Types of vector.

1) **Equal vectors:** Two vectors $\vec{A}$ and $\vec{B}$ are said to be equal when they have equal magnitudes and same direction.

(2) **Parallel vector:** Two vectors $\vec{A}$ and $\vec{B}$ are said to be parallel when

(i) Both have same direction.

(ii) One vector is scalar (positive) non-zero multiple of another vector.

(3) **Anti-parallel vectors:** Two vectors $\vec{A}$ and $\vec{B}$ are said to be anti-parallel when

(i) Both have opposite direction.

(ii) One vector is scalar non-zero negative multiple of another vector.

(4) **Collinear vectors:** When the vectors under consideration can share the same support or have a common support then the considered vectors are collinear.

(5) **Zero vector** $(\vec{0})$**:** A vector having zero magnitude and arbitrary direction (not known to us) is a zero vector.

(6) **Unit vector:** A vector divided by its magnitude is a unit vector. Unit vector for $\vec{A}$ is $\hat{A}$ (read as A cap / A hat).
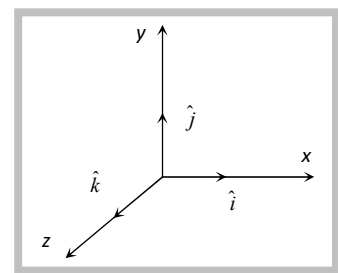
Since, $\qquad \hat{A} = \dfrac{\vec{A}}{A} \Rightarrow \vec{A} = A\,\hat{A}$.

Thus, we can say that unit vector gives us the direction.

(7) **Orthogonal unit vectors:** $\hat{i}, \hat{j}$ and $\hat{k}$ are called orthogonal unit vectors. These vectors must form a Right Handed Triad (It is a coordinate system such that when we Curl the fingers of right hand from x to y then we must get the direction of z along thumb). The
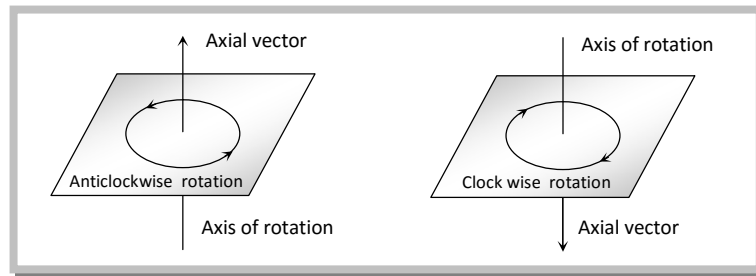
$$\hat{i} = \frac{\vec{x}}{x}, \hat{j} = \frac{\vec{y}}{y}, \hat{k} = \frac{\vec{z}}{z}$$

$\therefore \ \vec{x} = x\hat{i}, \ \vec{y} = y\hat{j}, \ \vec{z} = z\hat{k}$

(8) **Polar vectors:** These have starting point or point of application. Example displacement and force etc.

(9) **Axial Vectors:** These represent rotational effects and are always along the axis of rotation in accordance with right hand screw rule. Angular velocity, torque and angular momentum, etc., are example of physical quantities of this type.

(10) **Coplanar vector:** Three (or more) vectors are called coplanar vector if they lie in the same plane. Two (free) vectors are always coplanar.