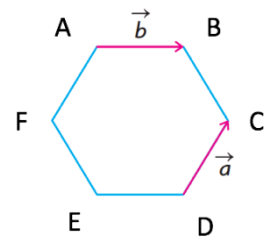


AS Assessment: Vector addition and subtraction

1. A regular hexagon, with sides of 3 cm, is shown below. Assume we place the x-y plane at vertex D, and D is the origin (0, 0). Determine:

a) $\vec{a} + \vec{b}$

b) $\overrightarrow{FE} - \overrightarrow{CA}$



2. If $\vec{a} = (k, \frac{1}{2}, k)$ is a unit vector, determine all possible values of k.
3. In triangle ABC, a median is drawn from vertex A to the midpoint of BC, which is labelled D. If $\overrightarrow{AB} = \vec{a}$ and $\overrightarrow{AC} = \vec{c}$, prove that $\overrightarrow{AD} = \frac{1}{2}\vec{a} + \frac{1}{2}\vec{c}$.
4. a) Draw a diagram on the appropriate coordinate system for the following vector: $\overrightarrow{OM} = (-1, 3, -2)$.
- b) Determine the angles between vector \overrightarrow{OM} and x-, y-, and z-axis.
5. Determine whether $\vec{r} = (16, 11, -24)$ can be written as a linear combination of $\vec{p} = (-2, 3, 4)$ and $\vec{q} = (4, 1, -6)$. Explain the significance of your result.
6. Prove that if or not the points A (3, 0, 4), B (1, 2, 5), and C (2, 1, 3) can construct a triangle? If yes, what kind of triangle is it?