

## Graded Exercise 1

1 October 2024

## Rules for hand in:

- You can only hand in one piece of paper (i.e. keep your solution short but complete!)
- In the top right corner of your piece of paper, you write the two digits of the month you were born as well as your initials. (Example: as I am born in April, I would write: 04 AI).
- Handwriting must be legible (else your solution won't be graded).
- Hand in by 3:00pm.

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

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**Problem 2**

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

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

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**BE AWARE :** "Graded" 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.