

Higher Vectors.

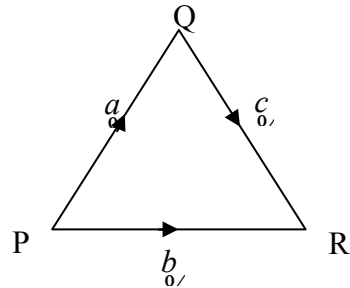
1. Calculate the length of the vector $2\hat{i} - 3\hat{j} + \sqrt{k}$ (2)

2. Show the points A(1, 3, 2), B(2, -1, 4) and C(4, -9, 8) are collinear. (3)

3. PQR is an equilateral triangle of side 2 units

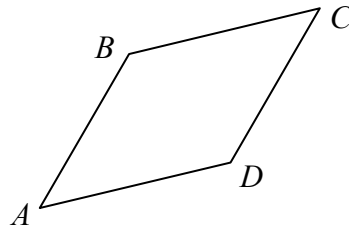
$$\vec{PQ} = \vec{a}, \vec{PR} = \vec{b} \text{ and } \vec{QR} = \vec{c}$$

Evaluate $\vec{a} \cdot (\vec{b} + \vec{c})$ and hence identify two vectors which are perpendicular.



(4)

4. A is the point 2, -1, 4), B is (7, 1, 3) and C is (-6, 4, 2). If ABCD is a parallelogram, find the coordinates of D.



(3)

5. For what value of t are the vectors $\vec{u} = \begin{pmatrix} t \\ -2 \\ 3 \end{pmatrix}$ and $\vec{v} = \begin{pmatrix} 2 \\ 10 \\ t \end{pmatrix}$ perpendicular? (2)

6. P, Q and R have coordinates (1, 3, -1), (2, 0, 1) and (-3, 1, 2) respectively.

(a) Express the vectors \vec{QP} and \vec{QR} in component form (1)

(b) Hence or otherwise find the size of angle PQR (5)

TOTAL (20)