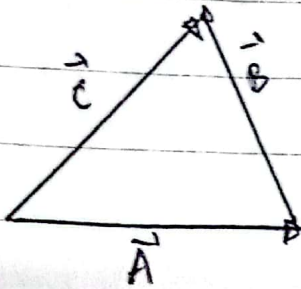


Soal 1



$$\vec{A} = 1\hat{i} + 2\hat{j} + 0\hat{k}$$

$$\vec{B} = -1\hat{i} - 2\hat{j} + 3\hat{k}$$

Hitung vektor C

Hitung sudut $\vec{A}\vec{B}$

$$\vec{A} + \vec{B} = \vec{C}$$

$$\vec{C} = 0\hat{i} + 0\hat{j} + 3\hat{k}$$

• Sudut $\vec{A}\vec{B}$

$$\vec{A} \cdot \vec{B} = (1\hat{i} + 2\hat{j} + 0\hat{k}) \cdot (-1\hat{i} - 2\hat{j} + 3\hat{k})$$

$$= -1 - 4 + 0 = -5$$

$$|\vec{A}| = \sqrt{1^2 + 2^2 + 0^2} = \sqrt{5}$$

$$|\vec{B}| = \sqrt{(-1)^2 + (-2)^2 + (3)^2} = \sqrt{1 + 4 + 9} = \sqrt{14}$$

$$\vec{A} \cdot \vec{B} = |\vec{A}| |\vec{B}| \cos \theta$$

$$-5 = \sqrt{5} \sqrt{14} \cos \theta$$

$$\theta = \arccos \frac{-5}{\sqrt{5} \sqrt{14}}$$

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Soal 2

$$\vec{A} = 2x\hat{i} + 3x^2\hat{j} + 4xy\hat{k}$$

$$\vec{B} = xy\hat{i} + 2x\hat{j} + 3x\hat{k}$$

$$\vec{A} \times \vec{B} = \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ 2x & 3x^2 & 4xy \\ xy & 2x & 3x \end{vmatrix} = \hat{i}(9x^3 - 8x^2y) - \hat{j}(6x^2 - 4x^2y^2) - \hat{k}(3x^3y - 4x^2)$$

~~Soal 2~~ :

Soal 3

Hitung divergensi vektor berikut

a) $U_1 = x^2 \hat{i} + 3xz^2 \hat{j} - 2xz \hat{k}$

b) $U_2 = xy \hat{i} + 2yz \hat{j} + 3xz \hat{k}$

c) $U_3 = y^2 \hat{i} + (2xy + z^2) \hat{j} - 2yz \hat{k}$

Jb :

a) $\nabla \cdot U_1 = \hat{i} \left(\frac{\partial}{\partial x} (x^2) \right) + \hat{j} \left(\frac{\partial}{\partial y} (3xz^2) \right) + \hat{k} \left(\frac{\partial}{\partial z} (-2xz) \right)$

$$= 2x \hat{i} + \cancel{0} \hat{j} - 2x \hat{k}$$

$$= 2x \hat{i} + 0 \hat{j} - 2x \hat{k}$$

b) $\nabla \cdot U_2 = y + 2z + 3x$

c) $\nabla \cdot U_3 = 0 \hat{i} + (2x + 2z) \hat{j} - 2y \hat{k}$