

VECTORS

SET 2

- 1 Show that the line joining $D(2,2,3)$ and $E(4,3,2)$ is parallel to the line joining $F(5,3,-2)$ and $G(9,5,-4)$.
- 2 Show that $A(2,5,0)$, $B(5,8,3)$ and $C(4,7,2)$ are collinear and find the ratio $AB:BC$.
- 3 P divides the line joining $S(1,0,2)$ and $T(5,4,10)$ in the ratio $1:3$. Find the coordinates of P .
- 4 Use the **scalar product** to prove that the triangle with vertices $P(1,0,0)$, $Q(1,1,1)$ and $R(0,1,1)$ is right-angled.

- 5 A go-kart driver is being affected by two forces modelled by the vectors:

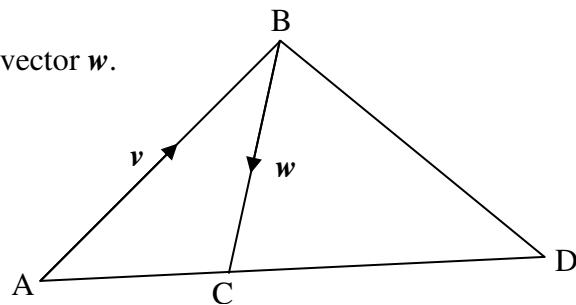
$$\mathbf{u} = \begin{pmatrix} 8 \\ 7 \\ -3 \end{pmatrix} \text{ and } \mathbf{v} = \begin{pmatrix} 9 \\ -4 \\ 5 \end{pmatrix}$$

- (a) Calculate the resultant force.
- (b) Calculate the magnitude of the resultant force.
- (c) Calculate the acute angle between the two forces.

- 6 \overrightarrow{AB} represents vector \mathbf{v} and \overrightarrow{BC} represents vector \mathbf{w} .

$$AC:CD = 1:3.$$

Find vector \overrightarrow{BD} in terms of \mathbf{v} and \mathbf{w} .



- 7 The sides of this equilateral triangle are 2 units long and represent the vectors \mathbf{a} , \mathbf{b} and \mathbf{c} as shown in the diagram.

Evaluate $\mathbf{a} \cdot (\mathbf{a} + \mathbf{b} + \mathbf{c})$.

