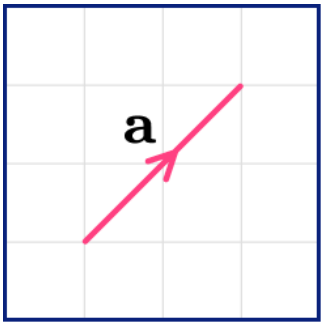
Column Vectors - Worksheet

Skill

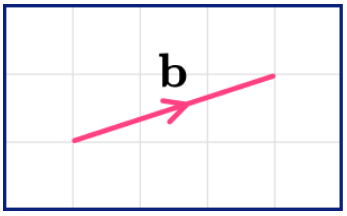
Group A - Writing column vectors

Write the vectors shown on the diagram as a column vector:

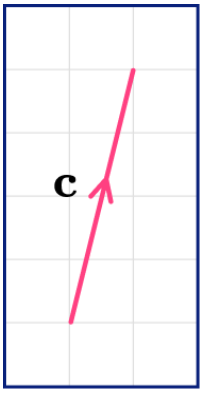
1)



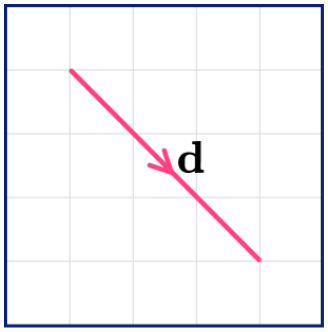
2)



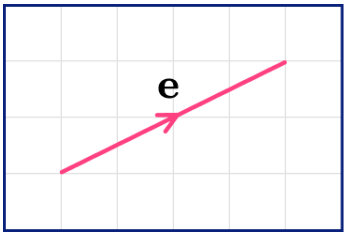
3)



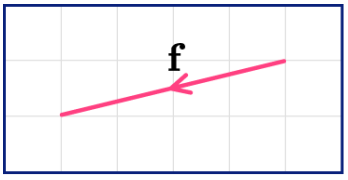
4)



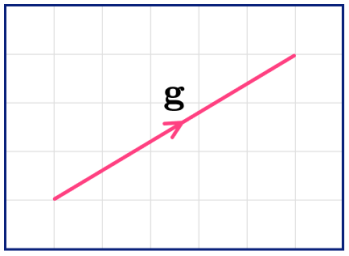
5)



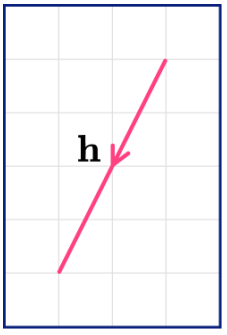
6)



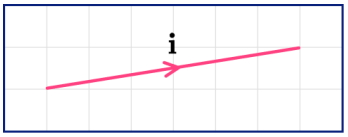
7)



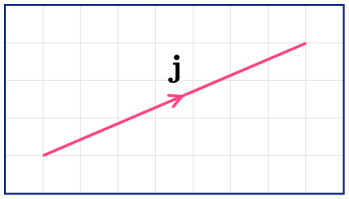
8)



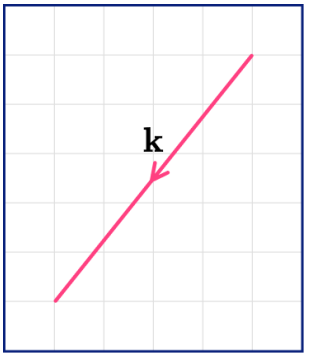
9)



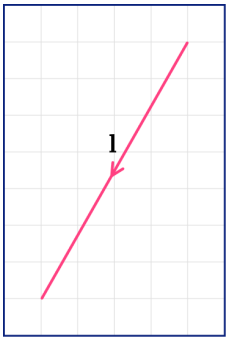
10)



11)



12)

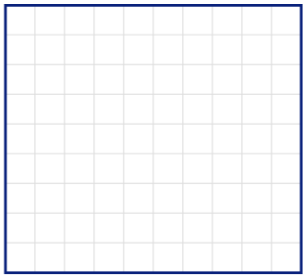


Column Vectors - Worksheet

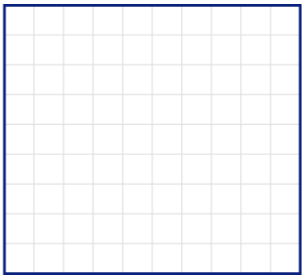
Group B - Drawing column vectors

Draw and label the following column vectors on the grid provided:

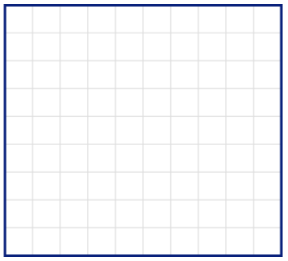
1) $\begin{pmatrix} 2 \\ 1 \end{pmatrix}$



