Vector Space

✦ Given Vector Space V, then $W \subset V$ is a subspace if

1. $\vec{0} \in W$
2. $\vec{w_1} + \vec{w_2} \in W$ if $\vec{w_1}, \vec{w_2} \in W$
3. $c\vec{w} \in W$ if $\vec{w} \in W$ and $c \in R$

$A = \langle \vec{v_1}, \vec{v_2}, \vec{v_3} \dots \vec{v_n} \rangle$

$colA = \langle A\vec{c} \mid \vec{c} \in R^n \rangle$

Null Space
consist of all solutions $\vec{x}$ to $A\vec{x} = \vec{0}$

$Nul \; A = \{ \vec{x} \mid A\vec{x} = \vec{0} \}$

RZF (row-echelon form) { all zero rows beneath other rows

All pivot must live to right of any pivot above it

eq. $\begin{bmatrix} 1 & 0 & -1 & 1 \\ 0 & 0 & 1 & -1 \\ 0 & 0 & 0 & 0 \end{bmatrix}$ pivot

pivot column : a column exactly 1 pivot
free column : a column with no pivot

Reduced row-echelon form (RRZF)

1. get RZF

2. make pivot 1

3. make element above pivot 0