3. $(\vec{u}+\vec{0})=(\vec{0}+\vec{u})=\vec{u}$ identity element
4. $\vec{u}+(-\vec{u})=\vec{0}$ inverse element
5. $l(m\vec{u})=(lm)\vec{u}$
6. $m(\vec{u}+\vec{v})=m\vec{u}+m\vec{v}$
7. $(l+m)\vec{u}=l\vec{u}+m\vec{u}$
8. $(1)\vec{u}=\vec{u}$

Note: a vector $\vec{v}$ of length equals to 1 i.e. $\|\vec{v}\|=1$, is called a unit vector.

Definition: For any vector $\vec{v}$ such that $\|\vec{v}\|\neq 0$, (non-zero vector), it is possible to find the unit vector $\vec{u}$ of the vector $\vec{v}$ in the direction of $\vec{v}$, which is defined by:

$$\vec{u}=\frac{1}{\|\vec{v}\|}(\vec{v})$$

so that from the definition above

$$\|\vec{u}\|=\left\|\frac{1}{\|\vec{v}\|}(\vec{v})\right\| \overset{\text{by}\circledast}{=} \left(\frac{1}{\cancel{\|\vec{v}\|}}\right)(\cancel{\|\vec{v}\|})=1$$

unit vector

$\circledast$ $$\|m\vec{v}\|=\|m(v_1,v_2,v_3)\|$$
$$=\|(mv_1,mv_2,mv_3)\|$$
$$=\sqrt[2]{(mv_1)^2+(mv_2)^2+(mv_3)^2}$$