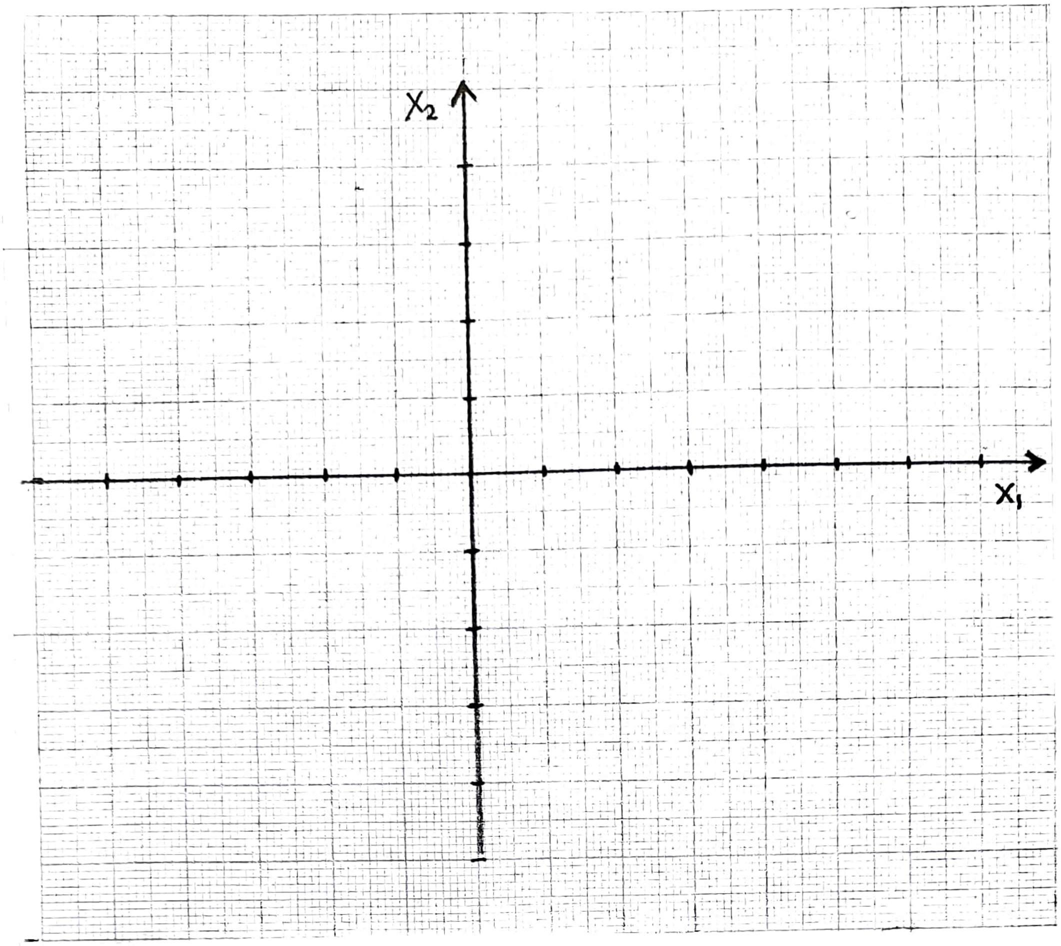

Lastname, Firstname:

old basis:

$\vec{e}_1 = \langle 1,0 \rangle$ $\vec{e}_2 = \langle 0,1 \rangle$

new basis:

$\vec{b}_1 = \langle 3,-1 \rangle, \vec{b}_2 = \langle 2,2 \rangle$

$B = \langle \vec{b}_1 | \vec{b}_2 \rangle$

$= \begin{bmatrix} & \\ & \end{bmatrix}$

basis changing matrix (columns are new basis vectors)

its inverse:

$B^{-1} = \begin{bmatrix} & \\ & \end{bmatrix}$

linear change of coordinates

$\vec{x}$ in terms of $\vec{y}$: $\vec{x} = B\vec{y}$

$\vec{y}$ in terms of $\vec{x}$: $\vec{y} = B^{-1}\vec{x}$

matrix form: $\begin{bmatrix} x_1 \\ x_2 \end{bmatrix} = \begin{bmatrix} & \\ & \end{bmatrix} \begin{bmatrix} y_1 \\ y_2 \end{bmatrix}$

$\begin{bmatrix} y_1 \\ y_2 \end{bmatrix} = \begin{bmatrix} & \\ & \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}$

scalar form: $x_1 =$

$x_2 =$

$y_1 =$

$y_2 =$

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point 1: $\langle x_1, x_2 \rangle = \langle -2, 6 \rangle \rightarrow \langle y_1, y_2 \rangle =$

point 2: $\langle y_1, y_2 \rangle = \langle 2, -1 \rangle \rightarrow \langle x_1, x_2 \rangle =$

Instructions: Following the example handout, fill in the blanks above. Then reproduce the example graphic with $\vec{e}_1, \vec{e}_2$ then $\vec{b}_1, \vec{b}_2$. Then use a ruler to create the new 4×4 grid of "unit parallelograms" formed with edges $\vec{b}_1, \vec{b}_2$ and their translated vectors as in the example. Draw in the y_1, y_2 axes on this grid and label them. Then graphically locate and draw in the position vectors of point 1 using the x-grid and point 2 using the y-grid. Confirm that the other coordinates you read off from the other grid agree with your computation above.