

TUGAS VEKTOR

- 1 If $\overline{OA} = 4\mathbf{i} + 3\mathbf{j}$, $\overline{OB} = 6\mathbf{i} - 2\mathbf{j}$, $\overline{OC} = 2\mathbf{i} - \mathbf{j}$, find \overline{AB} , \overline{BC} and \overline{CA} , and deduce the lengths of the sides of the triangle ABC.
- 2 Find the direction cosines of the vector joining the two points (4, 2, 2) and (7, 6, 14).
- 3 If $\mathbf{a} = 2\mathbf{i} + 2\mathbf{j} - \mathbf{k}$ and $\mathbf{b} = 3\mathbf{i} - 6\mathbf{j} + 2\mathbf{k}$, find (a) $\mathbf{a} \cdot \mathbf{b}$ and (b) $\mathbf{a} \times \mathbf{b}$.
- 4 If $\mathbf{a} = 5\mathbf{i} + 4\mathbf{j} + 2\mathbf{k}$, $\mathbf{b} = 4\mathbf{i} - 5\mathbf{j} + 3\mathbf{k}$ and $\mathbf{c} = 2\mathbf{i} - \mathbf{j} - 2\mathbf{k}$, where \mathbf{i} , \mathbf{j} , \mathbf{k} are the unit vectors, determine:
 - (a) the value of $\mathbf{a} \cdot \mathbf{b}$ and the angle between the vectors \mathbf{a} and \mathbf{b}
 - (b) the magnitude and the direction cosines of the product vector ($\mathbf{a} \times \mathbf{b}$) and also the angle which this product vector makes with the vector \mathbf{c} .
5. If $\mathbf{A} = x^2y\mathbf{i} + (xy + yz)\mathbf{j} + xz^2\mathbf{k}$; $\mathbf{B} = yz\mathbf{i} - 3xz\mathbf{j} + 2xy\mathbf{k}$; and $\phi = 3x^2y + xyz - 4y^2z^2 - 3$; determine, at the point (1, 2, 1)
 - (a) $\nabla\phi$; (b) $\nabla \cdot \mathbf{A}$; (c) $\nabla \times \mathbf{B}$; (d) grad div \mathbf{A} ; (e) curl curl \mathbf{A} .