Worksheet 7,   Math 10560

1. Find the vector given by the projection of $v = \langle 2, 1, 5 \rangle$ onto $a = \langle 1, -1, 2 \rangle$.

2. Does the following equation describe a sphere? If so, what is the orgin and the radius?

$$2x^2 + 2y^2 + 2z^2 = 8x - 24z + 1$$

3. Determine the unit vector that has the same direction as $v = \langle 2, 4, -1 \rangle$.

4. Find the area of the parallelpiped given by the vectors $v = \langle 1, 1, 1 \rangle$, $w = \langle 2, 1, 0 \rangle$ and $u = \langle 0, 2, 3 \rangle$.

5. Let L be the line that contains the points $P(4, 2, -1)$ and $Q(-2, 5, 3)$. Does this line intersect the yz-plane? If so where?

6. Let v be a vector starting at the point $P(1, 3, 2)$ and such that

$$v \cdot \mathbf{i} = 2$$

$$v \cdot \mathbf{j} = 1$$

$$v \cdot \mathbf{k} = 4$$

Write down v in terms of its components. What is the terminal point of the vector v?