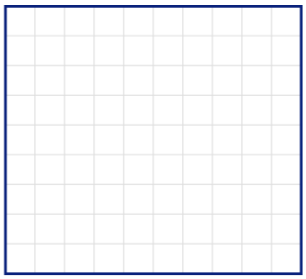
2) $\begin{pmatrix} -2 \\ 1 \end{pmatrix}$



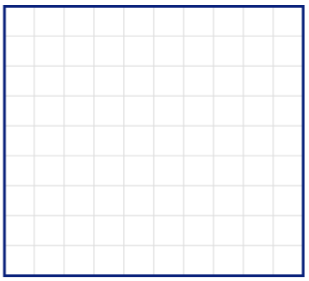
3) $\begin{pmatrix} -2 \\ -1 \end{pmatrix}$



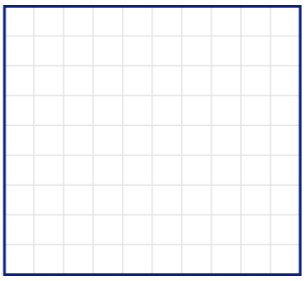
4) $\begin{pmatrix} 2 \\ -1 \end{pmatrix}$



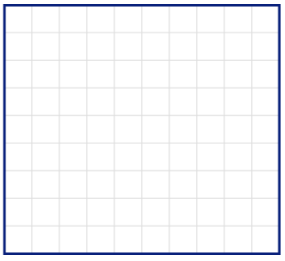
5) $\begin{pmatrix} 4 \\ 3 \end{pmatrix}$



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

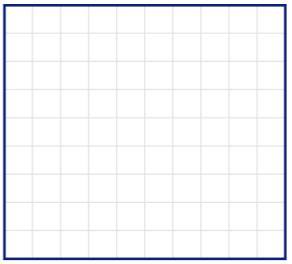


7) $\begin{pmatrix} -4 \\ -3 \end{pmatrix}$

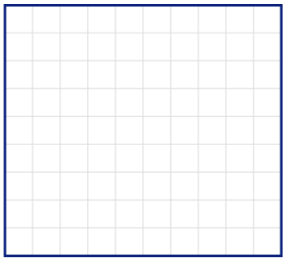


8) $\begin{pmatrix} 4 \\ -3 \end{pmatrix}$

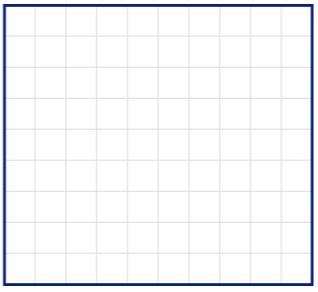
9) $\begin{pmatrix} 8 \\ 2 \end{pmatrix}$



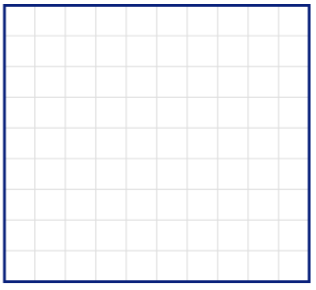
10) $\begin{pmatrix} -8 \\ 2 \end{pmatrix}$



11) $\begin{pmatrix} -8 \\ -2 \end{pmatrix}$



12) $\begin{pmatrix} 8 \\ -2 \end{pmatrix}$



Column Vectors - Worksheet

Group C - Negative vectors

Write down the negative vector of the following vectors:

1) $\begin{pmatrix} 5 \\ 2 \end{pmatrix}$

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

3) $\begin{pmatrix} -3 \\ -7 \end{pmatrix}$

4) $\begin{pmatrix} 0 \\ -6 \end{pmatrix}$

5) $\begin{pmatrix} 8 \\ -1 \end{pmatrix}$

6) $\begin{pmatrix} -4 \\ 0 \end{pmatrix}$

7) $\begin{pmatrix} 1 \\ 2 \end{pmatrix}$

8) $\begin{pmatrix} 6 \\ 4 \end{pmatrix}$

9) $\begin{pmatrix} 3 \\ -2 \end{pmatrix}$

10) $\begin{pmatrix} -9 \\ -7 \end{pmatrix}$

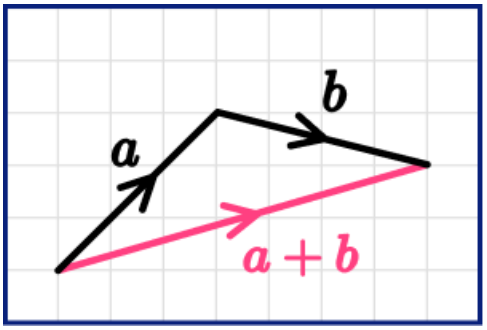
11) $\begin{pmatrix} 2 \\ 11 \end{pmatrix}$

12) $\begin{pmatrix} -8 \\ 3 \end{pmatrix}$

Column Vectors - Worksheet

Applied

1) Shown on the grid are the vectors $\boldsymbol{a}$, $\boldsymbol{b}$ and their resultant vector $\boldsymbol{a} + \boldsymbol{b}$.

