_3 = -9$$

Lotgerade zu E durch den Punkt A(2|4|13)

$$g: \vec{x} = \begin{pmatrix} 2 \\ 4 \\ 13 \end{pmatrix} + t \begin{pmatrix} 0 \\ 1 \\ 5 \end{pmatrix} ;$$

$$g \cap E = \{F\} \Rightarrow 0 \cdot (2 + 0t) + 1(4 + t) + 5(13 + 5t) = -9$$
$$4 + t + 65 + 25t = -9$$
$$26t = -78$$
$$t = -3$$

$$\vec{OF} = \begin{pmatrix} 2 \\ 4 \\ 13 \end{pmatrix} - 3 \begin{pmatrix} 0 \\ 1 \\ 5 \end{pmatrix} = \begin{pmatrix} 2 \\ 1 \\ -2 \end{pmatrix} \Rightarrow F(2|1|-2)$$

$$d = |\vec{AF}| = \sqrt{0 + (1 - 4)^2 + (-2 - 13)^2} = \sqrt{9 + 225} = \sqrt{234} = \sqrt{9 \cdot 26}$$

$$\underline{\underline{d = |\vec{AF}| = 3 \cdot \sqrt{26}}}$$

$$\underline{\underline{d(B; E) = 2 \sqrt{26}}} ; \underline{\underline{d(C; E) = 2 \sqrt{26}}}$$