

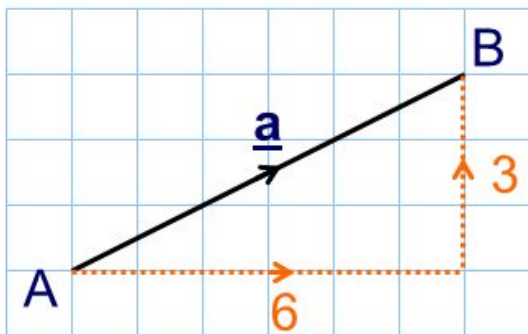
Vector

Vector can be expressed by

$$2D: \begin{pmatrix} x \\ y \end{pmatrix} \text{ or } xi + yj$$

$$3D: \begin{pmatrix} x \\ y \\ z \end{pmatrix} \text{ or } xi + yj + zk$$

Vector is a quantity which has a **magnitude** and **direction**.



The vector shown can be named \overrightarrow{AB} or \vec{a} .

$$\overrightarrow{AB} = \begin{pmatrix} 6 \\ 3 \end{pmatrix} \text{ or } 6\vec{i} + 3\vec{j}$$

\overrightarrow{AB} is also called **direction vector**.

\overrightarrow{BA} is opposite direction as \overrightarrow{AB} , so $\overrightarrow{BA} = \begin{pmatrix} -6 \\ -3 \end{pmatrix}$.

Position vector

It is a vector from the origin to a point.

It is also a point of the vector.

$$\text{If A is at } (4, 2), \overrightarrow{OA} = \begin{pmatrix} 4 \\ 2 \end{pmatrix}$$

Vector operation

Skill 1: $\overrightarrow{AB} = \vec{B} - \vec{A}$

1. Consider the points $A(4, -2, 1)$, $B(10, 2, -4)$, find \overrightarrow{AB} .

2. Consider the points $X(-3, 9, 4)$, $Y(-3, 1, 0)$, find \overrightarrow{XY} .

3. Consider the points $H(0, 2)$, $K(2, 0)$, find \overrightarrow{KH} .
