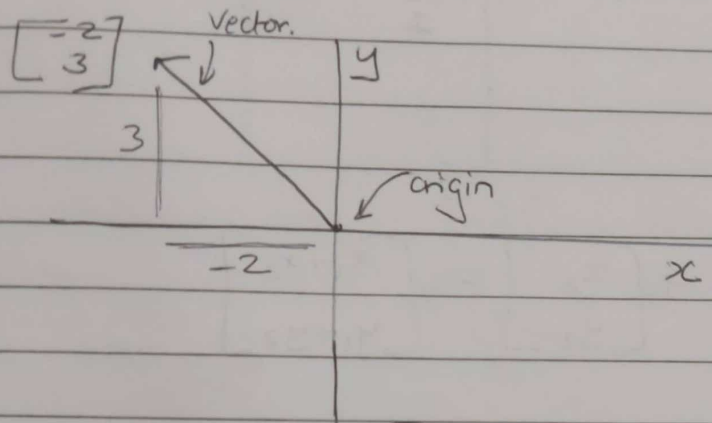


VECTORS

- Vectors \rightarrow ordered list of numbers (CS perspective)
 \rightarrow Arrows pointing in space (Physics perspective)
 \rightarrow Can be anything which satisfies addition, multiplication and other operations (Maths perspective)

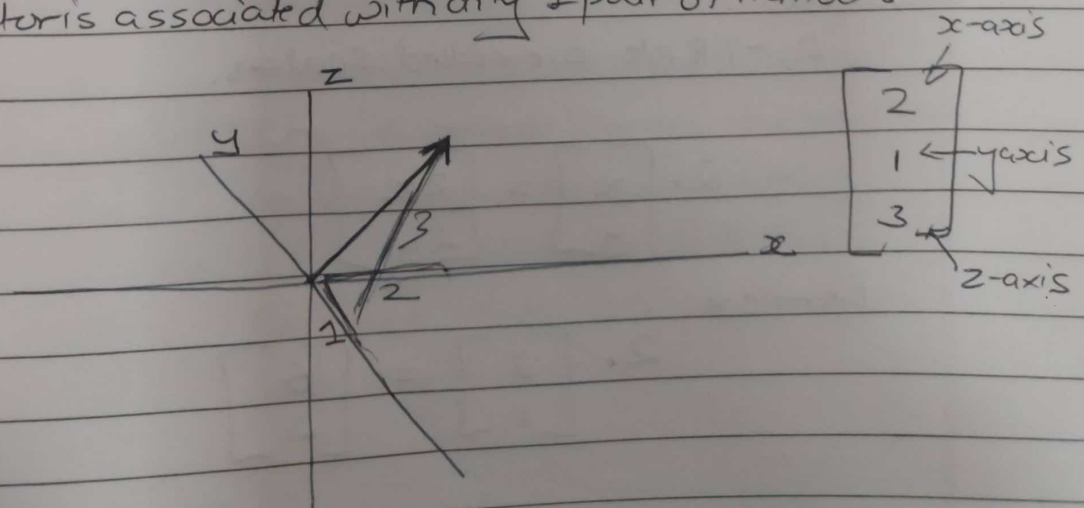
2-D plane

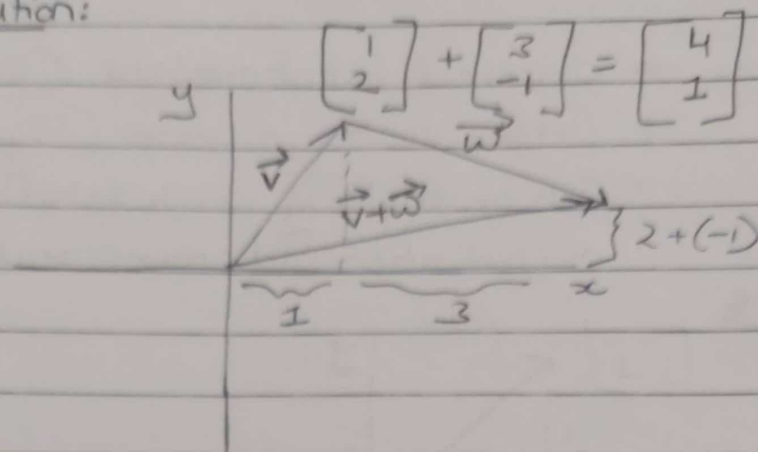


- \rightarrow Coordinates of vector i.e. $\begin{bmatrix} -2 \\ 3 \end{bmatrix}$ gives instructions for how to get from tail of vector - at origin - to its tip.
 1st number (-2) tells how far to walk along x-axis
 +ve number \rightarrow right
 -ve number \rightarrow left
 2nd number (3) tells how far to walk along y-axis
 +ve number \rightarrow upwards
 -ve number \rightarrow downwards

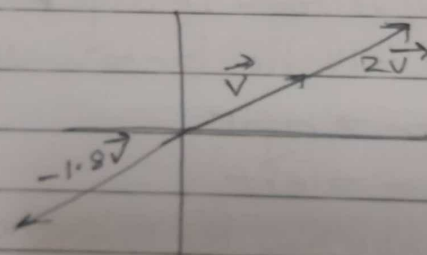
- \rightarrow Every vector is associated with only 1 pair of numbers

3-D



Vector Addition:

$$\begin{bmatrix} x_1 \\ y_1 \end{bmatrix} + \begin{bmatrix} x_2 \\ y_2 \end{bmatrix} = \begin{bmatrix} x_1 + x_2 \\ y_1 + y_2 \end{bmatrix}$$

Scalar ~~Multiplication~~ Multiplication of vector

Scaling \rightarrow The process of stretching or squishing or sometimes reversing the direction of vector where,

2, -1.8, etc. are called scalars.

$$2 \cdot \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 2x \\ 2y \end{bmatrix}$$

Example \rightarrow

$$2 \cdot \begin{bmatrix} 3 \\ 1 \end{bmatrix} = \begin{bmatrix} 6 \\ 2 \end{bmatrix}$$