## Answer on Question \#45088 - Analytic Geometry

## Task:

Obtain the equation of the plane passing through the line $(x-1) / 2=-(y+1) / 1=(z-3) / 4$ and which is perpendicular to the plane $x+2 y+z=4$.

## Solution:

As the plane is passing through the line $(x-1) / 2=-(y+1) / 1=(z-3) / 4$, so the vector $(2,-1,4)$ is parallel to the plane. Since, our plane is perpendicular to the plane $x+2 y+z=4$, than the vector $(1,2,1)$ is also parallel to our plane. It is easily seen that the point $(3,-2,7)$ belongs to line
$(x-1) / 2=-(y+1) / 1=(z-3) / 4$. Thus, our plane contains vectors $(x-3, y+2, z-7),(1,2,1),(2,-1,4)$. The equation of plane can be found from the condition that three vectors are coplanar, which yields the determinant of the following matrix is zero.

| $x$ | 3 | $y$ | 2 | $z$ |
| :--- | :--- | :--- | :--- | :--- |
| 1 | 2 | 1 | 7 |  |
| 2 | - | 1 | 4 |  |
|  |  |  |  |  |

$=(x-3)(8+1)-(y+2)(4-2)+(z-7)(-1-4)=9 x-2 y-5 z+4=0$.
So, the equation of our plane is $9 x-2 y-5 z+4=0$
Answer: 9x-2y-5z+4=0.