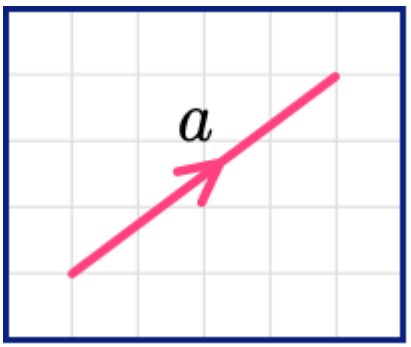


(a) Write $\boldsymbol{a}$ as a column vector.

(b) Write $\boldsymbol{b}$ as a column vector.

(c) Write the resultant vector, $\boldsymbol{a} + \boldsymbol{b}$ as a column vector.

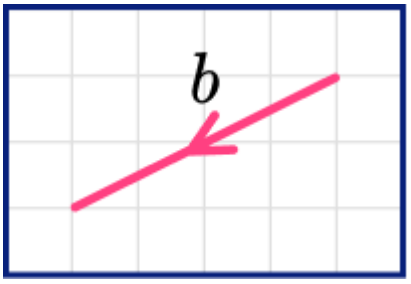
2) Lucas has been asked to draw the vector $\boldsymbol{a} = \begin{pmatrix} 3 \\ 4 \end{pmatrix}$.
This is what he drew:



What mistake(s) has Lucas made?

Column Vectors - Worksheet

3) Peter has been asked to draw the vector $\boldsymbol{b} = \begin{pmatrix} 4 \\ -2 \end{pmatrix}$.
This is what he drew.



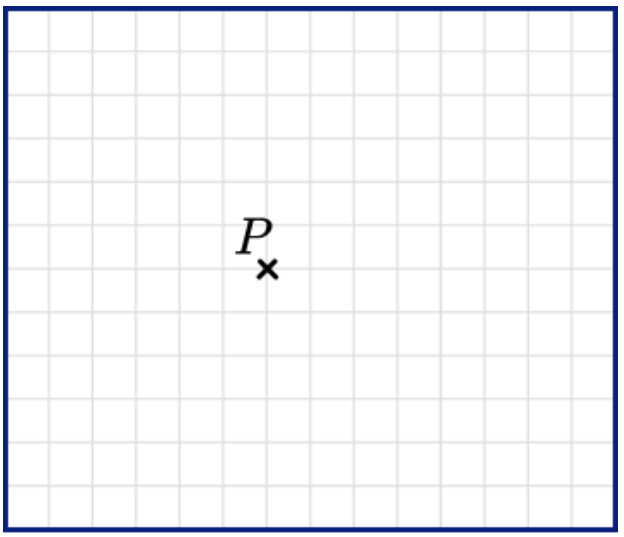
What mistake(s) has Lucas made?

4) (a) A is the point $(4,\ 3)$ and B is the point $(5,\ 0)$.
Write down as a column vector $\overrightarrow{AB}$.

(b) C is the point $(6, -\ 1)$ and D is the point $(2,\ 1)$.
Write down as a column vector $\overrightarrow{CD}$.

Column Vectors - Exam Questions

1) From the point P, draw the vectors below.



(a) $a = \begin{pmatrix} 3 \\ 5 \end{pmatrix}$ **(1)**

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

(2 marks)

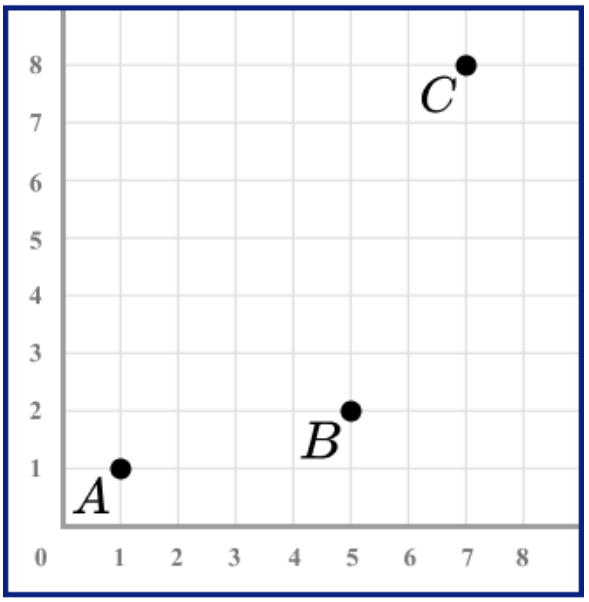
---

2) On the axes below, draw the vectors from the point stated.

