

Linear Algebra I: Homework 1

Due Friday, January 26, 2018

1. For the following parts, answer whether the given tuple describes a solution to the system of linear equations. If it is **not** a solution, explain why!

- a. For the system,

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

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

is $(1, -1, 1)$ a solution?

- b. For the system,

$$5x - y + z = 7$$

$$3x + y - z = 1$$

is $(1, s - 2, s)$ a solution (for every real number s)?

2. Rewrite the following system of equations as an augmented matrix. You do not actually have to solve the system.

$$5x - y + z + 6w = 7$$

$$3x + 3y - 2z = 1$$

$$y - z = 0$$

$$x - y - z = 0$$

$$y = 3$$

3. Draw a picture that describes a system of three linear equations that has **no** solution.
4. Find all solutions to the following system of linear equations:

$$3x + y = 1$$

$$x - y = 2$$

5. For the following parts, answer whether the function described is **linear** or **not**.

- a. $f(x) = 3x + 1$

- b. $f(x_1, x_2) = 3x_1 - 6x_2$

- c. $f(x_1, x_2, x_3) = 3x_1 + x_3$

- d. $f(x, y) = 3xy + x + y$