

Solutions

Marking: **M1** a correct method, **A1** the correct answer.

Each answer shows the steps, then the **result**.

2.1

$$\bullet \begin{pmatrix} 4+1 \\ 2-3 \end{pmatrix} = \begin{pmatrix} 5 \\ -1 \end{pmatrix}$$

2.2

$$\bullet \begin{pmatrix} 6 \\ -2 \end{pmatrix}$$

2.3

$$\sqrt{6^2 + 8^2} = \sqrt{100} = \mathbf{10}$$

3.1

$$\bullet \begin{pmatrix} 5-1 \\ 2-6 \end{pmatrix} = \begin{pmatrix} 4 \\ -4 \end{pmatrix}$$

3.2

$$\bullet \overrightarrow{AB} = \mathbf{b} - \mathbf{a} = \begin{pmatrix} 6 \\ 8 \end{pmatrix}$$

$$\bullet \text{ magnitude } \sqrt{6^2 + 8^2} = \mathbf{10}$$

3.3

(a)

$$\bullet 2\mathbf{a} = \begin{pmatrix} 6 \\ -2 \end{pmatrix}$$

$$\bullet 2\mathbf{a} - \mathbf{b} = \begin{pmatrix} 6 - (-2) \\ -2 - 4 \end{pmatrix} = \begin{pmatrix} 8 \\ -6 \end{pmatrix}$$

(b)

$$\bullet |\mathbf{a}| = \sqrt{3^2 + (-1)^2}$$

$$\bullet \sqrt{10} = \mathbf{3.16} \text{ to 2 d.p.}$$

(c)

$$\bullet \overrightarrow{AC} = -\mathbf{a} + \mathbf{b}$$

$$\bullet \text{ in a parallelogram } \overrightarrow{OB} = \mathbf{a} + \mathbf{b}$$

(d)

$$\bullet \overrightarrow{AB} = \mathbf{b} \text{ so } \overrightarrow{AM} = \frac{1}{2}\mathbf{b}$$

$$\bullet \overrightarrow{OM} = \overrightarrow{OA} + \overrightarrow{AM} = \mathbf{a} + \frac{1}{2}\mathbf{b}$$

$$\bullet = \begin{pmatrix} 3 \\ -1 \end{pmatrix} + \begin{pmatrix} -1 \\ 2 \end{pmatrix} = \begin{pmatrix} 2 \\ 1 \end{pmatrix}$$