

Section 1: The scalar product

Exercise level 2

- A(1, 0), B(0, 3), C(2, 5) and D(3, 2) are vertices of the quadrilateral ABCD.
 - Write down the vectors \overrightarrow{AB} , \overrightarrow{BC} , \overrightarrow{CD} and \overrightarrow{AD} .
 - What sort of quadrilateral is ABCD?
 - Find the internal angles of the quadrilateral.
- A, B and C have coordinates (2, 2), (4, 6) and (10, 3) respectively.
 - Show that angle ABC is a right angle.
 - Find the position vector of the midpoint of AC.
 - If ABCD is a rectangle, find the coordinates of D.
- Given that $\mathbf{a} = 2\mathbf{i} + 6\mathbf{j} - 3\mathbf{k}$ and $\mathbf{b} = 3\mathbf{i} + s\mathbf{j} + t\mathbf{k}$
 - Find s and t such that \mathbf{a} and \mathbf{b} are parallel
 - Find a relationship between s and t such that \mathbf{a} and \mathbf{b} are at right angles.
- A, B, and C have position vectors $-\mathbf{i} + 2\mathbf{j} + 3\mathbf{k}$, $8\mathbf{i} + 7\mathbf{j} - 9\mathbf{k}$ and $2\mathbf{i} - 3\mathbf{j} - \mathbf{k}$ respectively. Prove that triangle ABC is right angled and find its area.