$\begin{pmatrix} 2 \\ 3 \end{pmatrix}$ from A

$\begin{pmatrix} 1 \\ -2 \end{pmatrix}$ from B

$\begin{pmatrix} -1 \\ -4 \end{pmatrix}$ from C



(3 marks)

Column Vectors - Exam Questions

3) Given the vectors

$$\boldsymbol{a} = \begin{pmatrix} -4 \\ 3 \end{pmatrix} \qquad \boldsymbol{b} = \begin{pmatrix} 3 \\ -2 \end{pmatrix} \qquad \boldsymbol{c} = \begin{pmatrix} -1 \\ -2 \end{pmatrix}$$

write the following as column vectors:

(a) $-\boldsymbol{a}$

.....

(1)

(b) $-\boldsymbol{b}$

.....

(1)

(c) $-\boldsymbol{c}$

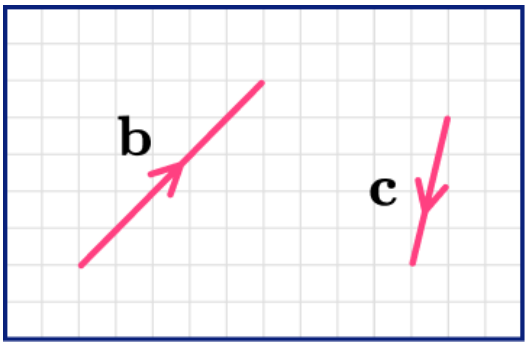
.....

(1)

(3 marks)

---

4) Shown below are vectors $\boldsymbol{b}$ and $\boldsymbol{c}$.



(a) Write the column vector that represents $\boldsymbol{b}$.

.....

(1)

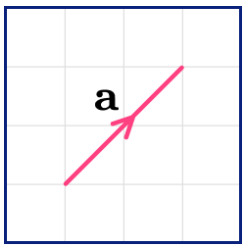
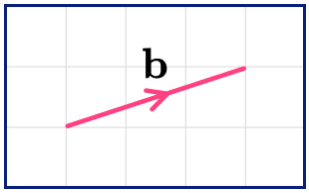
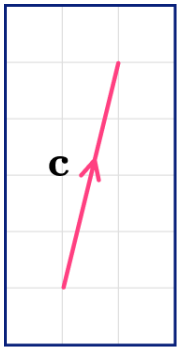
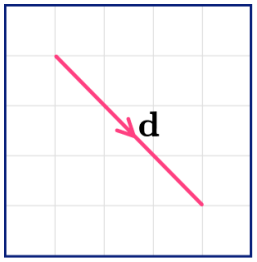
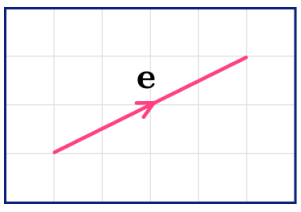
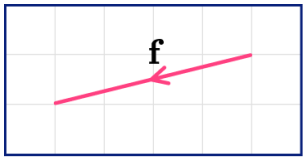
(b) Write the column vector that represents $\boldsymbol{c}$.

.....

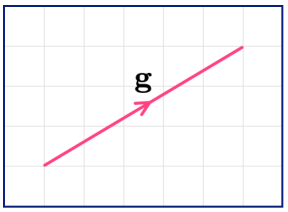
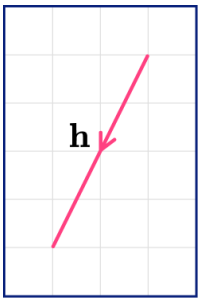
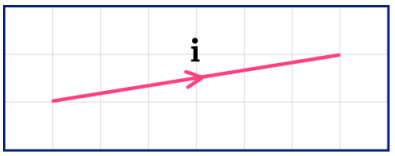
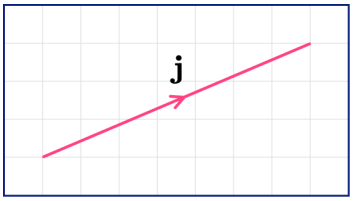
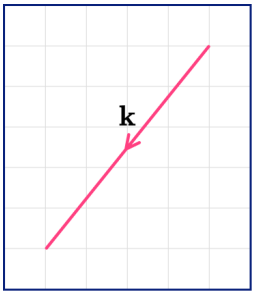
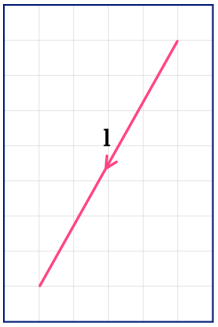
(1)

(2 marks)

Column Vectors - Answers

	Question	Answer
	Skill Questions	
Group A	Write the vectors shown on the diagram as a column vector: 1)  2)  3)  4)  5)  6) 	1) $\begin{pmatrix} 2 \\ 2 \end{pmatrix}$ 2) $\begin{pmatrix} 3 \\ 1 \end{pmatrix}$ 3) $\begin{pmatrix} 1 \\ 4 \end{pmatrix}$ 4) $\begin{pmatrix} 3 \\ -3 \end{pmatrix}$ 5) $\begin{pmatrix} 4 \\ 2 \end{pmatrix}$ 6) $\begin{pmatrix} -4 \\ -1 \end{pmatrix}$

