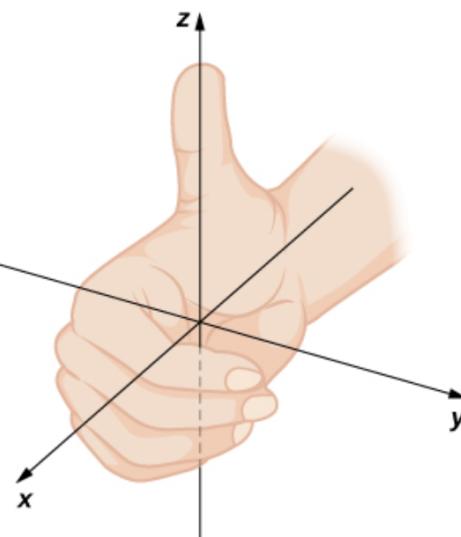
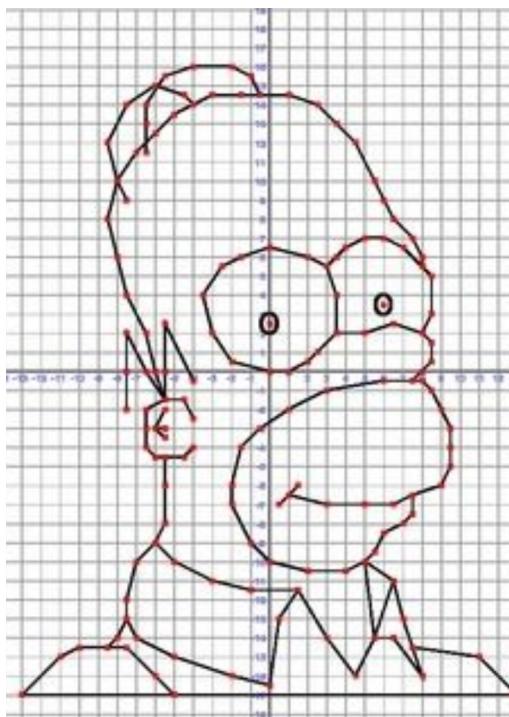
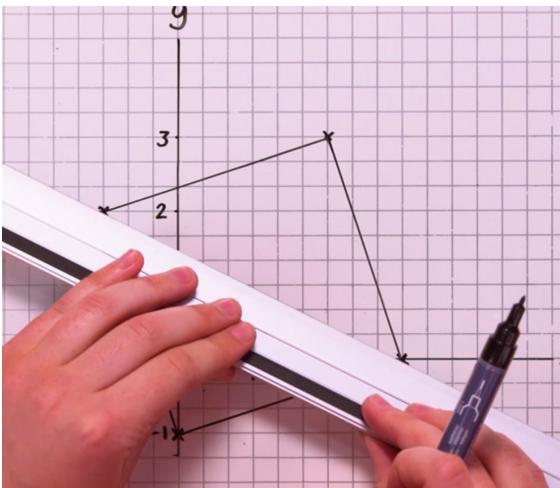




# What is coordinate



To go beyond 2d/3d Euclidean space

## Conceptualize

Ex.  $V =$  collection of all possible ducks  
differing only in width

 $\vec{v}_1$  $\vec{v}_2$  $\vec{v}_3$ 

...

Pick one duck  $\vec{b} \in \vec{V}$ ,  $\vec{b} \neq \vec{0}$



$\vec{b}$

For all other  $\vec{v} \in V$ ,  $\vec{v} = a \vec{b}$



$$= 1.8$$



$$\vec{v} = 1.8 \vec{b}$$



Ex.  $V$  = collection of all possible ducks  
differing only by height & width



...



Check .

$B = \{\vec{b}_1, \vec{b}_2\}$  is a basis for  $V$



$\vec{b}_1$



$\vec{b}_2$

*"We share a philosophy about linear algebra: we think basis-free, we write basis-free, but when the chips are down we close the office door and compute with matrices like fury."*

*Kaplansky, Irving*



















