

Vectors

For AQA GCSE Mathematics (8300) • Foundation tier

Name _____

Total marks: **23**

Answer **all** questions in the spaces provided. Show your working: marks are given for correct method.

- 1** Vectors **a** and **b** are drawn on the grid.



- (a) Write **a** as a column vector.

[1 mark]

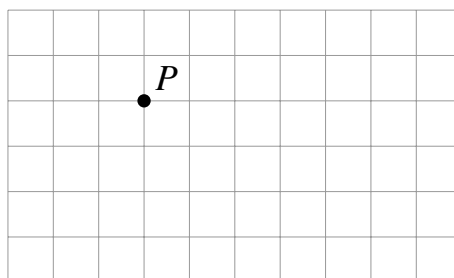
Answer $\begin{pmatrix} \\ \end{pmatrix}$

- (b) Write **b** as a column vector.

[1 mark]

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

- 2 On the grid, draw the vector $\begin{pmatrix} 3 \\ -2 \end{pmatrix}$ starting at point P .



[1 mark]

- 3 A is the point $(1, 4)$ and B is the point $(6, 2)$.

(a) Write down the column vector $\overrightarrow{AB}$

[1 mark]

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

(b) Write down the column vector $\overrightarrow{BA}$

[1 mark]

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

4 $\mathbf{p} = \begin{pmatrix} 2 \\ 5 \end{pmatrix}$ and $\mathbf{q} = \begin{pmatrix} 4 \\ -1 \end{pmatrix}$

Work out, as a column vector,

(a) $\mathbf{p} + \mathbf{q}$

[1 mark]

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

(b) $\mathbf{p} - \mathbf{q}$

[1 mark]

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

(c) $3\mathbf{p}$

[1 mark]

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

(d) $2\mathbf{p} - 3\mathbf{q}$

[2 marks]

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

5 Circle the vector that is equal to $-2\begin{pmatrix} 3 \\ -1 \end{pmatrix}$

[1 mark]

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

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

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

$$\begin{pmatrix} 1 \\ -3 \end{pmatrix}$$

6 $\mathbf{a} = \begin{pmatrix} 6 \\ 1 \end{pmatrix}$ and $\mathbf{b} = \begin{pmatrix} 2 \\ 4 \end{pmatrix}$
Circle the vector $\mathbf{a} - \mathbf{b}$

[1 mark]

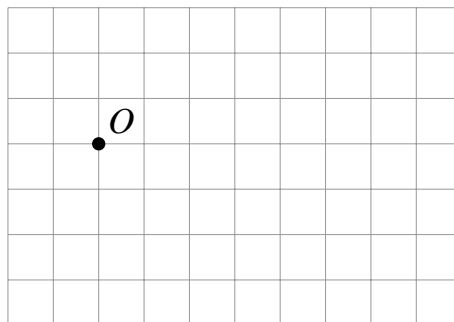
$$\begin{pmatrix} 4 \\ -3 \end{pmatrix}$$

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

$$\begin{pmatrix} 4 \\ 3 \end{pmatrix}$$

$$\begin{pmatrix} -4 \\ 3 \end{pmatrix}$$

7 $\mathbf{r} = \begin{pmatrix} 3 \\ 1 \end{pmatrix}$ and $\mathbf{s} = \begin{pmatrix} 2 \\ -3 \end{pmatrix}$



(a) On the grid, draw the vector $\mathbf{r} + \mathbf{s}$ starting at point O .

[1 mark]

(b) Write $\mathbf{r} + \mathbf{s}$ as a column vector.

[1 mark]

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

8 $\mathbf{m} + \mathbf{n} = \begin{pmatrix} 7 \\ 1 \end{pmatrix}$ and $\mathbf{m} = \begin{pmatrix} 2 \\ 5 \end{pmatrix}$

Work out $\mathbf{n}$ as a column vector.

[2 marks]

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

9 $2\mathbf{a} + \mathbf{b} = \begin{pmatrix} 7 \\ 4 \end{pmatrix}$ and $\mathbf{a} = \begin{pmatrix} 3 \\ -1 \end{pmatrix}$

Work out $\mathbf{b}$ as a column vector.

[2 marks]

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

10 R is the point $(4, -1)$.

$$\overrightarrow{RS} = \begin{pmatrix} -6 \\ 3 \end{pmatrix}$$

Work out the coordinates of S .

[2 marks]

Answer _____

- 11** P is the point $(1, 2)$.

$$\overrightarrow{PQ} = 2\mathbf{a} - \mathbf{b} \text{ where } \mathbf{a} = \begin{pmatrix} 3 \\ 1 \end{pmatrix} \text{ and } \mathbf{b} = \begin{pmatrix} -1 \\ 4 \end{pmatrix}$$

Work out the coordinates of Q .

[3 marks]

Answer (_____ , _____)