Math Homework – PreIB 3.AB 3 & 4

Systems of Linear Equations

Áďa Klepáčů

June 2, 2024

DON'T FORGET TO EXPLAIN STUFF AND INCLUDE COMPUTATIONS WHERE APPROPRIATE!

Consider the system

$$\begin{aligned} x &+ 2y - z = 5 \\ -x &+ y + 3z = 1 \\ x &- 3y + z = -5 \end{aligned}$$

1. Determine the mutual position of the planes given by these equations. Are they parallel? Do they meet in a single point or in a line?
2. If the system *does* have a solution, compute it.
3. Rotate one of the planes (that is, change one of the equations appropriately) so that the three planes meet **in a line**.
4. Show that the system from 3 indeed has an infinite number of solutions.
5. Alter the system from 3 yet again in a way that makes it have **no solutions at all**.
6. Yet again, show that the system you created in 5 indeed has no solution.