

MATH 2130 LINEAR ALGEBRA
HOMEWORK 1
DUE 2025 AUGUST 31

PROBLEM 1 (P1)

Use Gauss's method to find the unique solution to the system

$$x - 2y + z = -6,$$

$$x + 3z = -14,$$

and

$$2x + 2y + z = -1.$$

PROBLEM 2 (P1)

Consider the system

$$x + 2y - z + 3w = 5,$$

$$y - 3z + w = 1,$$

and

$$z + 3w = -4.$$

Note that this system is already in echelon form. Does this system have a unique solution, no solutions, or infinitely many solutions?

PROBLEM 3 (P1)

For which values of k are there no solutions, many solutions, or a unique solution to the system

$$2x + 3y - z + w = 2$$

and

$$6x + 9y - 3z + 3w = k?$$

PROBLEM 4 (S1)

Describe the set of points on the plane through $(2, 3, 4)$, $(1, 0, 2)$, $(1, 2, 0)$. Does this plane pass through the origin?

PROBLEM 5 (S1)

Describe the set of points on the line through $(1, 2, 3)$ and $(1, -1, 2)$. Does the point $(1, 5, 4)$ lie on this line?