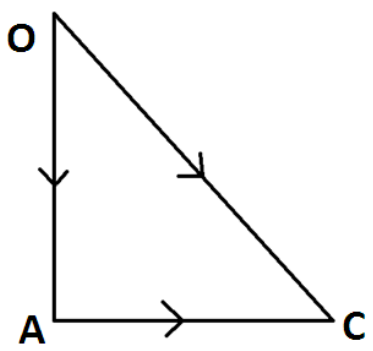
VECTOR

(1) $The\ unit\ vector\ along\ \vec{a} = \frac{\vec{a}}{|\vec{a}|}$.

(2) **Triangle law of addition of vectors**



$If\ \overrightarrow{OA} = \vec{a}\ , \overrightarrow{AC} = \vec{b}\ , then\ \vec{a} + \vec{b} = \vec{c}$

$$\Longrightarrow\ \overrightarrow{OA} + \overrightarrow{AC} = \overrightarrow{OC}.$$

(3) **Position vectors**

(i) $The\ position\ vector\ of\ a\ point\ P\ w.r.t.\ origin\ O\ is\ \overrightarrow{OP}\ vector.$

(ii) $If\ the\ position\ vector\ of\ P\ \&\ Q\ are\ \vec{a}\ \&\ \vec{b}\ respectively\ w.r.t.\ origin\ O, then$

$$\overrightarrow{PQ} = \overrightarrow{OQ} - \overrightarrow{OP} = \vec{b} - \vec{a}\ .$$

(iii) $If\ a\ point\ R\ divides\ \overline{PQ}\ internally\ in\ the\ ratio\ m{:}n,$

$then\ the\ position\ vector\ of\ R\ will\ be\ \frac{m\vec{b}+n\vec{a}}{m+n}.$

(iv) $If\ a\ point\ R\ divides\ PQ\ externally\ in\ the\ ratio\ m{:}n,$

$then\ the\ position\ vector\ of\ R\ will\ be\ \frac{m\vec{b}-n\vec{a}}{m-n}.$

(v) $The\ position\ vector\ of\ the\ mid\ point\ of\ \overline{PQ}\ is\ \frac{\vec{a}+\vec{b}}{2}\ .$

(4) $If\ \vec{r} = x\vec{a} + y\vec{b}, then$

$x\vec{a}, y\vec{b} = Vector\ components\ of\ \vec{r}\ along\ \vec{a}\ \&\ \vec{b}.$

$x, y =\ Scalar\ components\ of\ \vec{r}\ along\ \vec{a}\ \&\ \vec{b}.$

(5) **2-Dimensional (2-D)**

$If\ P(x, y)\ be\ a\ point\ in\ 2-D\ plane, then\ the\ position\ vector\ of\ P\ \ w.r.t.\ origin\ O\ (\vec{r})\ is$

$\overrightarrow{OP} = \vec{r} = x\hat{\imath} + y\hat{\jmath}$