

Vector

- What should be added in vector $\mathbf{a} = 3\mathbf{i} + 4\mathbf{j} - 2\mathbf{k}$ to get its resultant a unit vector \mathbf{i}
 - $-2\mathbf{i} - 4\mathbf{j} + 2\mathbf{k}$
 - $-2\mathbf{i} + 4\mathbf{j} - 2\mathbf{k}$
 - $2\mathbf{i} + 4\mathbf{j} - 2\mathbf{k}$
 - None of these
- If $\mathbf{a} = \mathbf{i} + 2\mathbf{j} + 3\mathbf{k}$, $\mathbf{b} = -\mathbf{i} + 2\mathbf{j} + \mathbf{k}$ and $\mathbf{c} = 3\mathbf{i} + \mathbf{j}$, then the unit vector along its resultant is
 - $3\mathbf{i} + 5\mathbf{j} + 4\mathbf{k}$
 - $\frac{3\mathbf{i} + 5\mathbf{j} + 4\mathbf{k}}{50}$
 - $\frac{3\mathbf{i} + 5\mathbf{j} + 4\mathbf{k}}{5\sqrt{2}}$
 - None of these
- If the sum of two unit vectors is a unit vector, then the angle between them is equal to
 - $\frac{\pi}{6}$
 - $\frac{\pi}{3}$
 - $\frac{\pi}{2}$
 - $\frac{2\pi}{3}$
- If $ABCD$ is a parallelogram, $\overrightarrow{AB} = 2\mathbf{i} + 4\mathbf{j} - 5\mathbf{k}$ and $\overrightarrow{AD} = \mathbf{i} + 2\mathbf{j} + 3\mathbf{k}$, then the unit vector in the direction of BD is
 - $\frac{1}{\sqrt{69}}(\mathbf{i} + 2\mathbf{j} - 8\mathbf{k})$
 - $\frac{1}{69}(\mathbf{i} + 2\mathbf{j} - 8\mathbf{k})$
 - $\frac{1}{\sqrt{69}}(-\mathbf{i} - 2\mathbf{j} + 8\mathbf{k})$
 - $\frac{1}{69}(-\mathbf{i} - 2\mathbf{j} + 8\mathbf{k})$
- The vectors \mathbf{b} and \mathbf{c} are in the direction of north-east and north-west respectively and $|\mathbf{b}| = |\mathbf{c}| = 4$. The magnitude and direction of the vector $\mathbf{d} = \mathbf{c} - \mathbf{b}$, are
 - $4\sqrt{2}$, towards north
 - $4\sqrt{2}$, towards west
 - 4, towards east
 - 4, towards south
- ABC is an isosceles triangle right angled at A . Forces of magnitude $2\sqrt{2}$, 5 and 6 act along \overrightarrow{BC} , \overrightarrow{CA} and \overrightarrow{AB} respectively. The magnitude of their resultant force is
 - 4
 - 5
 - $11 + 2\sqrt{2}$
 - 30
- If the resultant of two forces of magnitudes P and Q acting at a point at an angle of 60° is $\sqrt{7}Q$, then P/Q is
 - 1
 - $3/2$
 - 2
 - 4
- If two vertices of a triangle are $\mathbf{i} - \mathbf{j}$ and $\mathbf{j} + \mathbf{k}$, then the third vertex can be
 - $\mathbf{i} + \mathbf{k}$
 - $\mathbf{i} - 2\mathbf{j} - \mathbf{k}$
 - $\mathbf{i} - \mathbf{k}$
 - $2\mathbf{i} - \mathbf{j}$
