Exercise 1
Calculate the coordinates of \( v \) relative to the orthogonal basis
\[ \{(-1, 0, 0), (0, 1, -2), (0, 2, 1)\} : \]
(i) \( v = (2, -1, -3) \);
(ii) \( v = (-1, -1, 1) \).

Exercise 2
Use the Gram-Schmidt process to transform the given basis into orthogonal one:
(i) \( u_1 = (-2, 0), u_2 = (1, 3) \);
(ii) \( u_1 = (1, 0, -1), u_2 = (1, 0, 0), u_3 = (2, 1, -1) \);

Exercise 3
Find the least squares approximate solution of the linear system:
\[
\begin{align*}
  x & = 1 \\
  y & = 0 \\
  y + z & = 1 \\
  x + y + z & = 0
\end{align*}
\]