$$A = (a_1; a_2; a_3) \qquad \vec{OA} = \begin{pmatrix} a_1 \\ a_2 \\ a_3 \end{pmatrix}$$

$$B = (b_1; b_2; b_3) \qquad \vec{OB} = \begin{pmatrix} b_1 \\ b_2 \\ b_3 \end{pmatrix}$$

$$\vec{AB} = \vec{OB} - \vec{OA} = \begin{pmatrix} b_1 \\ b_2 \\ b_3 \end{pmatrix} - \begin{pmatrix} a_1 \\ a_2 \\ a_3 \end{pmatrix} = \begin{pmatrix} b_1 - a_1 \\ b_2 - a_2 \\ b_3 - a_3 \end{pmatrix}$$

$$X = (x_1; x_2) \qquad \vec{OX} = \begin{pmatrix} x_1 \\ x_2 \end{pmatrix}$$

$$Y = (y_1; y_2) \qquad \vec{OY} = \begin{pmatrix} y_1 \\ y_2 \end{pmatrix}$$

$$\vec{XY} = \vec{OY} - \vec{OX} = \begin{pmatrix} y_1 \\ y_2 \end{pmatrix} - \begin{pmatrix} x_1 \\ x_2 \end{pmatrix} = \begin{pmatrix} y_1 - x_1 \\ y_2 - x_2 \end{pmatrix}$$

$A=(1;2)=(a_1;a_2)$

$B=(3;-8)=(b_1;b_2)$

$C=(-7;-6)=(c_1;c_2)$

A, B, C alignés ?

$\overrightarrow{AB}$

① Calculer $\overrightarrow{AB}$, $\overrightarrow{AC}$.

② Appliquer le critère du déterminant.

$$\begin{pmatrix} 2 \\ -10 \end{pmatrix} = \overrightarrow{AB} = \begin{pmatrix} b_1 - a_1 \\ b_2 - a_2 \end{pmatrix} \qquad \overrightarrow{AC} = \begin{pmatrix} c_1 - a_1 \\ c_2 - a_2 \end{pmatrix}$$

$$\overrightarrow{AC} = \begin{pmatrix} -8 \\ -8 \end{pmatrix}$$

$$\begin{vmatrix} 2 & -8 \\ -10 & -8 \end{vmatrix} = -16-(-10)(-8) = -16-80 = -96 \neq 0$$

$\Rightarrow$ A, B, C pas alignés.

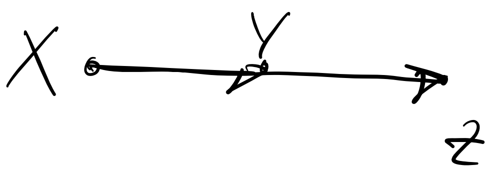
$X=(1;2;3)$

$Y=(-1;2;-1)$

$Z=(1;1;-2)$

X, Y, Z alignés ?

$\Leftrightarrow \overrightarrow{XY} = k\overrightarrow{XZ}$



$$\overrightarrow{XY} = \begin{pmatrix} -1-1 \\ 2-2 \\ -1-3 \end{pmatrix} = \begin{pmatrix} -2 \\ 0 \\ -4 \end{pmatrix}$$

$$\vec{XZ} = \begin{pmatrix} 1-1 \\ 1-2 \\ -2-3 \end{pmatrix} = \begin{pmatrix} 0 \\ -1 \\ -5 \end{pmatrix}$$

$$\begin{pmatrix} -2 \\ 0 \\ -4 \end{pmatrix} = k \begin{pmatrix} 0 \\ -1 \\ -5 \end{pmatrix}$$

$$\vec{XY} = k \cdot \vec{XZ} \Rightarrow \begin{aligned} -2 &= k \cdot 0 = 0 &\Leftrightarrow\ & -2 = 0 \quad ⚡ \\ 0 &= -k &\Leftrightarrow\ & k = 0 \\ -4 &= k \cdot (-5) &\Leftrightarrow\ & k = \frac{4}{5} \end{aligned}$$

X, Y, Z ne sont pas alignés.