CBSE question paper

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1. If $\vec{a}, \vec{b}, \vec{c}$ are position vectors of the points A(2,3,-4), B(3,-4,-5) and C(3,2,-3) respectively, then $|\vec{a} + \vec{b} + \vec{c}|$ is equal to

   (a) $\sqrt{113}$

   (b) $\sqrt{185}$

   (c) $\sqrt{203}$

   (d) $\sqrt{209}$

2. Find the distance of the point (a,b,c) from the x-axis

3. If $\vec{a} = 2\hat{i} - \hat{j} + 2\hat{k}$ and $\vec{b} = 5\hat{i} - 3\hat{j} - 4\hat{k}$, then find the ratio $\dfrac{\text{projection of vector } \vec{a} \text{ on } \vec{b}}{\text{projection of vector } \vec{b} \text{ on vector } \vec{a}}$

<div align="center">OR</div>

   Let $\hat{a}$ and $\hat{b}$ be two unit vectors. If the vectors $\vec{c} = \hat{a} + 2\hat{b}$ and $\vec{d} = 5\hat{a} - 4\hat{b}$ are perpendicular to each other, then find the angle between the vectors $\hat{a}$ and $\hat{b}$.

4. Show that $|\vec{a}|\vec{b} + |\vec{b}|\vec{a}$ is perpendicular to $|\vec{a}|\vec{b} - |\vec{b}|\vec{a}$, for any two non-zero vectors $\vec{a}$ and $\vec{b}$.

5. Prove that three points A,B and C with position vectors $\vec{a}, \vec{b}$ and $\vec{c}$ respectively are collinear if and only if $(\vec{b} \times \vec{c}) + (\vec{c} \times \vec{a}) + (\vec{a} \times \vec{b}) = \vec{0}$.