

Step-1

The objective is to complete the statement, "Normally 4 plane" in four dimensional space meet at a _____, and also find the combination of $(1,0,0,0), (1,1,0,0), (1,1,1,0), (1,1,1,1)$ which produce $b = (3,3,3,2)$.

Step-2

Consider the following expression,

$$(1,0,0,0), (1,1,0,0), (1,1,1,0), (1,1,1,1)$$

Produces $b = (3,3,3,2)$

Normally 4 planes in four-dimension space meet at a **point** (similar to 3 planes meeting in 3 dimension space at a point).

The combination of the 4 column vectors producing b is:

$$1 \begin{pmatrix} 1 \\ 1 \\ 1 \\ 0 \end{pmatrix} + 2 \begin{pmatrix} 1 \\ 1 \\ 1 \\ 1 \end{pmatrix} = \begin{pmatrix} 3 \\ 3 \\ 3 \\ 2 \end{pmatrix}$$

The system of linear equations this is satisfying is

$$\begin{array}{l} x + y + z + t = 3 \\ y + z + t = 3 \\ z + t = 3 \\ t = 2 \end{array}$$

The solution of the equation is given as following in matrix format:

$$\begin{bmatrix} 0 \\ 0 \\ 1 \\ 2 \end{bmatrix}.$$