

CHEAT SHEET

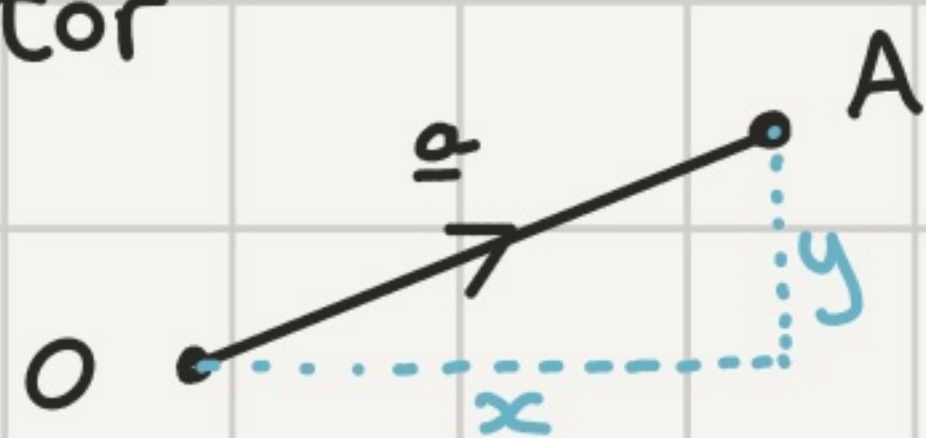
Vectors

Key Concepts

There are 8 key concepts:

① Four Ways to Represent a Vector

Consider the vector



i) \vec{OA}

ii) \underline{a}

iii) $x\hat{i} + y\hat{j}$

iv) $\begin{pmatrix} x \\ y \end{pmatrix}$

⑤ Magnitude of a Vector

The length of $\underline{a} = \begin{pmatrix} x \\ y \\ z \end{pmatrix}$ is $|\underline{a}| = \sqrt{x^2 + y^2 + z^2}$

⑥ Unit Vectors Unit vectors have length/magnitude one.

⑦ Collinear Vectors

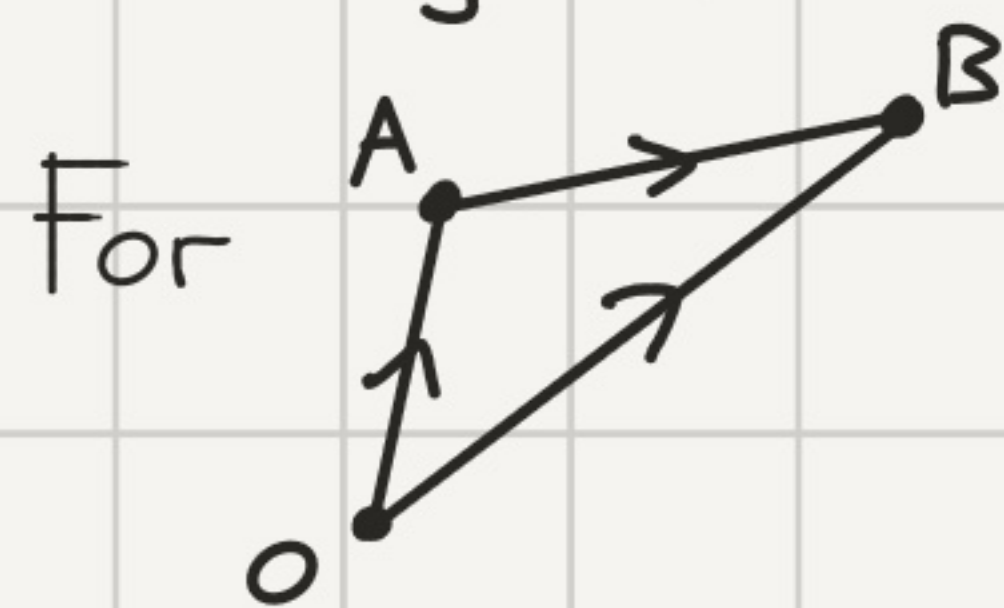
Collinear vectors lie on the same line.

② Parallel vectors are multiples of each other.

⑧ Angles with the Axes

The angle $\underline{a} = \begin{pmatrix} x \\ y \\ z \end{pmatrix}$ makes with the x-axis is θ_x , the y axis is θ_y & the z-axis is θ_z . The angles can be found using the formulae

③ Triangle Law of Addition



$$\vec{OB} = \vec{OA} + \vec{AB}$$

④ Position Vectors Every point

has a position vector, which is the vector from the origin to the point.

$$\cos \theta_x = \frac{x}{|\underline{a}|}$$

$$\cos \theta_y = \frac{y}{|\underline{a}|}$$

$$\cos \theta_z = \frac{z}{|\underline{a}|}$$