Essentials of Analytical Geometry and Linear Algebra I, Class #7

Innopolis University, October 2020

1. Find the equation of the plane passing through the point $(2, -3, 4)$ and parallel to the plane $2x - 5y - 7z + 15 = 0$.
2. Find the equation of the plane passing through the point $(-1, 3, 2)$ and perpendicular to the planes $x + 2y + 2z = 5$ and $3x + 3y + 2z = 8$.
3. Find the ratio in which the line joining the points $(2, -1, 4)$ and $(6, 2, 4)$ is divided by the plane $x + 2y + 3z + 5 = 0$.
4. Find the equation of the plane which passes through the intersection of the planes $2x + 3y + 10z - 8 = 0, 2x - 3y + 7z - 2 = 0$ and is perpendicular to the plane $3x - 2y + 4z - 5 = 0$.
5. Find the equations of the line passing through the point $(1, 2, 3)$ and perpendicular to the planes $x - 2y - z + 5 = 0$ and $x + y + 3z + 6 = 0$.
6. Find the perpendicular distance from the point $(1, 3, -1)$ to the line $\frac{x-13}{5} = \frac{y+8}{-8} = \frac{z-31}{1}$
7. Find the distance of the points $(2, 3, -5), (3, 4, 7)$ from the plane $x + 2y - 2z = 9$ and prove that these points lie on the opposite sides of the plane.
8. Find the distance of the point $(1, -2, 3)$ from the plane $x - y + z = 5$ measured parallel to the line $\frac{x}{2} = \frac{y}{3} = \frac{z}{-6}$

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1. Find the equation of the plane passing through the points $(2, 2, 1)$, $(2, 3, 2)$ and $(-1, 3, 1)$.
2. Find the equation of the plane passing through the point $(2, 2, 4)$ and perpendicular to the planes $2x - 2y - 4z - 3 = 0$ and $3x + y + 6z - 4 = 0$.
3. Find the equation of the plane passing through the points $(9, 3, 6)$ and $(2, 2, 1)$ and perpendicular to the plane $2x + 6y + 6z - 9 = 0$.
4. Find for what values of , the points $(0, -1, \lambda)$, $(4, 5, 1)$, $(3, 9, 4)$ and $(-4, 4, 4)$ are coplanar.
5. Find the equation of the plane containing the line of intersection of the planes $x + y + z - 6 = 0, 2x + 3y + 4z + 5 = 0$ and passing through the point $(1, 1, 1)$.
6. Find the equation of the plane passing through the line of intersection of the planes $2x - y + 5z - 3 = 0$ and $4x + 2y - z + 7 = 0$ and parallel to z-axis.
7. Find the equation of the line joining the points $(2, 3, 5)$ and $(-1, 2, -4)$.
8. Find the equation of the line passing through the point $(3, 2, -6)$ and perpendicular to the plane $3x - y - 2z + 2 = 0$.
9. Express the symmetrical form of the equations of the line $x+2y+z-3 = 0$, $6x + 8y + 3z - 13 = 0$.
10. Find the equation of plane passing through the line $\frac{x-1}{2} = \frac{y+1}{-1} = \frac{z-3}{4}$ and parallel to the line $\frac{x}{1} = \frac{y}{2} = \frac{z}{3}$
11. Find the distance between the parallel planes $2x - 2y + z + 3 = 0, 4x - 4y + 2z + 5 = 0$.
12. Find the coordinates of the point where the line given by $x + 3y - z = 6$, $y - z = 4$ cuts the plane $2x + 2y + z = 6$.
13. Reduce the equations of the lines $x = ay + b$, $z = cy + d$ to symmetrical form and hence find the condition that the line be perpendicular to the line whose equations are $x = a'y + b'$, $z = c'y + d'$.