## REVIEW SET 14E

**1** Show that A(−2, −1, 3), B(4, 0, −1) and C(−2, 1, −4) are vertices of an isosceles triangle.

**2** Find scalars $r$, $s$ and $t$ if $2\begin{pmatrix} s-1 \\ r+1 \\ t \end{pmatrix} = \begin{pmatrix} 4s \\ 3r \\ r \end{pmatrix} + \begin{pmatrix} r \\ -1 \\ s \end{pmatrix}$.

**3** Find two points on the $Z$-axis which are 6 units from P(−4, 2, 5).

**4** If $\mathbf{a} = \begin{pmatrix} -1 \\ 3 \\ -2 \end{pmatrix}$ and $\mathbf{b} = \begin{pmatrix} 5 \\ -1 \\ 4 \end{pmatrix}$, find $\mathbf{x}$ if: **a** $\mathbf{a} - \mathbf{x} = 2\mathbf{b}$ **b** $\mathbf{b} - 2\mathbf{x} = -\mathbf{a}$

**5** Find $a$ and $b$ if J(−4, 1, 3), K(2, −2, 0) and L($a$, $b$, 2) are collinear.

**6** Given $\mathbf{p} = 2\mathbf{i} - \mathbf{j} + 4\mathbf{k}$ and $\mathbf{q} = -\mathbf{i}.-4\mathbf{j} + 2\mathbf{k}$, find:

**a** $|\mathbf{p} \bullet \mathbf{q}|$ **b** the angle between $\mathbf{p}$ and $\mathbf{q}$.

**7** **a** Find $r$ and $s$ if $\begin{pmatrix} r \\ 4 \\ 3 \end{pmatrix}$ and $\begin{pmatrix} -5 \\ 10 \\ s \end{pmatrix}$ are parallel.

**b** Find a vector of length 4 units which is parallel to $3\mathbf{i} - 2\mathbf{j} + \mathbf{k}$.

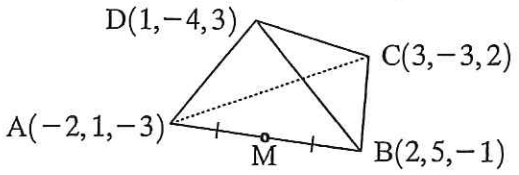
**8** **a** Find $k$ given that $\begin{pmatrix} k \\ \frac{1}{\sqrt{2}} \\ -k \end{pmatrix}$ is a unit vector.

**b** Find the vector which is 5 units long and has the opposite direction to $\begin{pmatrix} 3 \\ 2 \\ -1 \end{pmatrix}$.

**9** If $\mathbf{u} = \begin{pmatrix} -4 \\ 2 \\ 1 \end{pmatrix}$ and $\mathbf{v} = \begin{pmatrix} -1 \\ 3 \\ -2 \end{pmatrix}$, find:

**a** $\mathbf{u} \bullet \mathbf{v}$ **b** the angle between $\mathbf{u}$ and $\mathbf{v}$

**10** For the given tetrahedron, find the measure of angle DMC.




**11** Consider the points A(0, 1, 1), B(−2, 2, 3), C(1, −1, 2) and D(−1, 3, $k$).

**a** Find a vector of length 10 units which is perpendicular to the plane defined by points A, B and C.

**b** Find the area of triangle ABC. **c** If point D lies on plane ABC, find $k$.

**12** **a** Find $t$ given that $\begin{pmatrix} 2-t \\ 3 \\ t \end{pmatrix}$ and $\begin{pmatrix} t \\ 4 \\ t+1 \end{pmatrix}$ are perpendicular.

**b** Show that K(4, 3, −1), L(−3, 4, 2) and M(2, 1, −2) are vertices of a right angled triangle.