

INSTRUCTIONS

1. To receive full credit you must explain how you got your answer.
2. While I encourage collaboration, you must write solutions **IN YOUR OWN WORDS. DO NOT SHARE COMPLETE SOLUTIONS** before they are due. **YOU WILL RECEIVE NO CREDIT** if you are found to have copied from whatever source or let others copy your solutions.
3. Workshop must be handwritten (electronic handwriting is allowed) for authentication purposes and submitted on Canvas. Late submission will **NOT** be accepted. It is your responsibility to **MAKE SURE THAT YOUR SUBMISSIONS ARE SUCCESSFUL AND YOUR FILES ARE LEGIBLE AND COMPLETE**. It is also your responsibility that whoever reads your work will understand and enjoy it. 1 point out of 10 may be taken off if your solutions are hard to read or poorly presented.

WORKSHOP 1

1. Let \mathcal{S} denote the set of real solutions to the system of equations

$$\begin{cases} x + y + z = 1 \\ x + y - z = 1 \end{cases} .$$

Show that one **CANNOT** define addition and scalar multiplication as before to make \mathcal{S} a vector space over \mathbb{R} .

2. Let \mathbb{R}^2 be the set of pairs of real numbers.
 - a. Define appropriate addition and scalar multiplication on \mathbb{R}^2 and show that these operations make it a vector space over \mathbb{R} .
 - b. Can you visualize addition and scalar multiplication on \mathbb{R}^2 in a two dimensional coordinate system?
 - c. Can you generalize this to \mathbb{R}^n , where n is any positive integer?