

Class- 12 Maths -Vector Algebra

- Q1 Prove that $|\vec{a} \cdot \vec{b} \times \vec{c}| = abc$ if and only if $\vec{a}, \vec{b}, \vec{c}$ are mutually perpendicular.
- Q2 Prove that $\vec{a} \times (\vec{b} \times \vec{c}) + \vec{b} \times (\vec{c} \times \vec{a}) + \vec{c} \times (\vec{a} \times \vec{b}) = \vec{0}$
- Q3 The volume of a parallelopiped whose edges are represented by $-12\vec{i} + \lambda\vec{k}, 3\vec{j} - \vec{k}, 2\vec{i} + \vec{j} - 15\vec{k}$ is 546. Find the value of λ .
- Q4 Prove that $[\vec{a} \times \vec{b}, \vec{b} \times \vec{c}, \vec{c} \times \vec{a}] = [\vec{a}, \vec{b}, \vec{c}]^2$
- Q5 Find the magnitude and direction cosines of the moment about the point $(1, -2, 3)$ of a force $2\vec{i} + 3\vec{j} + 6\vec{k}$ whose line of action passes through the origin.
- Q6 With usual notation prove that $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$
- Q7 Let $\vec{a}, \vec{b}, \vec{c}$ be unit vectors such that $\vec{a} \cdot \vec{b} = \vec{a} \cdot \vec{c} = 0$ and the angle between \vec{b} and \vec{c} is $\frac{\pi}{6}$. Prove that $\vec{a} = \pm 2(\vec{b} \times \vec{c})$
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- Q8 Find the unit vectors perpendicular to the plane containing the vectors $2\vec{i} + \vec{j} + \vec{k}$ and $\vec{i} + 2\vec{j} + \vec{k}$
- Q9 The constant forces $2\vec{i} - 5\vec{j} + 6\vec{k}, -\vec{i} + 2\vec{j} - \vec{k}$ and $2\vec{i} + 7\vec{j}$ act on a particle which is displaced from position $4\vec{i} - 3\vec{j} - 2\vec{k}$ to position $6\vec{i} + \vec{j} - 3\vec{k}$. Find the work done.
- Q10 Altitudes of a triangle are concurrent – prove by vector method.
- Q11 If $\vec{a}, \vec{b}, \vec{c}$ are three mutually perpendicular unit vectors, then prove that $|\vec{a} + \vec{b} + \vec{c}| = \sqrt{3}$
- Q12 prove that $\vec{r} = (\vec{r} \cdot \vec{i})\vec{i} + (\vec{r} \cdot \vec{j})\vec{j} + (\vec{r} \cdot \vec{k})\vec{k}$
- Q13 If $|\vec{a} + \vec{b}| = 60, |\vec{a} - \vec{b}| = 40$ and $|\vec{b}| = 46$ find $|\vec{a}|$.
- Q14 : Angle in a semi-circle is a right angle. Prove by vector method.
- Q15 Prove that $\cos(A - B) = \cos A \cos B + \sin A \sin B$
- Q16 If $|\vec{a}| = 13, |\vec{b}| = 5$ and $\vec{a} \cdot \vec{b} = 60$ then find $|\vec{a} \times \vec{b}|$