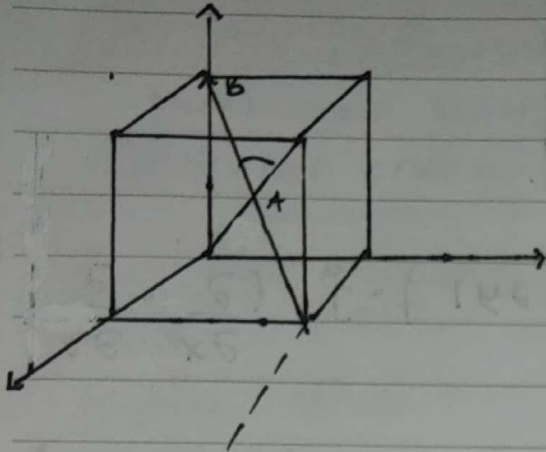


1. Hitung sudut antara diagonal



$$\vec{A} = \hat{i} + \hat{j} + 2\hat{k}$$

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

$$A \cdot B = |A| |B| \cos \theta$$

$$2 = \sqrt{6} \sqrt{6} \cos \theta$$

$$\cos \theta = \frac{2}{\sqrt{6} \sqrt{6}}$$

$$2. \vec{A} = 3x^2y\hat{i} + 2yz\hat{j} + xyz\hat{k}$$

$$\vec{B} = yz\hat{i} + 3xy^2\hat{j} + 3xz\hat{k}$$

$$\vec{A} \times \vec{B} = \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ 3x^2y & 2yz & xyz \\ yz & 3xy^2 & 3xz \end{vmatrix}$$

$$\vec{A} \times \vec{B} = \hat{i} (3x^2yz^2 - 3x^2y^2z) - \hat{j} (9x^2yz - xy^2z^2) - \hat{k} (2y^2z^2 - 9x^2y^3)$$

$$3. T = x^2 + 2xy + 3z + 4$$

$$a). \nabla^2 T$$

$$b). \nabla_x (\nabla T)$$

jawab:

$$a). \nabla T = (2x + 2y)\hat{i} + (2x)\hat{j} + (3)\hat{k}$$

$$\nabla^2 T = 2y + 2x$$

$$b). \nabla_x (\nabla T) = \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ \frac{\partial}{\partial x} & \frac{\partial}{\partial y} & \frac{\partial}{\partial z} \\ 2x+2y & 2x & 3 \end{vmatrix}$$

$$\nabla_x (\nabla T) = \hat{i} \left( \frac{\partial}{\partial y} 3 - \frac{\partial}{\partial z} (2x+2y) \right) - \hat{j} \left( \frac{\partial}{\partial x} 3 - \frac{\partial}{\partial z} 2x \right)$$

$$(2x+2y) \Big| - \hat{k} \left( \frac{\partial}{\partial y} (2x+2y) - \frac{\partial}{\partial x} 2x \right)$$