1. Let the vectors \( \vec{u}_1, \vec{u}_2, \) and \( \vec{u}_1 - \vec{u}_2 \) be the legs of a triangle \( T \). Find the area of \( T \).

\[
\vec{u}_1 = (1, 3, 2) \\
\vec{u}_2 = (1, 6, 4) 
\]

2. Give a point and normal vector for the plane which contains the lines

3. Find an equation for the plane perpendicular to \( \ell_1 \) passing through the point \( \ell_2(0) \).

4. A plane is given by the equation

\[
3x + 7y - z = 0 
\]

(a) Write the plane in the form of normal vector at a given point.

(b) Find the intersection between the plane in problem 2b and the plane in problem 3a.

5. Decide whether or not the following sets of vectors are linearly independent. If they are find the area/volume of the the region formed by the vectors.

(a)

\[
\vec{v}_1 = (1, 2, 3) \\
\vec{v}_2 = (-1, -2, -3) 
\]

(b)

\[
\vec{u}_1 = (1, 3, 2) \\
\vec{u}_2 = (1, 6, 4) 
\]

(c)

\[
\vec{w}_1 = (1, 4, 2) \\
\vec{w}_2 = (-1, 5, 3) \\
\vec{w}_3 = (2, 4, 6) 
\]

(d)

\[
\vec{x}_1 = (1, 3, 2) \\
\vec{x}_2 = (1, 6, 4) \\
\vec{x}_3 = (3, 12, 8) 
\]

6. Sketch the level curves of the function for \( c = -2, -1, 0, 1, 2 \) of \( f(x, y) = x^2 - 2y^2 \) and \( f(x, y) = -x^2 - y^2 \)