Math 2401 (D1-D3)
8/25/2014

Worksheet 2 - Chapter 12

1. Find a vector with length 4 and direction $\frac{1}{\sqrt{3}}\vec{i} - \frac{1}{\sqrt{3}}\vec{j} + \frac{1}{\sqrt{3}}\vec{k}$.

2. Find the distance between the points $P_1(4, 1, 2)$ and $P_2(4, -2, 6)$. Write the vector $\overrightarrow{P_1P_2}$ in component form. What is the length of the vector $\overrightarrow{P_1P_2}$? What is the direction of the vector $\overrightarrow{P_1P_2}$?

3. Given the vectors $\vec{u} = \vec{i} - \vec{j} + 2\vec{k}$ and $\vec{v} = 3\vec{i} - \vec{k}$, find $\cos\theta$, where θ is the angle between $\vec{u}$ and $\vec{v}$.

4. Find a unit vector orthogonal to the plane determined by the points $P(2, -2, 1)$ and $Q(-1, 0, -2)$ and $R(0, -1, 2)$. Find the area of the triangle ΔPQR.

5. Find the volume of the parallelepiped determined by the vectors $\vec{u} = 2\vec{i} - \vec{k}$, $\vec{v} = -2\vec{i} + \vec{j}$, and $\vec{w} = \vec{i} + 2\vec{j} - 2\vec{k}$.