Q1. (June 2018 v1)

12 $\mathbf{g} = \begin{pmatrix} 2 \\ 5 \end{pmatrix}$ $\mathbf{h} = \begin{pmatrix} -3 \\ 4 \end{pmatrix}$

Write as a single vector

(a) $\mathbf{g} + \mathbf{h}$,

( ) [1]

(b) $-\mathbf{h}$.

( ) [1]

Q2. (June 2018 v2)

12 $\mathbf{a} = \begin{pmatrix} 5 \\ -2 \end{pmatrix}$ $\mathbf{b} = \begin{pmatrix} -7 \\ -3 \end{pmatrix}$

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

( ) [2]

Q3. (June 2018 v3)

19 **(a)** Work out.

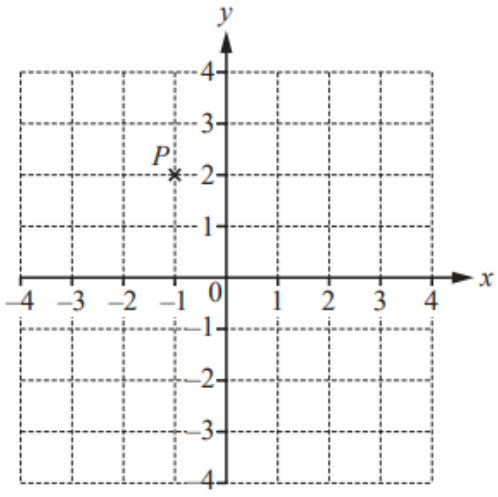
(i) $\begin{pmatrix}5\\-1\end{pmatrix}+\begin{pmatrix}2\\6\end{pmatrix}$

$\begin{pmatrix}\quad\\\quad\end{pmatrix}$ [1]

(ii) $4\begin{pmatrix}-5\\2\end{pmatrix}$

$\begin{pmatrix}\quad\\\quad\end{pmatrix}$ [1]

(b)



P is the point $(-1, 2)$ and $\overrightarrow{PQ} = \begin{pmatrix}4\\-3\end{pmatrix}$.

Find the co-ordinates of Q.

(..... , ...) [1]

Q4. (June 2019 v3)

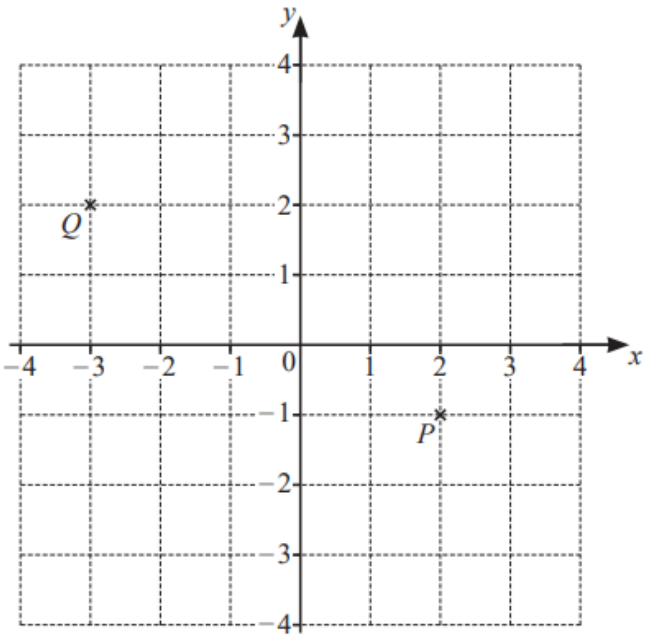
11 $\mathbf{p} = \begin{pmatrix} 5 \\ 0 \end{pmatrix}$ $\mathbf{q} = \begin{pmatrix} 1 \\ 6 \end{pmatrix}$

Work out $2\mathbf{p} + 3\mathbf{q}$.

( ) [2]

Q5. (June 2020 v1)

9



(a) Write $\overrightarrow{PQ}$ as a column vector.

( ) [1]

(b) Write $3\overrightarrow{PQ}$ as a single vector.

