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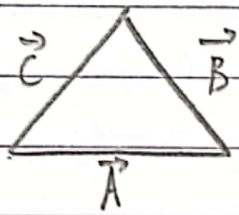
Test

Soal 1



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

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

1. Hitung vektor $\vec{C}$
2. Hitung sudut $\vec{A}\vec{B}$

1. $\vec{A} + \vec{B} = |\vec{A}|\,|B|\cos\theta$

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

2. $A : \vec{i} + 2\vec{j} + 0k$

   $|\vec{A}| : \sqrt{\hat{i} + 2\hat{j} + 0k}$

   $\hat{A} = \frac{\vec{P}}{\vec{A}} = \frac{\hat{i} + 2\hat{j} + 0k}{\sqrt{\hat{i} + 2\hat{j} + 0^2}}$

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

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

   $(\vec{A}) = \sqrt{1^2 + 2^2 + 0^2} = 0$

   $= \sqrt{5}$

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

$= \sqrt{1 + 4 + 9}$

$= \sqrt{14}$

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

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

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

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

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

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

$$\vec{A} \times \vec{B} = \begin{vmatrix} 2x\hat{i} & 3x^2\hat{j} & 4xy\hat{k} \\ xy\hat{i} & 2x\hat{j} & 3x\hat{k} \end{vmatrix} =$$

$= \hat{i}(9x^3 - 8x^2y) - \hat{j}(6x^2y^2) - \hat{k}(3x^3y - 4x^2)$

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3. Hitung divergensi Vektor berikut.

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

b). $V_2 = xy\hat{i} + 2yz\hat{j} + 2xz\hat{k}$

c) $V_3 = y^2\hat{i} + (2xy + z^2)\hat{j} - 2yz\hat{k}$

Jawab :

a. $\nabla V_1 = \hat{i}\left(\frac{2}{2x}(1)\right) + \hat{j}\left(\frac{2}{2y}3xz^2\right) + \hat{k}\left(\frac{2}{2z}(2xz)\right)$

$= 2x + 0 - 2x$

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

b. $\nabla V_2 = y \cdot + 2z + 3x \cdot$

c $\nabla V_3 = = 0\hat{i} + (2x + z^2) + -2y$