

MATHS

BOOKS - BHARATI BHAWAN MATHS (HINGLISH)

Vectors and Addition of Vectors



1. Prove that the vectors
$$3\overrightarrow{I} + 5\overrightarrow{j} + 2\overrightarrow{k}, 2\overrightarrow{I} - 3\overrightarrow{j} - 5\overrightarrow{k}$$
 and $5\overrightarrow{I} + 2\overrightarrow{j} - 3\overrightarrow{k}$ form the sides of an equilatera, triangle.

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2. Show that the points (0, 7, 10), (-1, 6, 6) and (-4, 9, 6) form a

righat angled isosceles triangle.

1. If O is the circumcentre and P the orthocentre of $\triangle ABC$, prove that $\overrightarrow{OA} + \overrightarrow{OB} + \overrightarrow{OC} = \overrightarrow{OP}$.

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2. If O is the circumcentre and P the orthocentre of $\triangle ABC$, prove that $\overrightarrow{OA} + \overrightarrow{OB} + \overrightarrow{OC} = \overrightarrow{OP}$.

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3. If S is circumcentre, O is orthocentre of ΔABC , then $\overrightarrow{SA} + \overrightarrow{SB} + \overrightarrow{SC}$

=

4. If ABCDEF is a regular hexagon, prove that

$$\overrightarrow{AC} + \overrightarrow{AD} + \overrightarrow{EA} + \overrightarrow{FA} + \overrightarrow{3AB}$$

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5. In Fig. ABCDEF is a regular hexagon. Prove that
 $\overrightarrow{AB} + \overrightarrow{AC} + \overrightarrow{AD} + \overrightarrow{AE} + \overrightarrow{AF} = \overrightarrow{6AO}.$

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6. Find area of the triangle formed by the points $(1, 2, 3), (-1, -1, 8)$
and $(-4, 4, 6).$
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7. The vectors of A,B,C and D are respectively $2\overrightarrow{I} + 3\overrightarrow{j} + 5\overrightarrow{k}, \overrightarrow{I} + 2\overrightarrow{j} + 3\overrightarrow{k}, -5\overrightarrow{I} + 4\overrightarrow{j} - 2\overrightarrow{k}$ and $\overrightarrow{I} + 10\overrightarrow{j} + 10\overrightarrow{k}$. Show that AB and CD are parallel.

8. Find all
$$\lambda \in R$$
 such that $(x, y, z) \neq (0, 0, 0)$ and
 $\left(\overrightarrow{i} + \overrightarrow{j} + 3\overrightarrow{k}\right)x + \left(3\overrightarrow{i} - 3\overrightarrow{j} + \overrightarrow{k}\right)y + \left(-4\overrightarrow{i} + 5\overrightarrow{j}\right)z = \lambda\left(x\overrightarrow{i}\right)$

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9. What is the unit vector \hat{a} parallel to the vector $\vec{a} = 3\vec{I} + 4\vec{j} - 2\vec{k}$? Find the vector \vec{b} such that $\hat{a} + \vec{b}$ becomes the unit vector \vec{i} ?

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10. Vectors $\overrightarrow{a}, \overrightarrow{b}$ are noncollinear. Find x so that the vectors $(x-1)\overrightarrow{a} + \overrightarrow{b}$ and $(2+3x)\overrightarrow{a} - 2\overrightarrow{b}$ are collinear.

11. The position vectors of the points A,B,C are $\overrightarrow{a}, \overrightarrow{b}, \overrightarrow{c}$ respectively. If

 $3\overrightarrow{a}+2\overrightarrow{c}=5\overrightarrow{b}$, are the points A,B,and C collinear? If so find AB : BC.

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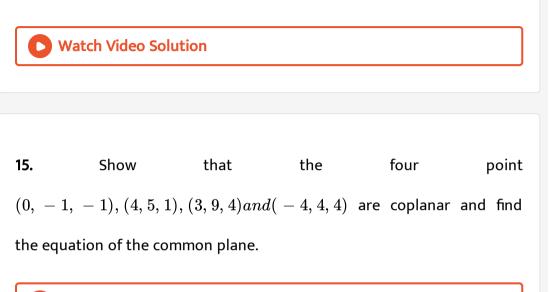
12. If three vector $2\overrightarrow{i} - \overrightarrow{j} - \overrightarrow{k}, \overrightarrow{i} + 2\overrightarrow{j} - 3\overrightarrow{k}, 3\overrightarrow{i} + \lambda\overrightarrow{j} + 5\overrightarrow{k}$ are coplanar then the value of λ is :

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13. If \overrightarrow{a} , \overrightarrow{b} , \overrightarrow{c} are three non collinear vectors then show that the following points are collinear. $6\overrightarrow{a} - 4\overrightarrow{b} + 10\overrightarrow{c}$, $-5\overrightarrow{a} + 3\overrightarrow{b} - 10\overrightarrow{c}$, $4\overrightarrow{a} - 6\overrightarrow{b} - 10\overrightarrow{c}$ and $2\overrightarrow{b} + 10\overrightarrow{c}$

14. If the points A(2,3,-4), B(1,-2,3) and C $(3,\lambda,-1)$ are colliner, then value

of λ is



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16. Three non-zero vectors $\overrightarrow{a}, \overrightarrow{b}, \overrightarrow{c}$ are such that no two of them are collinear. If the vector $\left(\overrightarrow{a} + \overrightarrow{b}\right)$ is collinear with the vector \overrightarrow{c} and the vector $\left(\overrightarrow{b} + \overrightarrow{c}\right)$ is collinear with vector \overrightarrow{a} , then prove that $\left(\overrightarrow{a} + \overrightarrow{b} + \overrightarrow{c}\right)$ is a null vector.