1) Given the vectors $u = (2, -1, 3)$ and $v = (2, -1, 5)$, find the distance between u and $3v$, the norm of the vector $u \times v$ and the cosine of the angel between the vectors u and v.

2) Find the equation of the plane P passing through the point $A(2,3,4)$ and which is parallel to the plane $2x - y + z + 6 = 0$. Then, find the distance between the point $B(1,1,-1)$ and the plane P above.

3) Assume T is the rotational operator on R^2 by an angle $\theta = \frac{\pi}{3}$ and S is the multiplication operator by the matrix $A = \begin{bmatrix} 1 & -2 \\ 3 & 1 \end{bmatrix}$.

a) Show that the operators T and S are one to one and onto.

b) Find $(ToS)(u)$, where $u = (1. -2)$.

c) Find $(ToS^{-1})(u)$, where $u = (1. -2)$.

4) Given the vectors $u = (1, -2, 3)$ and $v = (2, 4, 6)$ in R^3, find the vector component of u along v and the vector component of u orthogonal to v.