1. Consider all the set of points P(x, y, z) that are twice as far from A(0, -1, 1) as from B(1, 2, 0). Find and simplify an equation that represents these points P. What does this object look like?

[15 points]

- 2. Given $\mathbf{a} = \langle 1, -1, 3 \rangle$ and $\mathbf{b} = \langle 0, 1, 5 \rangle$, Find the following:
 - (a) ||**a**||

[3 points]

(b) $\mathbf{a} + \mathbf{b}$

[3 points]

(e) $\operatorname{proj}_{\mathbf{a}}\mathbf{b}$

[3 points]

3. Find the direction cosines and direction angles of the following vector. Give the direction angles correct to the nearest degree.

$$\langle 1,-2,-1\rangle$$

[10 points]

4. Verify the points are the vertices of a parallelogram and determine its area.

(1, 1, 1), (2, 3, 4), (6, 5, 2), (7, 7, 5)

[15 points]

5. Find a vector equation and parametric equation for the line through the point (6, -5, 2) and parallel to the vector $\langle 1, -2, -1 \rangle$.

[10 points]

6. Find the values of x such that the vectors $\langle 3, 2, x \rangle$ and $\langle 2x, 4, x \rangle$ are orthogonal. [10 points]