3.16 On doit avoir $\overrightarrow{\mathrm{AB}} = 2\,\overrightarrow{\mathrm{BC}}$, c'est-à-dire :

$$\begin{pmatrix} (-1)-(\lambda) \\ (7+2\,\mu)-(-2+3\,\lambda) \\ (3-\mu)-(1) \end{pmatrix} = 2\begin{pmatrix} (\nu)-(-1) \\ (4)-(7+2\,\mu) \\ (3-2\,\nu)-(3-\mu) \end{pmatrix}$$

$$\begin{pmatrix} -\lambda-1 \\ -3\,\lambda+2\,\mu+9 \\ -\mu+2 \end{pmatrix} = \begin{pmatrix} 2\,\nu+2 \\ -4\,\mu-6 \\ 2\,\mu-4\,\nu \end{pmatrix}$$

$$\left\{\begin{array}{rrrrr} -\lambda & & -\,2\,\nu & = & 3 \\ -3\,\lambda & +\,6\,\mu & & = & -15 \\ & -\,3\,\mu & +\,4\,\nu & = & -2 \end{array}\right. \quad \left|\begin{array}{l} \cdot(-3) \\ \cdot 1 \\ \\ \end{array}\right.$$

$$\left\{\begin{array}{rrrrr} -\lambda & & -\,2\,\nu & = & 3 \\ & 6\,\mu & +\,6\,\nu & = & -24 \\ & -\,3\,\mu & +\,4\,\nu & = & -2 \end{array}\right. \quad \left|\begin{array}{l} \\ :6 \\ \\ \end{array}\right. \left|\begin{array}{l} \\ :2 \\ \cdot 1 \end{array}\right.$$

$$\left\{\begin{array}{rrrrr} -\lambda & & -\,2\,\nu & = & 3 \\ & \mu\,+ & \nu & = & -4 \\ & & 7\,\nu & = & -14 \end{array}\right. \quad \left|\begin{array}{l} \\ \\ :7 \end{array}\right.$$

$$\left\{\begin{array}{rrrrr} -\lambda & & -\,2\,\nu & = & 3 \\ & \mu\,+ & \nu & = & -4 \\ & & \nu & = & -2 \end{array}\right. \quad \left|\begin{array}{l} \cdot(-1) \\ \\ \cdot(-2) \end{array}\right. \left|\begin{array}{l} \\ \cdot 1 \\ \cdot(-1) \end{array}\right.$$

$$\left\{\begin{array}{rrrrr} \lambda & & & = & 1 \\ & \mu & & = & -2 \\ & & \nu & = & -2 \end{array}\right.$$

Les coordonnées du point A sont $\left\{\begin{array}{l} x = 1 = 1 \\ y = -2 + 3 \cdot 1 = 1 \\ z = 1 = 1 \end{array}\right.$

Les coordonnées du point B sont $\left\{\begin{array}{l} x = -1 = -1 \\ y = 7 + 2 \cdot (-2) = 3 \\ z = 3 - (-2) = 5 \end{array}\right.$

Les coordonnées du point C sont $\left\{\begin{array}{l} x = -2 = -2 \\ y = 4 = 4 \\ z = 3 - 2 \cdot (-2) = 7 \end{array}\right.$

Comme $\overrightarrow{\mathrm{AB}} = \begin{pmatrix} -2 \\ 2 \\ 4 \end{pmatrix}$, une équation paramétrique de la droite AB peut être :

$(d_{\mathrm{AB}}) : \left\{\begin{array}{l} x = 1 - 2\,\lambda \\ y = 1 + 2\,\lambda \\ z = 1 + 4\,\lambda \end{array}\right. , \quad \lambda \in \mathbb{R}\,.$