Column Vectors - Answers

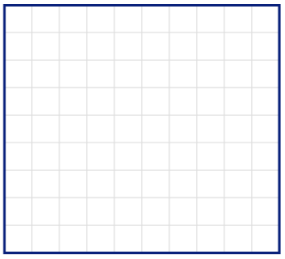
Group A contd	7) 	7) $\begin{pmatrix} 5 \\ 3 \end{pmatrix}$
	8) 	8) $\begin{pmatrix} -2 \\ -4 \end{pmatrix}$
	9) 	9) $\begin{pmatrix} 6 \\ 1 \end{pmatrix}$
	10) 	10) $\begin{pmatrix} 7 \\ 3 \end{pmatrix}$
	11) 	11) $\begin{pmatrix} -4 \\ -5 \end{pmatrix}$
	12) 	12) $\begin{pmatrix} -4 \\ -7 \end{pmatrix}$

Column Vectors - Answers

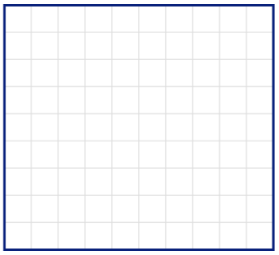
Group B

Draw and label the following column vectors on the grid provided:

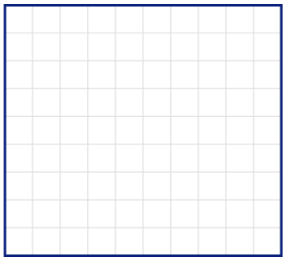
1) $\begin{pmatrix} 2 \\ 1 \end{pmatrix}$



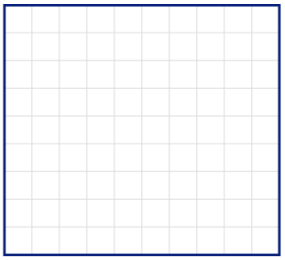
2) $\begin{pmatrix} -2 \\ 1 \end{pmatrix}$



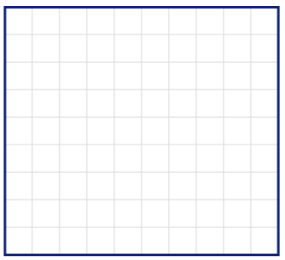
3) $\begin{pmatrix} -2 \\ -1 \end{pmatrix}$



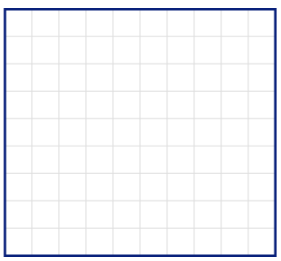
4) $\begin{pmatrix} 2 \\ -1 \end{pmatrix}$



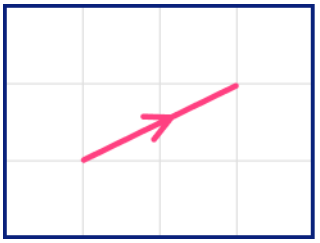
5) $\begin{pmatrix} 4 \\ 3 \end{pmatrix}$



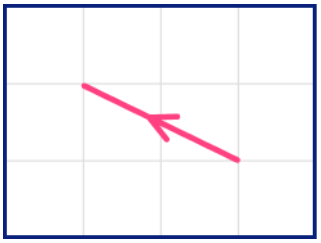
6) $\begin{pmatrix} -4 \\ 3 \end{pmatrix}$



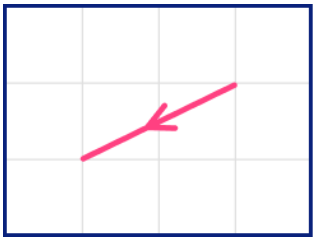
1)



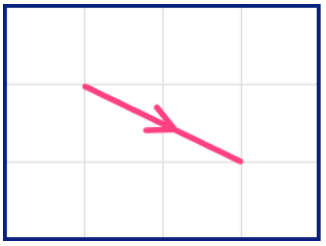
2)



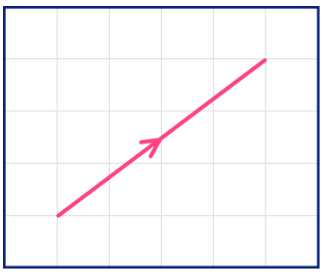
3)



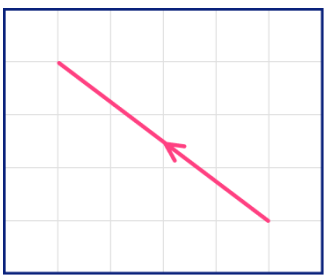
4)



5)



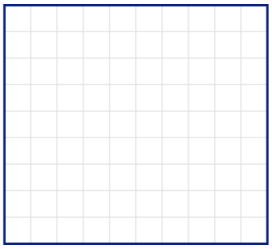
6)



