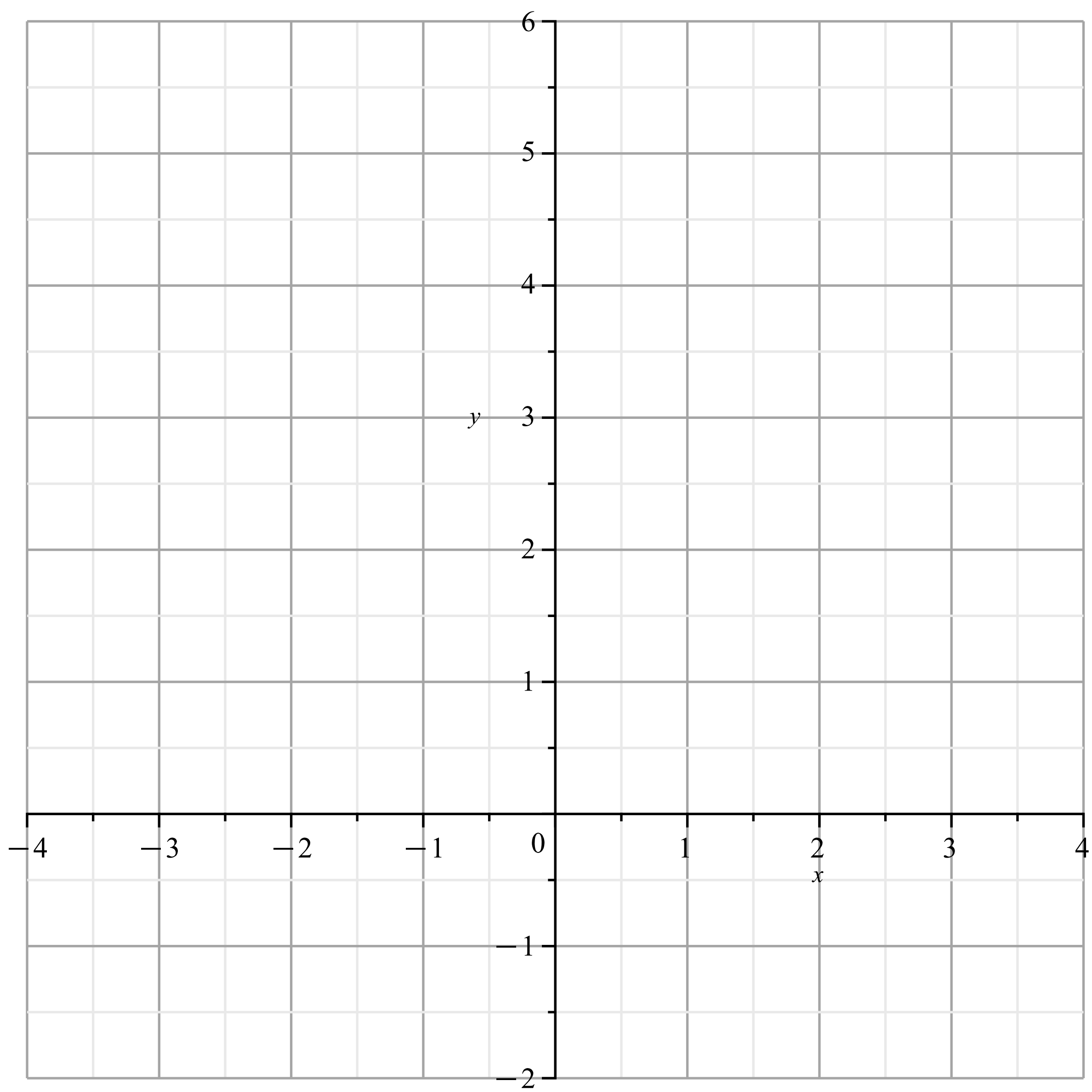
digonalization transformation practice

For each matrix use Maple to find the eigenvalues and the basis changing matrix $B = \langle b_1 | b_2 \rangle$ of corresponding eigenvectors, evaluate the matrix product $A_B = B^{-1} A\, B$ to see that it is diagonal and has the corresponding eigenvalues in order along the diagonal, and use the coordinate transformations $x = B\, y$ and $y = B^{-1}\, x$ to find the new coordinates $\langle y_1, y_2 \rangle$ of the point $x = \langle x_1, x_2 \rangle = \langle -2, 4 \rangle$ in the plane (use Maple). Then make a grid diagram with the new (labeled) coordinate axes associated with this eigenbasis together with basis vectors and the projection parallelogram of this point $x = y_1\, b_1 + y_2\, b_2$.

First fill in the blanks

$A = \begin{bmatrix} 1 & 4 \\ 2 & 3 \end{bmatrix}$, $x = \begin{bmatrix} -2 \\ 4 \end{bmatrix}$,

$\Lambda = \begin{bmatrix} \quad \end{bmatrix}$, $B = \begin{bmatrix} \qquad \end{bmatrix}$, $B^{-1} = \begin{bmatrix} \qquad \end{bmatrix}$, $A_B = \begin{bmatrix} \qquad \end{bmatrix}$, $Y = \begin{bmatrix} \quad \end{bmatrix}$



$A = \begin{bmatrix} -3 & 2 \\ -3 & 4 \end{bmatrix}, \quad X = \begin{bmatrix} 0 \\ 5 \end{bmatrix},$

$\Lambda = \begin{bmatrix} \quad \end{bmatrix}, \; B = \begin{bmatrix} \qquad \end{bmatrix}, \quad B^{-1} = \begin{bmatrix} \qquad \end{bmatrix}, \quad A_B = \begin{bmatrix} \qquad \end{bmatrix}, \quad Y = \begin{bmatrix} \quad \end{bmatrix}$