

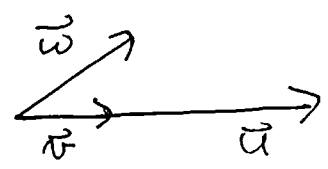
HW 3 T/F solutions

1. FALSE

$$\vec{u} = a\vec{v} + b\vec{w}$$

$$\Rightarrow \vec{w} = \frac{1}{b}\vec{u} - \frac{a}{b}\vec{v}$$

This only works if $b \neq 0$.



2. Fewer unknowns than equations

FALSE

can have a unique solution - example

$$\begin{bmatrix} 1 & 0 & | & a \\ 0 & 1 & | & b \\ 0 & 0 & | & 0 \end{bmatrix}$$

3. FALSE

$A\vec{x} = \vec{b}$ has a unique solution ~~if~~
does not imply A is square see q2.

4. TRUE

\rightarrow some of you made arithmetic errors.

$$\begin{bmatrix} 4 & 7 & 1 & | & 1 \\ 5 & 8 & 1 & | & 2 \\ 6 & 9 & 1 & | & 3 \end{bmatrix} \rightarrow \begin{bmatrix} 1 & 7/4 & 1/4 & | & 1/4 \\ 5 & 8 & 2 & | & 2 \\ 6 & 9 & 3 & | & 3 \end{bmatrix} \xrightarrow[-6I]{-5I} \begin{bmatrix} 1 & 7/4 & 1/4 & | & 1/4 \\ 0 & -3/4 & 3/4 & | & 7/4 \\ 0 & -6/4 & 6/4 & | & 5/4 \end{bmatrix} \xrightarrow[\substack{II \div 3 \\ III \div 2}]{\substack{II \rightarrow \\ III \leftarrow \\ +5/4 II}} \begin{bmatrix} 1 & 7/4 & 1/4 & | & 1/4 \\ 0 & 1 & -1 & | & -1 \\ 0 & 0 & 0 & | & 0 \end{bmatrix} \xrightarrow[-7/4 II]{\substack{I \div 4 \\ III \div 4}} \begin{bmatrix} 1 & 0 & | & 2 \\ 0 & 1 & | & -1 \\ 0 & 0 & | & 0 \end{bmatrix}$$

5. FALSE

$A\vec{x} \neq \vec{b}$ inconsistent \Rightarrow $\text{ref}(A)$ has row of zeros.
but $\text{ref}(A)$ has a row of zeros \nRightarrow $A\vec{x} = \vec{b}$ inconsistent
see q2 for an example.

6. FALSE

$$\begin{bmatrix} 1 & 2 & 0 \\ 0 & 0 & 1 \end{bmatrix} \quad \begin{bmatrix} 2 & 0 \\ 0 & 1 \end{bmatrix} \quad \text{not in ref.}$$

\uparrow remove column 1.

