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Math_Questions_0024

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Linear Equations

1. Determine whether the following planes are parallel or intersect. If they intersect, find the equation of the line of intersection. Interpret this system of two linear equations geometrically.

$$4x - 3y - z - 1 = 0 \text{ and } 2x + 4y + z - 5 = 0$$

2. Find the equation of the plane that passes through the line of intersection of the planes $4x - 3y - z - 1 = 0$ and $2x + 4y + z - 5 = 0$ and passes through $A(1, -3, 2)$.
3. Find the equation of the plane that passes through the line of intersection of the planes $4x - 3y - z - 1 = 0$ and $2x + 4y + z - 5 = 0$ and parallel to the x - axis.
4. Find the equation of the plane that passes through the line of intersection of the planes $x - 3y - 2z - 1 = 0$ and $2x + 4y + z - 5 = 0$ and parallel to the x -axis.
5. Show that the following systems have a unique solution (i.e. intersect at one point). Then, find the point of intersection.

- a. $3x + 4y + 5z - 18 = 0$
 $2x - y + 8z - 13 = 0$
 $5x - 2y + 7z - 20 = 0$

- b. $-x - y - z - 1 = 0$
 $4x + 5y + 2 = 0$
 $y - 3z - 3 = 0$

6. Solve the following systems and interpret the result geometrically

- a. $x - y - 2z - 3 = 0$
 $2x - 3y - 3z + 15 = 0$
 $x - 2y - z + 10 = 0$

- b. $3x + 4y + 5z - 18 = 0$
 $2x - y + 8z - 13 = 0$
 $-x + 17y + 25z + 11 = 0$