Assignment 11

Problem 1. Show that the surface given by the equation $x^2 + y^2 + z^2 = 1$ is a sphere of radius 1 centered at the origin.

Problem 2. Find the equation of the plane that passes through the points $A(1, 2, 3)$, $B(-2, 1, 0)$, and $C(0, 4, -1)$.

Problem 3. Determine the equation of the line that passes through the points $P(2, -1, 4)$ and $Q(-3, 5, -2)$.

Problem 4. Find the angle between the lines $r = (1, 2, 3) + t(2, 1, -1)$ and $s = (4, 0, -2) + u(1, 2, 3)$.

Problem 5. Find the point of intersection of the line $r = (1, 2, 3) + t(2, 1, -1)$ with the plane $3x + 2y - z = 5$.

Problem 6. Find the equation of the plane that passes through the line $r = (1, 2, 3) + t(2, 1, -1)$ and is parallel to the plane $3x + 2y - z = 5$.

Problem 7. Find the distance between the line $r = (1, 2, 3) + t(2, 1, -1)$ and the plane $3x + 2y - z = 5$.

Problem 8. Find the equation of the plane that passes through the origin and is perpendicular to the line $r = (1, 2, 3) + t(2, 1, -1)$.

Problem 9. Find the equation of the plane that passes through the origin and is parallel to the plane $3x + 2y - z = 5$.

Problem 10. Find the equation of the plane that passes through the origin and is perpendicular to the plane $3x + 2y - z = 5$.

Problem 11. Find the equation of the plane that passes through the origin and is parallel to the line $r = (1, 2, 3) + t(2, 1, -1)$.

Problem 12. Find the equation of the plane that passes through the origin and is perpendicular to the line $r = (1, 2, 3) + t(2, 1, -1)$.

Problem 13. Find the equation of the plane that passes through the origin and is parallel to the plane $3x + 2y - z = 5$.

Problem 14. Find the equation of the plane that passes through the origin and is perpendicular to the plane $3x + 2y - z = 5$.