( ) [1]

Q6. (June 2020 v2)

(c) On the grid, plot point E so that $\overrightarrow{EA} = \begin{pmatrix} -4 \\ 3 \end{pmatrix}$. [2]

Q7. (June 2021 v1)

9 Work out.

(a) $\begin{pmatrix} 6 \\ -5 \end{pmatrix} + \begin{pmatrix} 8 \\ -1 \end{pmatrix}$

( ) [1]

(b) $3\begin{pmatrix} -4 \\ 7 \end{pmatrix}$

( ) [1]

Q8. (June 2021 v2)

7 $\mathbf{a} = \begin{pmatrix} 5 \\ -7 \end{pmatrix}$ $\mathbf{b} = \begin{pmatrix} -2 \\ 6 \end{pmatrix}$

Work out $\mathbf{a} - \mathbf{b}$.

( ) [1]

Q9. (June 2021 v3)

10 **(a)** $\mathbf{a} = \begin{pmatrix} 3 \\ -4 \end{pmatrix}$ $\mathbf{b} = \begin{pmatrix} 5 \\ 2 \end{pmatrix}$

Work out.

(i) $8\mathbf{b}$

$\begin{pmatrix} \quad \\ \quad \end{pmatrix}$ [1]

(ii) $\mathbf{a} - \mathbf{b}$

$\begin{pmatrix} \quad \\ \quad \end{pmatrix}$ [1]

Q10. (June 2022 v2)

10 $\mathbf{p} = \begin{pmatrix} 2 \\ 8 \end{pmatrix}$ $\mathbf{q} = \begin{pmatrix} -1 \\ 4 \end{pmatrix}$

Find

(a) $\mathbf{p} - \mathbf{q}$,

$\begin{pmatrix} \quad \\ \quad \end{pmatrix}$ [1]

(b) $6\mathbf{p}$.

$\begin{pmatrix} \quad \\ \quad \end{pmatrix}$ [1]

Q11. (June 2022 v3)

(b) $\overrightarrow{PQ} = \begin{pmatrix} 3 \\ -2 \end{pmatrix}$

Mark point Q on the grid. [1]

(c) Find $\overrightarrow{QR}$.

$\overrightarrow{QR} = \begin{pmatrix} \quad \\ \quad \end{pmatrix}$ [1]

(d) Complete this statement.

$\overrightarrow{PQ} + \overrightarrow{QR} =$ ..... [1]

Q12. (June 2023 v1)

11 $\mathbf{a} = \begin{pmatrix} 3 \\ 7 \end{pmatrix}$ $\mathbf{b} = \begin{pmatrix} -2 \\ 5 \end{pmatrix}$

Work out $\mathbf{a} - 2\mathbf{b}$.

$\begin{pmatrix} \quad \\ \quad \end{pmatrix}$ [2]

Q13. (June 2023 v2)

15 F is the point $(1, -4)$, $\overrightarrow{FG} = \begin{pmatrix} 8 \\ -3 \end{pmatrix}$ and $\overrightarrow{GH} = \begin{pmatrix} -12 \\ 35 \end{pmatrix}$.

Find

(a) $3\overrightarrow{FG}$

( ) [1]

(b) $\overrightarrow{FG} + \overrightarrow{GH}$

( ) [1]

(c) the coordinates of the point G.

(..... , ...) [1]

Q14. (June 2024 v2)

10 $\mathbf{a} = \begin{pmatrix} 5 \\ -7 \end{pmatrix}$ $\mathbf{b} = \begin{pmatrix} 6 \\ -7 \end{pmatrix}$

Work out $\mathbf{a} - \mathbf{b}$.

( ) [1]

Q15. (June 2025 v2)

(b) (i) Write down the coordinates of point P.

(..... , ...) [1]

(ii) Work out the coordinates of point P after a translation by the vector $\begin{pmatrix} -20 \\ 12 \end{pmatrix}$.

(..... , ...) [1]

Q16. (Nov 2018 v1)

11 Work out.

(a) $6\begin{pmatrix} 2 \\ -1 \end{pmatrix}$

$\begin{pmatrix} \quad \\ \quad \end{pmatrix}$ [1]

(b) $\begin{pmatrix} 5 \\ -3 \end{pmatrix} - \begin{pmatrix} 2 \\ 4 \end{pmatrix}$

$\begin{pmatrix} \quad \\ \quad \end{pmatrix}$ [1]

Q17. (Nov 2018 v2)

4 Work out.

(a) $\begin{pmatrix}-2\\5\end{pmatrix}-\begin{pmatrix}-1\\1\end{pmatrix}$

$\begin{pmatrix}\quad\\\quad\end{pmatrix}$ [1]

