Unit 1 Group Work
MultiV 2021-22 / Dr. Kessner

No calculator! Have fun!

1. Let

$$\vec{u} = \left\langle 2\sqrt{3}, 2 \right\rangle$$

$$\vec{v} = \left\langle \frac{5}{2}, \frac{5\sqrt{3}}{2} \right\rangle$$

Express $\vec{v}$ as the sum of a vector with the same direction as $\vec{u}$ and a vector orthogonal to $\vec{u}$.

2. Find the equation of the plane through the points: $(3, 0, 0)$, $(0, 5, 0)$, and $(0, 0, 2)$. You must use vectors to obtain your equation. Once you have your equation, verify your intercepts. Also calculate the distance from the plane to the origin.

3. Find parametric equations for the line through $\langle 5\sqrt{2}, 0, 0 \rangle$ and $\langle 0, 5\sqrt{2}, 0 \rangle$. Find the distance from the point $\langle 0, 0, \sqrt{119} \rangle$ to the line.

4. Express the following vectors in both cylindrical and spherical coordinates.

a. $\mathbf{i} + \mathbf{j}$

b. $\mathbf{j} + \mathbf{k}$

c. $\mathbf{k} + \mathbf{i}$

d. $\mathbf{i} + \mathbf{j} + \mathbf{k}$