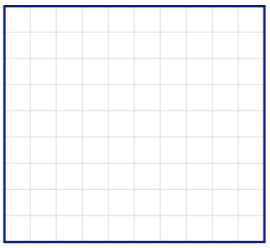
Column Vectors - Answers

Group B contd

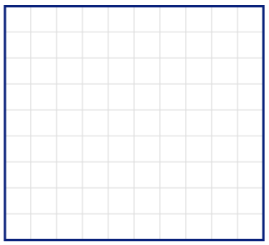
7) $\begin{pmatrix} -4 \\ -3 \end{pmatrix}$



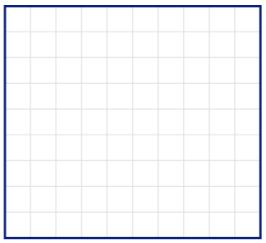
8) $\begin{pmatrix} 4 \\ -3 \end{pmatrix}$



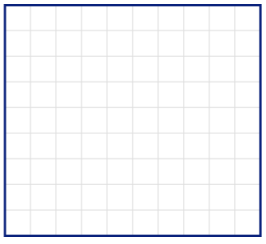
9) $\begin{pmatrix} 8 \\ 2 \end{pmatrix}$



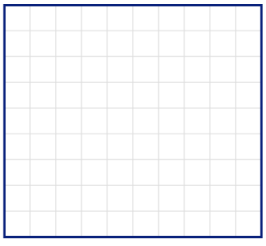
10) $\begin{pmatrix} -8 \\ 2 \end{pmatrix}$



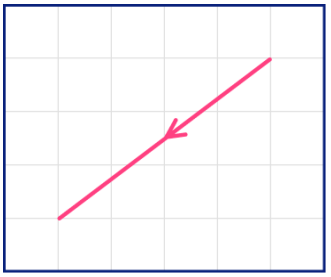
11) $\begin{pmatrix} -8 \\ -2 \end{pmatrix}$



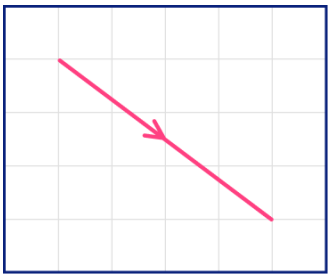
12) $\begin{pmatrix} 8 \\ -2 \end{pmatrix}$



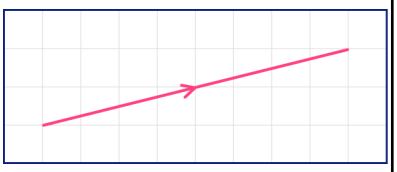
7)



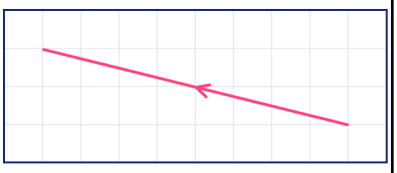
8)



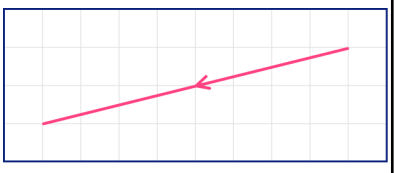
9)



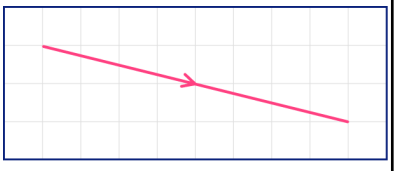
10)



11)



12)



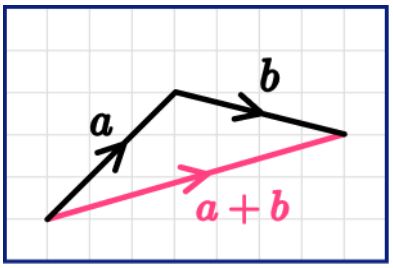
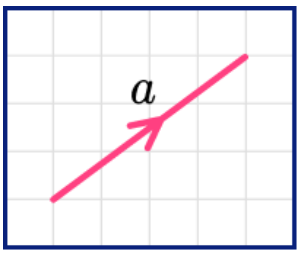
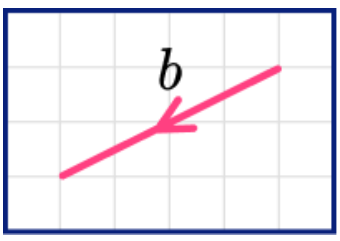
Column Vectors - Answers

