

Misc. from Section 1.4

23-24. True or False?

- (a) The equation $A\mathbf{x} = \mathbf{b}$ is consistent if the augmented matrix has a pivot position in every row.
 - (b) The equation $A\mathbf{x} = \mathbf{b}$ is consistent if the augmented matrix has a pivot position in every column.
 - (c) Any linear combination of vectors can always be written in the form $A\mathbf{x}$ for a suitable matrix A and vector \mathbf{x} .
 - (d) If the equation $A\mathbf{x} = \mathbf{b}$ is inconsistent, then \mathbf{b} is not in the set spanned by the columns of A .
 - (e) If the columns of an $m \times n$ matrix A span \mathbb{R}^m , then the equation $A\mathbf{x} = \mathbf{b}$ is consistent for each $\mathbf{b} \in \mathbb{R}^m$.
32. Let A be a 3×2 matrix. Explain why $A\mathbf{x} = \mathbf{b}$ MUST be inconsistent for some $\mathbf{b} \in \mathbb{R}^3$
34. Suppose that A is 3×3 and \mathbf{b} is a vector in \mathbb{R}^3 with the property that $A\mathbf{x} = \mathbf{b}$ has a unique solution. Explain why the columns of A must span \mathbb{R}^3 .