

Practice Problems about Systems.

- (1) Let $A = \begin{bmatrix} 1 & 5 & -2 & 0 \\ -3 & 1 & 9 & -5 \\ 4 & -8 & -1 & 7 \end{bmatrix}$, $\mathbf{p} = \begin{bmatrix} 3 \\ -2 \\ 0 \\ -4 \end{bmatrix}$, $\mathbf{b} = \begin{bmatrix} -7 \\ 9 \\ 0 \end{bmatrix}$. It can be shown that \mathbf{p} is a solution to $A\mathbf{x} = \mathbf{b}$. Use this fact to write \mathbf{b} as a linear combination of the columns of A .

(2) T or F?

- (a) If $A \in M_{m \times n}(\mathbb{R})$ and $A\mathbf{x} = \mathbf{b}$ is inconsistent for some $\mathbf{b} \in \mathbb{R}^m$, then A cannot have a pivot position in every row.
- (b) If $A \in M_{m \times n}(\mathbb{R})$ and $A\mathbf{x} = \mathbf{b}$ is inconsistent for some $\mathbf{b} \in \mathbb{R}^m$, then A cannot have a pivot position in every column.
- (c) If \mathbf{b} lies in the span of the set of columns of A , then $A\mathbf{x} = \mathbf{b}$ is consistent.
- (d) If $A\mathbf{x} = \mathbf{b}$ is inconsistent, then \mathbf{b} is not in the span of the set of columns of A .
- (e) A set of 3 vectors cannot span \mathbb{R}^4 .
- (f) A set of 4 vectors can span \mathbb{R}^4 .