

Day 3

$$A = \begin{bmatrix} 1 & 1 & 0 & 0 & -1 & 0 \\ 0 & 0 & 1 & 0 & 2 & 0 \\ 0 & 0 & 0 & 1 & 3 & 0 \\ 0 & 0 & 0 & 0 & 0 & 1 \end{bmatrix}; \quad \vec{b} = \begin{bmatrix} 4 \\ 5 \\ 6 \\ 7 \end{bmatrix}$$

- ① Find the solution set of  $LS(A, \vec{b})$ .
- ② Give 3 examples of solutions to  $LS(A, \vec{b})$
- ③ Give an example of a  $3 \times 3$  (coefficient) matrix  $\begin{bmatrix} ? & ? & ? \\ ? & ? & ? \\ ? & ? & ? \end{bmatrix}$  that is in RREF and has two free variables in its null space.
- ④ Find an example of a 5-row RREF matrix with null space  $\left\{ \begin{bmatrix} 0 \\ 0 \\ 0 \end{bmatrix} \right\}$ .
- ⑤ Find the solution set for augmented...

--- matrix

$$\begin{bmatrix} 1 & 1 & 0 & 0 & -1 & 0 & 0 \\ 0 & 0 & 1 & 0 & 2 & 0 & 0 \\ 0 & 0 & 0 & 1 & 3 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 1 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}.$$

⑥ If a linear system has two solutions,  
then it also has \_\_\_\_\_.

(Fill in the blank.)

⑦ Is your example for ③ unique, or  
is there another example?

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is there another example?