

11 Relative to an origin O , the position vectors of the points A and B are given by

$$\overrightarrow{OA} = 2\mathbf{i} + 3\mathbf{j} - \mathbf{k} \quad \text{and} \quad \overrightarrow{OB} = 4\mathbf{i} - 3\mathbf{j} + 2\mathbf{k}.$$

- (i) Use a scalar product to find angle AOB , correct to the nearest degree. [4]
- (ii) Find the unit vector in the direction of \overrightarrow{AB} . [3]
- (iii) The point C is such that $\overrightarrow{OC} = 6\mathbf{j} + p\mathbf{k}$, where p is a constant. Given that the lengths of \overrightarrow{AB} and \overrightarrow{AC} are equal, find the possible values of p . [4]