

$$42) \begin{aligned} \vec{AB} &= (-2; 4; 0) \\ \vec{AC} &= (7; -4; 5) \end{aligned}$$

$$\alpha = \arccos \frac{-2 \cdot 7 - 4 \cdot 4}{\sqrt{4+16} \cdot \sqrt{49+16+25}} = \arccos \frac{-30}{30\sqrt{2}} = \arccos \frac{-\sqrt{2}}{2} = \frac{3}{4}\pi$$

$$|\angle \vec{AB}; \vec{AC}| = \frac{\pi}{4}$$

44) b) Gleichung X:

$$\vec{n} = (1; -1; 0)$$

$$\vec{XA} = (1+\lambda; 2-\lambda; -3)$$

$$\frac{\pi}{3} = \arccos \frac{|1+\lambda-2+\lambda|}{\sqrt{2} \cdot \sqrt{2\lambda^2-2\lambda+14}}$$

$$\frac{1}{2} = \frac{|-1+2\lambda|}{2\sqrt{\lambda^2-\lambda+7}}$$

$$\sqrt{\lambda^2-\lambda+7} = |-1+2\lambda|$$

$$\lambda^2-\lambda+7 = 4\lambda^2-4\lambda+1$$

$$0 = 3\lambda^2-3\lambda-6$$

$$0 = 3(\lambda+1)(\lambda-2)$$

$$X_1 = [+2; 2; -3]$$

$$X_2 = [5; 0; -3]$$

$$43) X = A + B = \begin{bmatrix} 1 \\ 2 \\ 1 \end{bmatrix} + \begin{bmatrix} 1 \\ 1 \\ 3 \end{bmatrix}$$

$$\vec{n} = (a; b; c)$$

$$\vec{AB} = (3; -6; -6) \sim (1; -2; -2) \quad 0 = a - 2b - 2c$$

$$\vec{AC} = (-1; 1; 0) \quad 0 = a - b \Rightarrow a = b$$

$$\text{Einsetzen: } a = b$$

$$0 = a - a - 2c \Rightarrow c = -1$$

$$L = \left\{ \begin{bmatrix} 2+2\lambda \\ 1+2\lambda \\ 3-\lambda \end{bmatrix} \mid \lambda \in \mathbb{R} \right\}$$

$$50) \vec{n} = (2; -3; \sqrt{3})$$

$$\vec{v} = (2; 0; \sqrt{3})$$

$$\alpha = \arccos \frac{|4+3|}{\sqrt{76} \cdot \sqrt{7}} = \arccos \frac{\sqrt{7}}{4}$$

$$54) \vec{n} = (a; -1; 2)$$

$$\vec{v} = (1; 1; -2) \sim (-1; -1; 2)$$

$$a) 0 = \vec{n} \cdot \vec{v} = -a + 1 + 4 \Rightarrow \underline{\underline{a = 5}}$$

$$b) \vec{n} = k \cdot \vec{v} \Rightarrow \underline{\underline{a = -1}}$$

$$45) \left( \begin{array}{ccc|c} 2 & 1 & -1 & -3 \\ 1 & 1 & 0 & 5 \end{array} \right) \sim \left( \begin{array}{ccc|c} 1 & 1 & 0 & 5 \\ 1 & 1 & -1 & -3 \end{array} \right) \sim$$

$$\sim \left( \begin{array}{ccc|c} 1 & 1 & 0 & 5 \\ 1 & 1 & -1 & -3 \end{array} \right) \quad P = \{ [-8+6a; 13-1a; a] \}$$

$$\vec{v} = (1; -1; 1)$$

$$\vec{w} = (0; 0; 1)$$

$$\alpha = \arccos \frac{1}{\sqrt{3 \cdot 1}} = \arccos \frac{\sqrt{3}}{3}$$