Vectors المتجهات

Definitions- we mean by three dimensional space (3-space or $\mathbb{R}^3$), the set of all triples (x,y,z) where x,y and z are in $\mathbb{R}$ the set of all real numbers.

These triples are called points in $\mathbb{R}^3$, i.e.

$$\mathbb{R}^3 = \{(x,y,z) : x,y \text{ and } z \in \mathbb{R}\}$$

and we call the point $(0,0,0)$, the origin in $\mathbb{R}^3$.

$\mathbb{R}^3$ consists of three coordinate axes that form a three-dimensional rectangular coordinate system. The point of the intersection of the coordinate axes is the origin of the coordinate system $\mathbb{R}^3$. While by the two-dimensional space (2-space or $\mathbb{R}^2$), we mean the set of all two-tiples (pairs), (x,y) where x and y are in $\mathbb{R}$. And we call these pairs, points in $\mathbb{R}^2$.

$\mathbb{R}^2$ consists of two coordinate axes that form a two-dimensional rectangular coordinate system. The point of the intersection of the coordinate axes is called the origin of the coordinate system $\mathbb{R}^2$.
The origin of $\mathbb{R}^2$ is $(0,0)$.