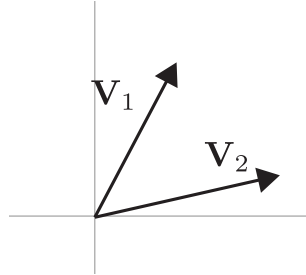


Name:

Student ID:

Math refresher



Answer the following questions about the above figure, where $\mathbf{V}_1 = (x_1, y_1, z_1)$ and $\mathbf{V}_2 = (x_2, y_2, z_2)$.

1. Find a vector \mathbf{V} that has the same direction as \mathbf{V}_1 and unit length.
2. How would you calculate the angle between vectors \mathbf{V}_1 and \mathbf{V}_2 ?
3. How would you find a vector \mathbf{V}_3 that is orthogonal to both \mathbf{V}_1 and \mathbf{V}_2 ?
4. Calculate the product $C = AB$, where

$$A = \begin{bmatrix} 0 & 1 \\ 1 & 0 \\ 2 & 3 \end{bmatrix}, \quad B = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}.$$

5. Calculate $D = BA^T$, where A and B are as in Problem 4.