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Nr. 2) A(3|0|0) B(3|5|0) H(0|0|4)

$$E_1: \vec{x} = \begin{pmatrix}3\\0\\0\end{pmatrix} + r\begin{pmatrix}3-3\\5-0\\0-0\end{pmatrix} + s\begin{pmatrix}0-3\\0-0\\4-0\end{pmatrix} = \begin{pmatrix}3\\0\\0\end{pmatrix} + r\begin{pmatrix}0\\5\\0\end{pmatrix} + s\begin{pmatrix}-3\\0\\4\end{pmatrix}$$

$$E_2: \vec{x} = \begin{pmatrix}0\\0\\0\end{pmatrix} + r\begin{pmatrix}3\\5\\0\end{pmatrix} + s\begin{pmatrix}0\\5\\4\end{pmatrix} = r\begin{pmatrix}3\\5\\0\end{pmatrix} + s\begin{pmatrix}0\\5\\4\end{pmatrix}$$

Nr. 3)

a) $\begin{pmatrix}8\\0\\6\end{pmatrix} = \begin{pmatrix}1\\6\\-1\end{pmatrix} + r\begin{pmatrix}2\\1\\3\end{pmatrix} + s\begin{pmatrix}3\\-2\\1\end{pmatrix}$

$$\begin{array}{rcl|l|l} 2r + 3s & = & 7 & \cdot 1 & \cdot 3 \\ r - 2s & = & 0 & \cdot(-2) & \\ 3r + s & = & 7 & & \cdot(-2) \end{array}$$

$2r + 3s = 7 \Rightarrow 2r = 7 - 3\cdot 1 = 4 \Rightarrow r = 2$

$7s = 7 \Rightarrow s = 1$

$7s = 7 \Rightarrow s = 1$ $\Rightarrow$ P(8|0|6) $\in$ E

b) $\begin{pmatrix}2\\1\\3\end{pmatrix} = \begin{pmatrix}1\\0\\-1\end{pmatrix} + r\begin{pmatrix}2\\1\\3\end{pmatrix} + s\begin{pmatrix}3\\-2\\1\end{pmatrix}$

$$\begin{array}{rcl|l|l} 2r + 3s & = & 1 & \cdot 1 & \cdot 3 \\ r - 2s & = & 1 & \cdot(-2) & \\ 3r + s & = & 4 & & \cdot(-2) \end{array}$$

$2r + 3s = 1$

$7s = -1 \Rightarrow s = -\frac{1}{7}$

$7s = -5 \Rightarrow s = -\frac{5}{7}$ $\Rightarrow$ P(2|1|3) $\notin$ E

c) P(16|-3|11) $\in$ E

d) P(6|-1|5) $\notin$ E

O. Fell