Math 222 in class problems   Week: January 25, 2021

1. Find a vector normal to the plane containing the vectors $\mathbf{a} = \langle 4, -1, 2 \rangle$ and $\mathbf{b} = \langle -1, 5, 3 \rangle$

2. If $\mathbf{w} = \mathbf{u} \times \mathbf{v} = 0$ then $\mathbf{u} \cdot \mathbf{w} = ?$

3. True or False:
   If $\mathbf{u} \cdot \mathbf{v} = 0$ and $\mathbf{u} \times \mathbf{v} = \mathbf{0}$, then at least one of $\mathbf{u} = \mathbf{0}$ or $\mathbf{v} = \mathbf{0}$ holds.

4. Find an equation of the plane that passes through the point $(3, 1, 4)$ and contains the line of intersection of the planes $x + 2y + 3z = 1$ and $2x - y + z = -3$.