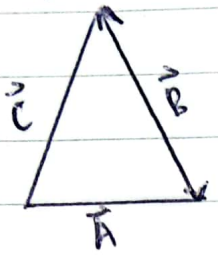
No. Senin

Date 19 . 02 . 2024

Kelistrikan dan kemagnetan

Soal 1



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

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

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

Hitung Vektor $\vec{C}$

Hitung sudut AB

Jawab :

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

- $\vec{A} \cdot \vec{B} = (\hat{i} + 2\hat{j} + 0k) \cdot (-\hat{i} - 2\hat{j} + 3k)$
  $= \hat{i} - 4\hat{j} + 0k = -5$

$|\vec{A}| = \sqrt{1 + 4 + 0}$

$|\vec{B}| = \sqrt{1 + 4 + 9}$

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

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

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

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Soal 2.

$\vec{A} = 2x\hat{i} + 3x^2\hat{j} + 9xy\hat{k}$

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

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

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3. Hitung Divergensi Vektor berikut:

a). $V_1 = x^2\hat{i} + 3xz^2\hat{j} - 2x\,z\hat{k}$

b). $V_2 = xy\hat{i} + 2y\,z\hat{j} + 3x\,z\,\hat{k}$

c). $V_2 = y^2\hat{i} + (2x\,y + z^2)\hat{j} - 2y\,z\hat{k}$

Jawab:

a). $\nabla \cdot V_1 = 2x + 0 - 2x$

b). $\nabla \cdot V_2 = y + 2z + 2x$

c). $\nabla \cdot V_3 = 2y + (2x + z^2) - 2y$