III Assignment Questions

1. Give the 3X3 homogeneous transformation matrix for each of the following transformation   
    sequences.
2. Rotate counterclockwise about the origin by 45 degree and then scale the x-direction by one and half of original size.
3. Scale the y-direction by twice as tall, shift down by 1 unit and then rotate clockwise by 30 degree
4. Prove that two scaling transformation commute (S1S2=S2S1) and two 2D rotations about origin also commute (R1R2=R2R1).
5. Locate the new position of the triangle [(5,4),(8,3),(8,8)] after its rotation by 90 degree clockwise about its centroid. Prove that triangle PQR [(8,2),(10,4),(8,6)] after reflection about x-axis and then about (y= -x )will be same as the rotation about origin by an angle 270 degree.
6. Apply 3D geometric transformation to make the given tetrahedron A(0,0,0),B(2,0,0), C(1,2,0),D(1,1,2) rotate about x axis making it erect with its base ABC resting on the x-z axis plane. Next magnify it four times about a fixed point p(1,1,2).
7. A mirror is placed such that it passes through (10,0) and (0,10) . Find the reflected view of a triangle with vertices A(5,50), B(20,40) and C(10,70) in this mirror.
8. A triangle A(4,0), B(4,4) C(2,2) and a circle with radius r=8 center (10,10) are defined in XY plane. Obtain the composite transformation matrix to fit triangle ABC inside the circle such that edge AB is horizontal and passing through the centre of the circle . The vertices A, B, C touch the edge of a circle.