

## Graded Exercise 1

2 October 2025

---

### Rules:

- Turn in only these stapled pages (i.e. keep your solution concise but complete!)
  - In the top right corner of your piece of paper, please write your SCIPER (or any other 6 digit number that you will recognize when we're handing the paper back to you).
  - Handwriting must be legible (else your solution won't be graded).
  - Hand in by end of lecture or email to Nicolas Pafumi + Souhail Ed-Dlimi.
- 

### Problem 1

Consider the equation  $Ax = b$  where

$$A = \begin{pmatrix} 10 & 30 + c_1 \\ -1 & -3 \end{pmatrix} \text{ and } b = \begin{pmatrix} c_2 \\ 0 \end{pmatrix}$$

For every pair of constants  $c_1, c_2 \in \mathbb{R}$ , find the solution space for the equation  $Ax = b$ .

### Problem 2

Assume that  $\{v, w\} \subset \mathbb{R}^n$  are linearly independent.

- a) Prove that  $\{v + w, 3w\}$  are linearly independent.
  - b) Can there exist a vector  $u \in \mathbb{R}^n$  such that  $v, w \in \text{Span}\{u\}$ ? Justify your answer.
- 

**BE AWARE :** “Grade” just means that we provide you with feedback / corrections on your submission. It does not mean that you will receive a numeric grade. This is an exercise and does not count towards the final grade of this course. Participation is not mandatory.





