1. Find the Cartesian equation of the plane

$$\vec{r} = \begin{bmatrix} 2 \\ -1 \\ 3 \end{bmatrix} + \lambda \begin{bmatrix} 1 \\ 4 \\ -2 \end{bmatrix} + \mu \begin{bmatrix} 3 \\ -3 \\ 2 \end{bmatrix}$$

2. a) Find a vector normal to the plane $\vec{r} = \begin{bmatrix} 1 \\ 4 \\ -2 \end{bmatrix} + \lambda \begin{bmatrix} 1 \\ 1 \\ -1 \end{bmatrix} + \mu \begin{bmatrix} -3 \\ 1 \\ 2 \end{bmatrix}$.

   b) Using your answer to part a), can you find the distance of the point $A(1, 1, 1)$ to the given plane?

3. a) Find the distance of $(1, 2, 4)$ from the plane $\Pi_1 : 2x + y - z = 4$.

   b) The line $\vec{r} = \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix} + \lambda \begin{bmatrix} -1 \\ -1 \\ 2 \end{bmatrix}$ intersects Π_1 at the point P. Find P.