Group C	Write down the negative vector of the following vectors:	
	1) $\begin{pmatrix} 5 \\ 2 \end{pmatrix}$	**1)** $\begin{pmatrix} -5 \\ -2 \end{pmatrix}$
	2) $\begin{pmatrix} -1 \\ 3 \end{pmatrix}$	**2)** $\begin{pmatrix} 1 \\ -3 \end{pmatrix}$
	3) $\begin{pmatrix} -3 \\ -7 \end{pmatrix}$	**3)** $\begin{pmatrix} 3 \\ 7 \end{pmatrix}$
	4) $\begin{pmatrix} 0 \\ -6 \end{pmatrix}$	**4)** $\begin{pmatrix} 0 \\ 6 \end{pmatrix}$
	5) $\begin{pmatrix} 8 \\ -1 \end{pmatrix}$	**5)** $\begin{pmatrix} -8 \\ 1 \end{pmatrix}$
	6) $\begin{pmatrix} -4 \\ 0 \end{pmatrix}$	**6)** $\begin{pmatrix} 4 \\ 0 \end{pmatrix}$
	7) $\begin{pmatrix} 1 \\ 2 \end{pmatrix}$	**7)** $\begin{pmatrix} -1 \\ -2 \end{pmatrix}$
	8) $\begin{pmatrix} 6 \\ 4 \end{pmatrix}$	**8)** $\begin{pmatrix} -6 \\ -4 \end{pmatrix}$
	9) $\begin{pmatrix} 3 \\ -2 \end{pmatrix}$	**9)** $\begin{pmatrix} -3 \\ 2 \end{pmatrix}$

Column Vectors - Answers

Group C contd	10) $\begin{pmatrix} -9 \\ -7 \end{pmatrix}$	10) $\begin{pmatrix} 9 \\ 7 \end{pmatrix}$
	11) $\begin{pmatrix} 2 \\ 11 \end{pmatrix}$	11) $\begin{pmatrix} -2 \\ -11 \end{pmatrix}$
	12) $\begin{pmatrix} -8 \\ 3 \end{pmatrix}$	12) $\begin{pmatrix} 8 \\ -3 \end{pmatrix}$

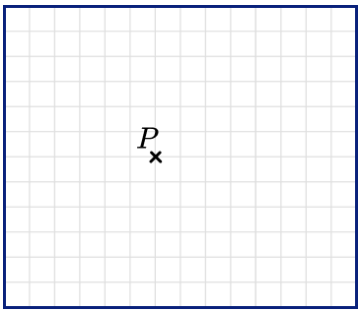
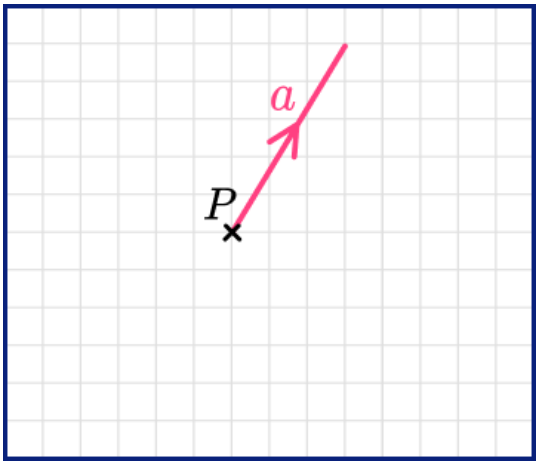
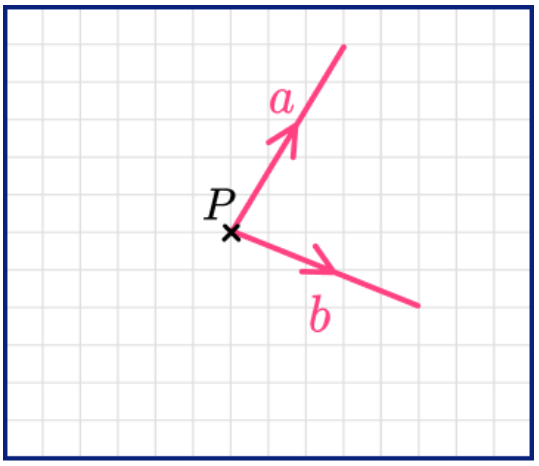
Column Vectors - Answers

	Question	Answer
	Applied Questions	
1)	Shown on the grid are the vectors $\boldsymbol{a}$, $\boldsymbol{b}$ and their resultant vector $\boldsymbol{a}+\boldsymbol{b}$.  **a)** Write $\boldsymbol{a}$ as a column vector. **b)** Write $\boldsymbol{b}$ as a column vector. **c)** Write the resultant vector, $\boldsymbol{a}+\boldsymbol{b}$, as a column vector.	**a)** $\boldsymbol{a}=\begin{pmatrix}3\\3\end{pmatrix}$ **b)** $\boldsymbol{b}=\begin{pmatrix}4\\-1\end{pmatrix}$ **c)** $\boldsymbol{a}+\boldsymbol{b}=\begin{pmatrix}7\\2\end{pmatrix}$
2)	Lucas has been asked to draw the vector $\boldsymbol{a}=\begin{pmatrix}3\\4\end{pmatrix}$. This is what he drew.  What mistake(s) has Lucas made?	The 4 should be at the top, to indicate 4 right, and the 3 should be at the bottom to indicate 3 up **or** he has drawn $\begin{pmatrix}4\\3\end{pmatrix}$
3)	Peter has been asked to draw the vector $\boldsymbol{b}=\begin{pmatrix}4\\-2\end{pmatrix}$. This is what he drew.  What mistake(s) has Lucas made?	The 4 should be at the top, to indicate 4 right. Peter has drawn 4 to the left which would have been -4 **or** he has drawn $\begin{pmatrix}-4\\-2\end{pmatrix}$

