

Nr. 1)  $A(2|4|1)$   $B(3|0|1-2)$   $\vec{AB} = \begin{pmatrix} 3-2 \\ 0-4 \\ -2-1 \end{pmatrix} = \begin{pmatrix} 1 \\ -4 \\ -3 \end{pmatrix}$

$$g_1: \vec{x} = \begin{pmatrix} 2 \\ 4 \\ 1 \end{pmatrix} + t \begin{pmatrix} 1 \\ -4 \\ -3 \end{pmatrix}$$

$$g_2: \vec{x} = \begin{pmatrix} 3 \\ 0 \\ -2 \end{pmatrix} + t \begin{pmatrix} 1 \\ -4 \\ -3 \end{pmatrix}$$

$$g_3: \vec{x} = \begin{pmatrix} 2 \\ 4 \\ 1 \end{pmatrix} + t \begin{pmatrix} -1 \\ 4 \\ 3 \end{pmatrix}$$

Nr. 3) a)  $g: \vec{x} = \begin{pmatrix} 1 \\ 2 \\ 5 \end{pmatrix} + t \begin{pmatrix} 1 \\ 0 \\ 2 \end{pmatrix}$   $P(2|2|7)$   $Q(4|5|11)$

$$\left. \begin{array}{l} 2 = 1 + t \cdot 1 \Rightarrow t = 1 \\ 2 = 2 + t \cdot 0 \quad \checkmark \\ 7 = 5 + t \cdot 2 \Rightarrow t = 1 \end{array} \right\} \Rightarrow P \in g$$

$$\left. \begin{array}{l} 4 = 1 + t \cdot 1 \Rightarrow t = 3 \\ 5 = 2 + t \cdot 0 \text{ für } t \in \mathbb{R} \Rightarrow 5 \neq 2 \\ 11 = 5 + t \cdot 2 \Rightarrow t = 3 \end{array} \right\} \Rightarrow Q \notin g$$

b)  $g: \vec{x} = \begin{pmatrix} 1 \\ -1 \\ 3 \end{pmatrix} + t \begin{pmatrix} -1 \\ 2 \\ 2 \end{pmatrix}$   $P(0|1|1)$   $Q(-1|3|7)$

$$\left. \begin{array}{l} 0 = 1 + t \cdot (-1) \Rightarrow t = 1 \\ 1 = -1 + t \cdot 2 \Rightarrow t = 1 \\ 1 = 3 + t \cdot 2 \Rightarrow t = -1 \end{array} \right\} \Rightarrow P \notin g$$

$$\left. \begin{array}{l} -1 = 1 + t \cdot (-1) \Rightarrow t = 2 \\ 3 = -1 + t \cdot 2 \Rightarrow t = 2 \\ 7 = 3 + t \cdot 2 \Rightarrow t = 2 \end{array} \right\} \Rightarrow Q \in g$$