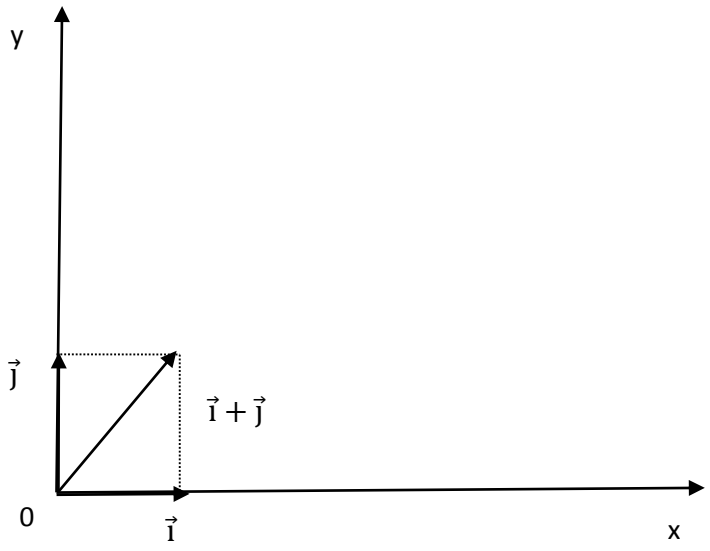
Answer on Question #58241, Physics / Mechanics | Relativity

i and j are unit vectors along x and y axis respectively. What is the magnitude and direction of the vectors i + j, and i − j ? What are the components of a vector A= 2i + 3j along the directions of i + j and i − j? [You may use graphical method]

Solution:

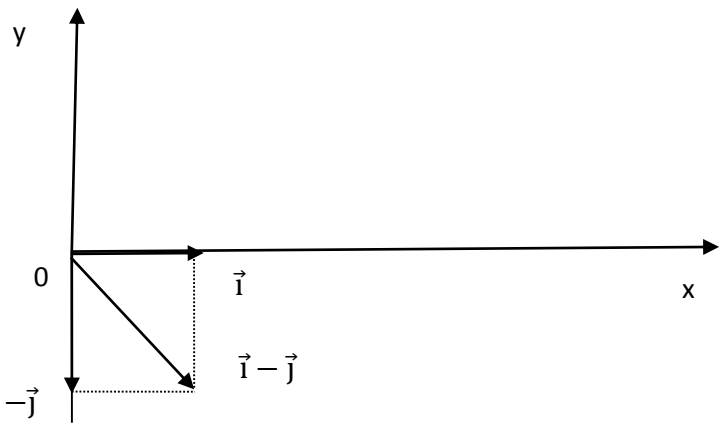


$\vec{i}(1;0)$

$\vec{j}(0;1)$

$\vec{i}+\vec{j}(1;1)$

$|\vec{i}+\vec{j}|=\sqrt{1^2+1^2}=\sqrt{2}$



$\vec{i}(1;0)$

$\vec{j}(0;-1)$

$\vec{i}-\vec{j}(1;-1)$

$|\vec{i}-\vec{j}|=\sqrt{1^2+(-1)^2}=\sqrt{2}$

The components of a vector A= 2i + 3j along the directions of $\vec{i}+\vec{j}$: $\vec{A}(2;3)$.

The components of a vector A= 2i + 3j along the directions of $\vec{i}-\vec{j}$: $\vec{A}(2;-3)$.

Answer:

$|\vec{i}+\vec{j}|=\sqrt{2}$

$|\vec{i}-\vec{j}|=\sqrt{2}$

$\vec{A}(2;3)$

$\vec{A}(2;-3)$.