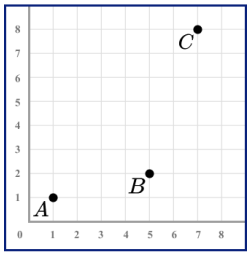
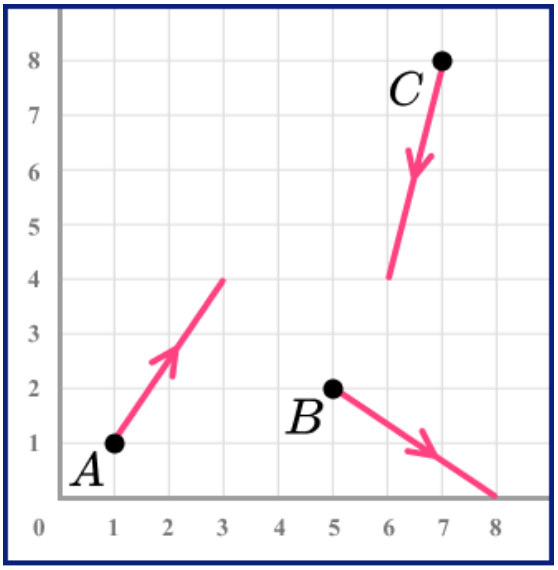
Column Vectors - Answers

4)	**a)** A is the point $(4,\ 3)$ and B is the point $(5,\ 0)$. Write down as a column vector $\overrightarrow{AB}$.	**a)** $\overrightarrow{AB} = \begin{pmatrix} 1 \\ -3 \end{pmatrix}$
	b) C is the point $(6, -\ 1)$ and D is the point $(2,\ 1)$. Write down as a column vector $\overrightarrow{CD}$.	**b)** $\overrightarrow{CD} = \begin{pmatrix} -4 \\ 2 \end{pmatrix}$

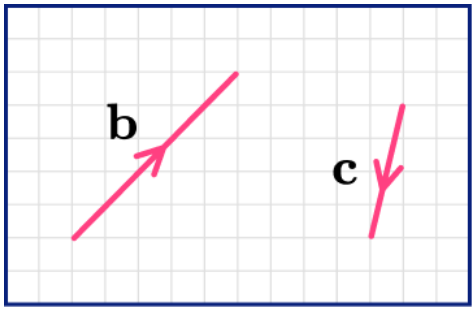
Column Vectors - Mark Scheme

	Question	Answer	
	Exam Questions		
1)	From the point P, draw the vectors below. 		
(a)	$a = \begin{pmatrix} 3 \\ 5 \end{pmatrix}$	(a) 	(1)
(b)	$b = \begin{pmatrix} 5 \\ -2 \end{pmatrix}$	(b) 	(1)

Column Vectors - Mark Scheme

2)	On the axes below, draw the vectors from the point stated. $\begin{pmatrix}2\\3\end{pmatrix}$ from A $\begin{pmatrix}1\\-2\end{pmatrix}$ from B $\begin{pmatrix}-1\\-4\end{pmatrix}$ from C 	 For correct vector from A including arrow For correct vector from B including arrow For correct vector from C including arrow	**(1)** **(1)** **(1)**
3) **(a)**	Given the vectors $\boldsymbol{a} = \begin{pmatrix}-4\\3\end{pmatrix}$ $\boldsymbol{b} = \begin{pmatrix}3\\-2\end{pmatrix}$ $\boldsymbol{c} = \begin{pmatrix}-1\\-2\end{pmatrix}$ write the following as column vectors: **- $\boldsymbol{a}$**	**(a)** $-a = \begin{pmatrix}4\\-3\end{pmatrix}$	**(1)**
(b)	**- $\boldsymbol{b}$**	**(b)** $-b = \begin{pmatrix}-3\\2\end{pmatrix}$	**(1)**
(c)	**- $\boldsymbol{c}$**	**(c)** $-c = \begin{pmatrix}1\\2\end{pmatrix}$	**(1)**

Column Vectors - Mark Scheme

4)	Shown below are vectors $\boldsymbol{b}$ and $\boldsymbol{c}$.  		
(a)	Write the column vector that represents $\boldsymbol{b}$.	**(a)** $b = \begin{pmatrix} 5 \\ 5 \end{pmatrix}$	**(1)**
(b)	Write the column vector that represents $\boldsymbol{c}$.	**(b)** $c = \begin{pmatrix} -1 \\ -4 \end{pmatrix}$	**(1)**