

5. Relative to a fixed origin O ,

- the point A has position vector $-2\mathbf{i} + 3\mathbf{j}$
- the point B has position vector $3\mathbf{i} + p\mathbf{j}$, where p is constant
- the point C has position vector $q\mathbf{i} + 7\mathbf{j}$, where q is constant

Given that $|\overrightarrow{AB}| = 5\sqrt{2}$

(a) find the possible values of p .

(3)

Given that the angle between \overrightarrow{AC} and the unit vector \mathbf{i} is $\frac{\pi}{3}$ radians,

(b) find the exact value of q .

(3)