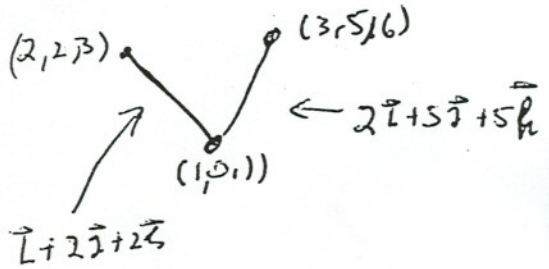
4. **(There is no partial credit for this problem. Make sure your answer is correct.)** Find the equation of the plane through $(1,0,1)$, $(2,2,3)$, and $(3,5,6)$.



The perpendicular vector is $\begin{vmatrix} \vec{i} & \vec{j} & \vec{k} \\ 1 & 2 & 2 \\ 2 & 5 & 5 \end{vmatrix}$

$= 0\vec{i} - \vec{j} + \vec{k}$

The plane is:

$0(x-1) - (y-0) + (z-1) = 0$

$-y + z = 1$

5. Let $\vec{a} = 3\vec{i} + 2\vec{j}$ and $\vec{b} = \vec{i} - 2\vec{j} + 3\vec{k}$. Compute $\vec{a} \times \vec{b}$.

$\vec{a} \times \vec{b} = \begin{vmatrix} \vec{i} & \vec{j} & \vec{k} \\ 3 & 2 & 0 \\ 1 & -2 & 3 \end{vmatrix} = 6\vec{i} - 9\vec{j} - 8\vec{k}$

6. Let $\vec{a} = 3\vec{i} + 2\vec{j}$ and $\vec{b} = \vec{i} - 2\vec{j} + 3\vec{k}$. Find the angle between $\vec{a}$ and $\vec{b}$.

$\vec{a} \cdot \vec{b} = \|\vec{a}\| \, \|\vec{b}\| \cos\theta$

$\cos\theta = \dfrac{\vec{a} \cdot \vec{b}}{\|\vec{a}\| \, \|\vec{b}\|} = \dfrac{-1}{\sqrt{13}\sqrt{14}}$

$\theta = \cos^{-1}\left(\dfrac{-1}{\sqrt{13}\sqrt{14}}\right)$