

Math 429 Fall 2005
Assignment 1: Due by Sept 12th

1. Solve the system of equations

$$\begin{aligned}x_1 + x_2 + x_3 + x_4 + x_5 &= 7, \\3x_1 + 2x_2 + x_3 + x_4 - 3x_5 &= -2, \\x_2 + 2x_3 + 2x_4 + 6x_5 &= 23, \\5x_1 + 4x_2 + 3x_3 + 3x_4 - x_5 &= 12.\end{aligned}$$

2. Describe the solutions of the system

$$\begin{aligned}\lambda x + y + z &= 1 \\x + \lambda y + z &= \lambda \\x + y + \lambda z &= \lambda^2\end{aligned}$$

as a function of λ .

3. What is the condition for the following three straight lines in a plane to pass through only one point ?

$$\begin{aligned}a_1x + b_1y + c_1 &= 0 \\a_2x + b_2y + c_2 &= 0 \\a_3x + b_3y + c_3 &= 0\end{aligned}$$

What if you have n -lines ?

4. Consider a set

$$S = \{(a, b) \in \mathbb{R}^2 \mid a \geq 0, b \geq 0\}$$

with the usual summation on \mathbb{R}^2 . Is this a vector space ? Justify your answer.

What if

$$S = \{(a, b) \in \mathbb{R}^2 \mid ab \geq 0\}$$

with the above summation ?