- If $\vec{F}_1 = \mathbf{i} - \mathbf{j} + \mathbf{k}$, $\vec{F}_2 = -\mathbf{i} + 2\mathbf{j} - \mathbf{k}$, $\vec{F}_3 = \mathbf{j} - \mathbf{k}$, $\vec{A} = 4\mathbf{i} - 3\mathbf{j} - 2\mathbf{k}$ and $\vec{B} = 6\mathbf{i} + \mathbf{j} - 3\mathbf{k}$, then the scalar product of $\vec{F}_1 + \vec{F}_2 + \vec{F}_3$ and \vec{AB} will be
 - 3
 - 6
 - 9
 - 12
- A vector whose modulus is $\sqrt{51}$ and makes the same angle with $\mathbf{a} = \frac{\mathbf{i} - 2\mathbf{j} + 2\mathbf{k}}{3}$, $\mathbf{b} = \frac{-4\mathbf{i} - 3\mathbf{k}}{5}$ and $\mathbf{c} = \mathbf{j}$, will be
 - $5\mathbf{i} + 5\mathbf{j} + \mathbf{k}$
 - $5\mathbf{i} + \mathbf{j} - 5\mathbf{k}$
 - $5\mathbf{i} + \mathbf{j} + 5\mathbf{k}$
 - $\pm(5\mathbf{i} - \mathbf{j} - 5\mathbf{k})$
- The unit vector perpendicular to the $3\mathbf{i} + 2\mathbf{j} - \mathbf{k}$ and $12\mathbf{i} + 5\mathbf{j} - 5\mathbf{k}$, is
 - $\frac{5\mathbf{i} - 3\mathbf{j} + 9\mathbf{k}}{\sqrt{115}}$
 - $\frac{5\mathbf{i} + 3\mathbf{j} - 9\mathbf{k}}{\sqrt{115}}$
 - $\frac{-5\mathbf{i} + 3\mathbf{j} - 9\mathbf{k}}{\sqrt{115}}$
 - $\frac{5\mathbf{i} + 3\mathbf{j} + 9\mathbf{k}}{\sqrt{115}}$
- The sine of the angle between the two vectors $3\mathbf{i} + 2\mathbf{j} - \mathbf{k}$ and $12\mathbf{i} + 5\mathbf{j} - 5\mathbf{k}$ will be
 - $\frac{\sqrt{115}}{\sqrt{14}\sqrt{194}}$
 - $\frac{51}{\sqrt{14}\sqrt{144}}$
 - $\frac{\sqrt{64}}{\sqrt{14}\sqrt{194}}$
 - None of these
- For any two vectors \mathbf{a} and \mathbf{b} , if $\mathbf{a} \times \mathbf{b} = \mathbf{0}$, then
 - $a = 0$
 - $b = 0$
 - Not parallel
 - None of these
- If \mathbf{a} and \mathbf{b} are two vectors, then $(\mathbf{a} \times \mathbf{b})^2$ equals
 - $\begin{vmatrix} \mathbf{a} \cdot \mathbf{b} & \mathbf{a} \cdot \mathbf{a} \\ \mathbf{b} \cdot \mathbf{b} & \mathbf{b} \cdot \mathbf{a} \end{vmatrix}$
 - $\begin{vmatrix} \mathbf{a} \cdot \mathbf{a} & \mathbf{a} \cdot \mathbf{b} \\ \mathbf{b} \cdot \mathbf{a} & \mathbf{b} \cdot \mathbf{b} \end{vmatrix}$
 - $\begin{vmatrix} \mathbf{a} \cdot \mathbf{b} \\ \mathbf{b} \cdot \mathbf{a} \end{vmatrix}$
 - None of these
- If vectors $\vec{A} = 2\mathbf{i} + 3\mathbf{j} + 4\mathbf{k}$, $\vec{B} = \mathbf{i} + \mathbf{j} + 5\mathbf{k}$ and \vec{C} form a left handed system, then \vec{C} is
 - $11\mathbf{i} - 6\mathbf{j} - \mathbf{k}$
 - $-11\mathbf{i} + 6\mathbf{j} + \mathbf{k}$
 - $11\mathbf{i} - 6\mathbf{j} + \mathbf{k}$
 - $-11\mathbf{i} + 6\mathbf{j} - \mathbf{k}$