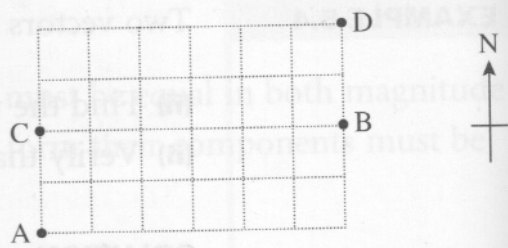
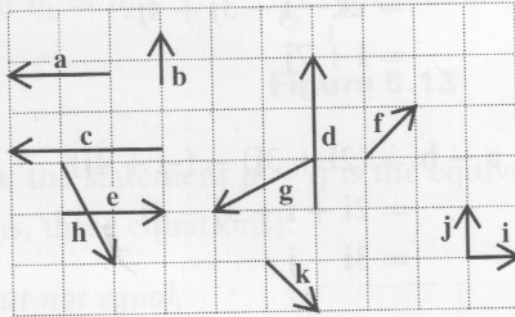


- 1 The diagram shows a grid of 1 m squares. A person walks first east and then north. How far should the person walk in each of these directions to travel



- (i) from A to B?
 (ii) from B to C?
 (iii) from A to D?

- 2 Write the vectors in the diagram in terms of unit vectors \mathbf{i} and \mathbf{j} .



- 3 Given that $\mathbf{a} = \begin{pmatrix} 2 \\ -1 \end{pmatrix}$ and $\mathbf{b} = \begin{pmatrix} 1 \\ 4 \end{pmatrix}$ what are the coordinates of the point with position vector $3\mathbf{a} - 2\mathbf{b}$?

- 4 Four vectors are given in component form by $\mathbf{a} = 3\mathbf{i} + 4\mathbf{j}$, $\mathbf{b} = 6\mathbf{i} - 7\mathbf{j}$, $\mathbf{c} = -2\mathbf{i} + 5\mathbf{j}$ and $\mathbf{d} = -5\mathbf{i} - 3\mathbf{j}$.

Find the vectors:

- (i) $\mathbf{a} + \mathbf{b}$ (ii) $\mathbf{b} + \mathbf{c}$ (iii) $\mathbf{c} + \mathbf{d}$
 (iv) $\mathbf{a} + \mathbf{b} + \mathbf{d}$ (v) $\mathbf{a} - \mathbf{b}$ (vi) $\mathbf{d} - \mathbf{b} + \mathbf{a}$.

- 5 Given vectors $\mathbf{a} = \begin{pmatrix} 4 \\ 1 \end{pmatrix}$, $\mathbf{b} = \begin{pmatrix} -1 \\ 0 \end{pmatrix}$, $\mathbf{c} = \begin{pmatrix} -2 \\ -3 \end{pmatrix}$ and $\mathbf{d} = \begin{pmatrix} 2 \\ 6 \end{pmatrix}$, find

- (i) $\mathbf{a} + 2\mathbf{b}$ (ii) $2\mathbf{c} - 3\mathbf{d}$
 (iii) $\mathbf{a} + \mathbf{c} - 2\mathbf{b}$ (iv) $-2\mathbf{a} + 3\mathbf{b} + 4\mathbf{d}$.

- 6 A, B and C are the points (1, 2), (5, 1) and (7, 8).

- (i) Write down in terms of \mathbf{i} and \mathbf{j} , the position vectors of these three points.
 (ii) Find the component form of the displacements \overrightarrow{AB} , \overrightarrow{BC} and \overrightarrow{CA} .
 (iii) Draw a diagram to show the position vectors of A, B and C and your answers to part (ii).

- 7 A, B and C are the points (0, -3), (2, 5) and (3, 9).

- (i) Write down in terms of \mathbf{i} and \mathbf{j} the position vectors of these three points.
 (ii) Find the displacements \overrightarrow{AB} and \overrightarrow{BC} .
 (iii) Show that the three points all lie on a straight line.

- 8 A, B, C and D are the points (4, 2), (1, 3), (0, 10) and (3, d).

- (i) Find the value of d so that \overrightarrow{DC} is parallel to \overrightarrow{AB} .
 (ii) Find a relationship between \overrightarrow{BC} and \overrightarrow{AD} . What is ABCD?