1 $\quad \mathbf{a} = \begin{pmatrix} 2 \\ 7 \end{pmatrix} \qquad \mathbf{b} = \begin{pmatrix} 5 \\ -2 \end{pmatrix}$

Work out $\quad 3\mathbf{a} + \mathbf{b}$

[2 marks]

$$3 \begin{bmatrix} 2 \\ 7 \end{bmatrix} + \begin{bmatrix} 5 \\ -2 \end{bmatrix}$$

$$= \begin{bmatrix} 6 \\ 21 \end{bmatrix} + \begin{bmatrix} 5 \\ -2 \end{bmatrix}$$

$$= \begin{bmatrix} 11 \\ 19 \end{bmatrix} \quad ②$$

Answer $\begin{pmatrix} 11 \\ 19 \end{pmatrix}$

2   Work out $3\begin{pmatrix} 1 \\ 6 \end{pmatrix} + \begin{pmatrix} 2 \\ 5 \end{pmatrix}$

[1 mark]

$\begin{bmatrix} 3 \\ 18 \end{bmatrix} + \begin{bmatrix} 2 \\ 5 \end{bmatrix} = \begin{bmatrix} 5 \\ 23 \end{bmatrix}$
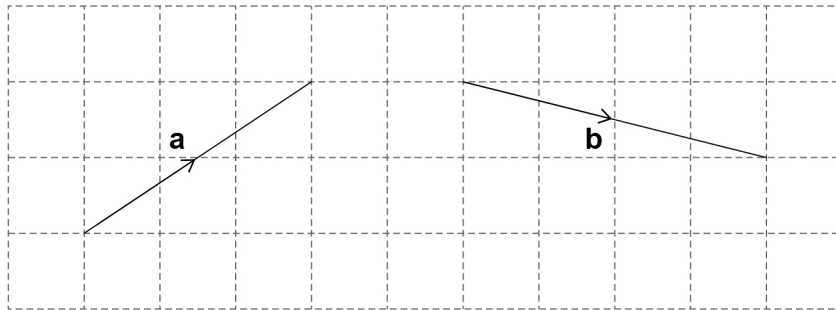
Answer $\begin{pmatrix} 5 \\ 23 \end{pmatrix}$ ①

3   The diagram shows the vectors **a** and **b**.

As a column vector $\mathbf{a} = \begin{pmatrix} 3 \\ 2 \end{pmatrix}$

3 (a)   What is **b** as a column vector?

[2 marks]

Answer $\begin{pmatrix} 4 \\ -1 \end{pmatrix}$ ①

3 (b)   Work out 4**a** as a column vector.

[1 mark]

$\begin{array}{l} 4 \times 3 \\ 4 \times 2 \end{array} = \begin{bmatrix} 12 \\ 8 \end{bmatrix}$

Answer $\begin{pmatrix} 12 \\ 8 \end{pmatrix}$ ①

3 (c) $\mathbf{a} + \mathbf{c} = \begin{pmatrix} 3 \\ 0 \end{pmatrix}$

Work out **c** as a column vector.

Circle your answer.

$\begin{bmatrix} 3 \\ 2 \end{bmatrix} + c = \begin{bmatrix} 3 \\ 0 \end{bmatrix}$

$c = \begin{bmatrix} 3-3 \\ 0-2 \end{bmatrix} = \begin{bmatrix} 0 \\ -2 \end{bmatrix}$

[1 mark]

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

4   Work out $\begin{pmatrix} 1 \\ 2 \end{pmatrix} + \begin{pmatrix} 4 \\ 6 \end{pmatrix} = \begin{bmatrix} 1+4 \\ 2+6 \end{bmatrix}$

[1 mark]

$$= \begin{pmatrix} 5 \\ 8 \end{pmatrix}$$

Answer $\begin{pmatrix} 5 \\ 8 \end{pmatrix}$ / 0