What do you see when you look at this matrix?

$$\begin{bmatrix} 1 & 4 & 7 \\ 2 & 5 & 8 \\ 3 & 6 & 9 \end{bmatrix}$$

- intersection of the rows for concurrent solutions of systems of equations
- mixing of the columns in vector equations for to check span and linear independence
- arrays as stand alone entities with their own algebra like associativity but not commutativity.

elementary row operations are matrix multiplications on the left EA.

function perspectives in 1.8, 1.9, 2.7
arrays transform objects or space: A *linear transformation* T

1. $T(\vec{x}+\vec{y}) = T(\vec{x}) + T(\vec{y})$
2. $T(c\vec{x}) = cT(\vec{x})$

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  - A not invertible like $T : \mathbb{R}^2 \to \mathbb{R}^2$ via $T(\vec{x}) = A\vec{x}$ where $A = \begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$.
    $\begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} =$
    smushes objects and spaces and is not recoverable