

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

$$\overrightarrow{OA} = \begin{pmatrix} 0 \\ 2 \\ -3 \end{pmatrix}, \quad \overrightarrow{OB} = \begin{pmatrix} 2 \\ 5 \\ -2 \end{pmatrix} \quad \text{and} \quad \overrightarrow{OC} = \begin{pmatrix} 3 \\ p \\ q \end{pmatrix}.$$

- (i) In the case where ABC is a straight line, find the values of p and q . [4]
- (ii) In the case where angle BAC is 90° , express q in terms of p . [2]
- (iii) In the case where $p = 3$ and the lengths of AB and AC are equal, find the possible values of q . [2]