(b) $7\begin{pmatrix}-3\\4\end{pmatrix}$

$\begin{pmatrix}\quad\\\quad\end{pmatrix}$ [1]

Q18. (Nov 2018 v3)

6 Work out $\begin{pmatrix}2\\5\end{pmatrix}-\begin{pmatrix}-3\\4\end{pmatrix}$.

$\begin{pmatrix}\quad\\\quad\end{pmatrix}$ [1]

Q19. (Nov 2019 v3)

17 Work out.

(a) $\begin{pmatrix} -3 \\ 5 \end{pmatrix} + \begin{pmatrix} 2 \\ -4 \end{pmatrix}$

$\begin{pmatrix} \quad \\ \quad \end{pmatrix}$ [1]

(b) $\begin{pmatrix} 6 \\ 2 \end{pmatrix} - \begin{pmatrix} 1 \\ 5 \end{pmatrix}$

$\begin{pmatrix} \quad \\ \quad \end{pmatrix}$ [1]

(c) $4\begin{pmatrix} 2 \\ -5 \end{pmatrix}$

$\begin{pmatrix} \quad \\ \quad \end{pmatrix}$ [1]

Q20. (Nov 2020 v1)

10 Work out.

(a) $\begin{pmatrix} 2 \\ -3 \end{pmatrix} + \begin{pmatrix} 5 \\ -1 \end{pmatrix}$

$\begin{pmatrix} \quad \\ \quad \end{pmatrix}$ [1]

(b) $4\begin{pmatrix} 2 \\ -5 \end{pmatrix}$

$\begin{pmatrix} \quad \\ \quad \end{pmatrix}$ [1]

Q21. (Nov 2021 v2)

14 Work out.

(a) $\begin{pmatrix} 3 \\ -2 \end{pmatrix} + \begin{pmatrix} -5 \\ 7 \end{pmatrix}$

( ) [1]

(b) $5\begin{pmatrix} 3 \\ -1 \end{pmatrix}$

( ) [1]

Q22. (Nov 2021 v3)

(b) Write $\overrightarrow{AB}$ as a vector.

( ) [1]

Q23. (Nov 2022 v2)

9 Work out.

(a) $\begin{pmatrix} 6 \\ -3 \end{pmatrix} + \begin{pmatrix} 4 \\ -5 \end{pmatrix}$

( ) [1]

(b) $6\begin{pmatrix} 3 \\ -2 \end{pmatrix}$

( ) [1]

Q24. (Nov 2023 v3)

10 $\mathbf{a} = \begin{pmatrix} 4 \\ 9 \end{pmatrix}$ $\mathbf{b} = \begin{pmatrix} -6 \\ 1 \end{pmatrix}$ $\mathbf{c} = \begin{pmatrix} 13 \\ -2 \end{pmatrix}$

Work out.

(a) $\mathbf{a} + \mathbf{b}$

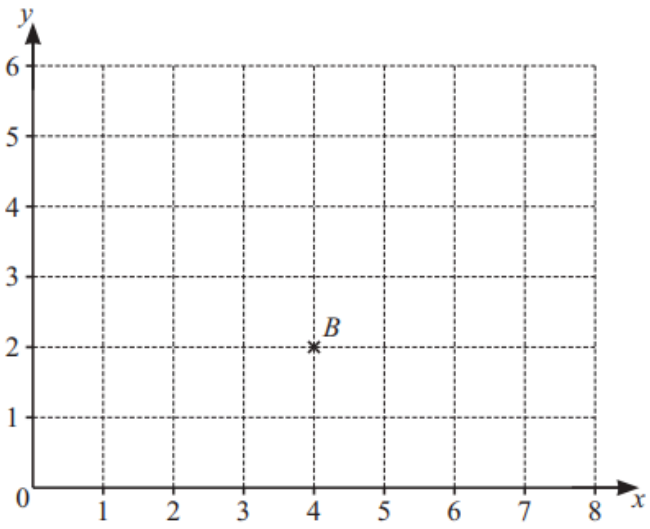
( ) [1]

(b) $3\mathbf{c}$

( ) [1]

Q25. (Nov 2024 v2)

19



$\overrightarrow{AB} = \begin{pmatrix} 3 \\ -2 \end{pmatrix}$

Mark point A on the grid. [1]