[1] By least squares, find the equation of the form \( y = ax + b \) which best fits the data

\[
\begin{bmatrix}
  x_1 & y_1 \\
  x_2 & y_2 \\
  x_3 & y_3
\end{bmatrix}
= 
\begin{bmatrix}
  0 & 1 \\
  1 & 1 \\
  3 & 2
\end{bmatrix}
\]
[2] Extend the vector (1,1,1,2) to an orthogonal basis for $\mathbb{R}^4$. 
Find the orthogonal projection of the vector $(1,0,0,0)$ onto the subspace of $\mathbb{R}^4$ spanned by the vectors $(1,1,1,0)$ and $(0,1,1,1)$. 
Find the matrix $A$ which projects $\mathbb{R}^4$ orthogonally onto the subspace spanned by the vectors $(1,1,1,1)$ and $(1,1,2,2)$. 
Find the eigenvalues and corresponding eigenvectors of the matrix

\[ A = \begin{bmatrix} 3 & 2 \\ 4 & 1 \end{bmatrix} \]
Find the matrix exponential $e^{A t}$, for the matrix

\[
A = \begin{bmatrix} 4 & 1 \\ 4 & 1 \end{bmatrix}
\]
Find the matrix exponential $e^{At}$, for the matrix

$$A = \begin{bmatrix} 1 & 1 & -1 \\ 1 & 1 & 2 \\ 1 & 1 & 2 \end{bmatrix}$$
Find a formula for $A^n$, for the matrix

\[
A = \begin{bmatrix}
2 & 0 & 0 \\
1 & 1 & 1 \\
1 & -1 & 3 \\
\end{bmatrix}
\]