Sec B1, CE , 25.07.21

Sunday, July 25, 2021 10:14 AM

Lecture - 1

Course Title: Vector Analysis and statistics

(1) Vector ⟶ 4 chapters

(2) Statistics ⟶ 2/3 ✗

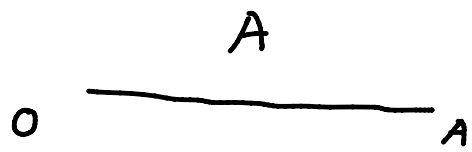
Ki Quiz-01 : vector

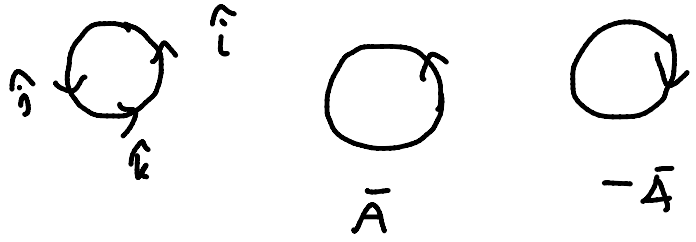
$\bar{A}$ $\underline{A}$ $\vec{A}$ A — 4, 5, 6

(i) Direction

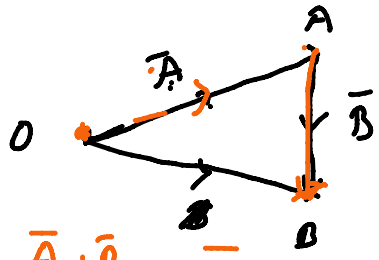
(ii) Magnitude

$|\vec{A}| = A$

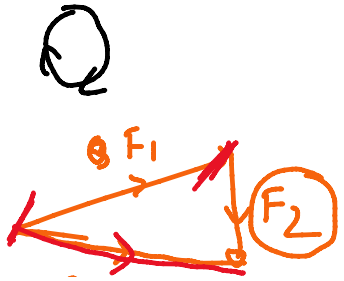




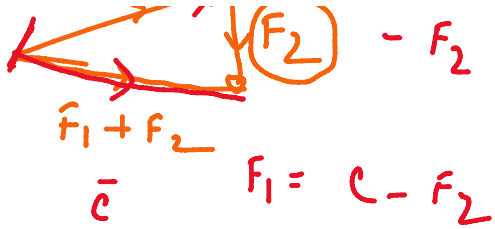
Resultant / Sum: The position vector of $\bar{A}$ = $\overline{OA}$



Sum = $\bar{A} + \bar{B} = \bar{C}$



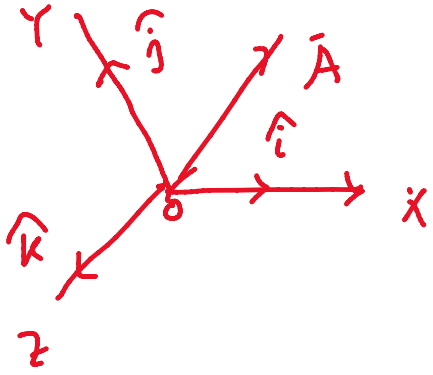
Sum $= \bar{A} + \bar{B} = \bar{C}$



Unit Vector:

$$\hat{A} \rightarrow \hat{A} = \frac{\bar{A}}{|A|}$$

$$\hat{A} = \frac{\bar{A}}{|\bar{A}|}$$



$$\bar{A} = A_1\hat{i} + A_2\hat{j} + A_3\hat{k}$$

$$\hat{A} = \frac{\bar{A}}{|A|}$$

$$|\bar{A}| = \sqrt{A_1^2 + A_2^2 + A_3^2}$$

$$\hat{A} = \frac{A_1\hat{i} + A_2\hat{j} + A_3\hat{k}}{\sqrt{A_1^2 + A_2^2 + A_3^2}}$$

Given:

$$F_1 = 2\hat{i} + 3\hat{j} - 5\hat{k}$$

$$F_2 = -5\hat{i} + \hat{j} + 3\hat{k}$$

Find:

(i) Resultant

$F_3 = \hat{i} - 2\hat{j} + 4\hat{k}$ (ii) Magnitude of (i)

$F_4 = 4\hat{i} - 3\hat{j} - 2\hat{k}$ (iii) Unit of (i)

Resultant $= F_1 + F_2 + F_3 + F_4$

$= (\quad) + (\quad) + (\quad)$

$+ (\quad)$

$= \hat{i}(2 - 5 + 1 + 4) + \hat{j}(3 + 1 - 2 - 3)$

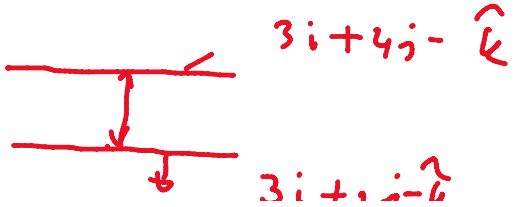
$+ \hat{k}(-5 + 3 + 4 - 2)$

$= 2\hat{i} - \hat{j} + 0\hat{k}$

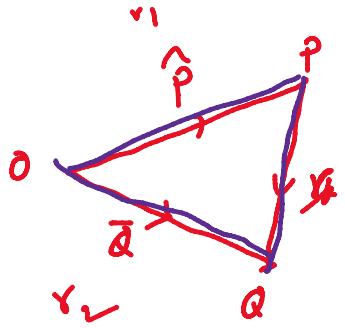
Resultant $= 2\hat{i} - j$

(ii) magnitude of Re. $= \sqrt{2^2 + (-1)^2} = \sqrt{5}$ $\quad |2i - j|$

(iii) unit of Resultant $= \dfrac{2\hat{i} - j}{\sqrt{5}}$



$3i + 2j - \hat{k}$



$\overline{OP} = \bar{r}_1 =$

$\overline{OQ} = \bar{r}_2 =$

$\overline{PQ}$

Addition

$\overline{OP} + \overline{PQ} = \overline{OQ}$

$\overrightarrow{PQ} = \overline{OQ} - \overline{OP}$

$= r_2 - r_1$

$=$