1. If $\vec{u} = \begin{bmatrix} -1 \\ 5 \end{bmatrix}$ and if $\vec{v} = \begin{bmatrix} 3 \\ 2 \end{bmatrix}$, and the vector $4\vec{u} + \vec{v}$ is drawn with its tail at the point $(10, -10)$, find the coordinates of the point at the head of $4\vec{u} + \vec{v}$.

2. Find the general equation of the plane through the point $(1, 1, 1)$ that is perpendicular to the line with parametric equations

$$\begin{aligned} x &= 2 - t \\ y &= 3 + 2t \\ z &= -1 + t \end{aligned}$$

3. Find the rank of the matrix: $\begin{bmatrix} 1 & -2 & 0 & 3 & 2 \\ 3 & -1 & 1 & 3 & 4 \\ 3 & 4 & 2 & -3 & 2 \\ 0 & -5 & -1 & 6 & 2 \end{bmatrix}$