

## Essential Skills 22

The questions in this series of worksheets appear frequently.

These are the GIFTS you must take to succeed

Vectors (Non Calculator)



Find the components of the resultant vector:

1.  $\begin{pmatrix} 5 \\ 2 \end{pmatrix} - \begin{pmatrix} 3 \\ 4 \end{pmatrix}$

2.  $\begin{pmatrix} 3 \\ 2 \\ 1 \end{pmatrix} - 2 \begin{pmatrix} 1 \\ 0 \\ -3 \end{pmatrix}$

3.  $\begin{pmatrix} 2 \\ -1 \\ 7 \end{pmatrix} + \begin{pmatrix} 4 \\ -3 \\ 5 \end{pmatrix}$

4.  $2 \begin{pmatrix} 0 \\ 1 \\ 8 \end{pmatrix} - 3 \begin{pmatrix} -1 \\ 2 \\ -5 \end{pmatrix}$

5.  $\begin{pmatrix} 4 \\ 0 \\ -1 \end{pmatrix} + \begin{pmatrix} 2 \\ 9 \\ 5 \end{pmatrix} - \begin{pmatrix} 3 \\ 8 \\ -3 \end{pmatrix}$

6.  $2 \begin{pmatrix} 1 \\ -5 \\ 7 \end{pmatrix} + \begin{pmatrix} 1 \\ -2 \\ -2 \end{pmatrix} - 4 \begin{pmatrix} 0 \\ -4 \\ 2 \end{pmatrix}$

Given that  $\mathbf{a} = \begin{pmatrix} 1 \\ 3 \\ -2 \end{pmatrix}$ ,  $\mathbf{b} = \begin{pmatrix} -1 \\ 1 \\ 5 \end{pmatrix}$  and  $\mathbf{c} = \begin{pmatrix} 2 \\ -5 \\ 3 \end{pmatrix}$ , calculate:

7.  $|\mathbf{a} + \mathbf{b}|$

8.  $|\mathbf{b} + \mathbf{c}|$

9.  $|\mathbf{a} + \mathbf{c}|$

10.  $|\mathbf{a} - \mathbf{b}|$

## APPLYING QUESTIONS



1. The magnitude of vector  $\begin{pmatrix} 4 \\ k \\ 20 \end{pmatrix}$  is 21. Find the possible values of  $k$ .

2.  $\mathbf{a}$  and  $\mathbf{b}$  are vectors with components  $\begin{pmatrix} 3 \\ 5 \\ -2 \end{pmatrix}$  &  $\begin{pmatrix} 3 \\ 5 \\ 1 \end{pmatrix}$  respectively.

Find the magnitude of  $3\mathbf{a} - 2\mathbf{b}$ , leaving your answer as a surd in its simplest form.