

Worksheet 4

Due: Tuesday, September 16

Remember, where appropriate, explain how you got your answers! No calculators are allowed or needed.

1. Solve

$$\begin{aligned}x + 2y - z &= -4 + 3i \\ 2x + y + z &= 1\end{aligned}$$

2. The matrix

$$\begin{bmatrix} 3 & 1 & -1 & 4 & 1 & 1 \\ 1 & 0 & 0 & -2 & 2 & 4 \\ -2 & 1 & 1 & 0 & 1 & -1 \end{bmatrix}$$

has rref

$$\begin{bmatrix} 1 & 0 & 0 & -2 & 2 & 4 \\ 0 & 1 & 0 & 3 & 0 & -2 \\ 0 & 0 & 1 & -7 & 5 & 9 \end{bmatrix}.$$

Find two solutions of the system of linear equations

$$\begin{aligned}3x_1 + x_2 - x_3 + 4x_4 + x_5 &= 1 \\ x_1 - 2x_4 + 2x_5 &= 4 \\ -2x_1 + x_2 + x_3 + x_5 &= -1.\end{aligned}$$

3. Given a system of linear equations, how many solutions can it have? Describe all possibilities, and give an example for each one.
4. Given a system S of linear equations, we get a new system S' by deleting the last equation in S . How is the solution set of S related to the solution set of S' ?