

Assignment 1

1. Suppose the system

$$\begin{aligned} 2x_1 + x_2 &= f \\ cx_1 + dx_2 &= g \end{aligned}$$

is consistent for all possible values of f and g . What can you say about c and d ?

2. Find three different systems of linear equations whose solutions are $x_1 = 3, x_2 = 0, x_3 = -1$.
3. Choose h and k so that the system

$$\begin{aligned} x_1 + 3x_2 &= 2 \\ 3x_1 + hx_2 &= k \end{aligned}$$

- (a) has no solution,
 (b) has one solution,
 (c) has infinitely many solutions.
4. In the following matrices \blacksquare is a nonzero entry and $*$ is a entry that may or may not be zero. For each of these (augmented) matrices determine if the associated system is consistent, and if it is consistent, determine if the solution is unique.

(a) $\begin{bmatrix} \blacksquare & * \\ 0 & 0 \end{bmatrix}$

(b) $\begin{bmatrix} \blacksquare & * \\ 0 & \blacksquare \end{bmatrix}$

(c) $\begin{bmatrix} \blacksquare & * & * \\ 0 & \blacksquare & * \end{bmatrix}$

(d) $\begin{bmatrix} 0 & \blacksquare & * & * \\ 0 & 0 & 0 & \blacksquare \end{bmatrix}$

(e) $\begin{bmatrix} \blacksquare & * & * & * \\ 0 & 0 & \blacksquare & * \\ 0 & 0 & 0 & 0 \end{bmatrix}$