

Year 10 Vector Retrieve and Connects

Contents

Questions and short answers



▶ Retrieve and Connect 1

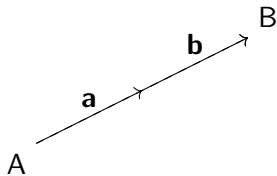
Worked solutions



▶ Retrieve and Connect 1

Retrieve and Connect

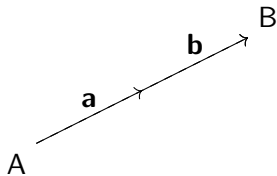
1. Start with zero, add 7, subtract 10, add 6, subtract 3, what is the result?
2. What if you started with -5 ?
3. Add: $\begin{pmatrix} 4 \\ 1 \end{pmatrix} + \begin{pmatrix} 2 \\ 3 \end{pmatrix}$



4. Find: $-\begin{pmatrix} 5 \\ 2 \end{pmatrix}$
5. What column vector represents the reverse of the following vector:
 $\begin{pmatrix} 3 \\ -4 \end{pmatrix}$?
6. Write an expression in terms of **a** and **b** that represents the whole journey from A to B.
7. Which vector would undo that journey? How many different ways can you write it?

Retrieve and Connect

1. Start with zero, add 7, subtract 10, add 6, subtract 3, what is the result? **0**
2. What if you started with -5 ? **-5**
3. Add: $\begin{pmatrix} 4 \\ 1 \end{pmatrix} + \begin{pmatrix} 2 \\ 3 \end{pmatrix}$ **$\begin{pmatrix} 6 \\ 4 \end{pmatrix}$**



4. Find: $-\begin{pmatrix} 5 \\ 2 \end{pmatrix}$ **$\begin{pmatrix} -5 \\ -2 \end{pmatrix}$**
5. What column vector represents the reverse of the following vector:
 $\begin{pmatrix} 3 \\ -4 \end{pmatrix}$? **$\begin{pmatrix} -3 \\ 4 \end{pmatrix}$**
6. Write an expression in terms of **a** and **b** that represents the whole journey from A to B.
 $a + b$
7. Which vector would undo that journey? How many different ways can you write it?

$$\overrightarrow{BA} = -(\mathbf{a} + \mathbf{b}) = -\mathbf{a} - \mathbf{b}$$

Worked Solution: Retrieve and Connect 1, Question 1

Question: Start with zero, add 7, subtract 10, add 6, subtract 3.
What is the result?

Worked Solution:

$$0 + 7 - 10 + 6 - 3 = 7 - 10 + 6 - 3 = -3 + 6 - 3 = 3 - 3 = 0.$$

So the result is 0.

Worked Solution: Retrieve and Connect 1, Question 2

Question: What if you started with -5 ?

Worked Solution:

$$-5 + 7 - 10 + 6 - 3 = 2 - 10 + 6 - 3 = -8 + 6 - 3 = -2 - 3 = -5.$$

The operations have total change 0, so the starting value is unchanged; the result is -5 .

Worked Solution: Retrieve and Connect 1, Question 3

Question: Add $\begin{pmatrix} 4 \\ 1 \end{pmatrix} + \begin{pmatrix} 2 \\ 3 \end{pmatrix}$.

Worked Solution: Add corresponding components:

$$\begin{pmatrix} 4 \\ 1 \end{pmatrix} + \begin{pmatrix} 2 \\ 3 \end{pmatrix} = \begin{pmatrix} 4 + 2 \\ 1 + 3 \end{pmatrix} = \begin{pmatrix} 6 \\ 4 \end{pmatrix}.$$

Worked Solution: Retrieve and Connect 1, Question 4

Question: Find $-\begin{pmatrix} 5 \\ 2 \end{pmatrix}$.

Worked Solution: Multiplying a vector by -1 changes the sign of each component:

$$-\begin{pmatrix} 5 \\ 2 \end{pmatrix} = \begin{pmatrix} -5 \\ -2 \end{pmatrix}.$$

Worked Solution: Retrieve and Connect 1, Question 5

Question: What column vector represents the reverse of the vector $\begin{pmatrix} 3 \\ -4 \end{pmatrix}$?

Worked Solution: The reverse vector has the same length but the opposite direction, so take the negative:

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

So the reverse vector is $\begin{pmatrix} -3 \\ 4 \end{pmatrix}$.

Worked Solution: Retrieve and Connect 1, Question 6

Question: Write an expression in terms of **a** and **b** that represents the whole journey from A to B.

Worked Solution: The diagram shows $\overrightarrow{AC} = \mathbf{a}$ and $\overrightarrow{CB} = \mathbf{b}$. The journey from A to B goes via C, so the vectors are added tip-to-tail:

$$\overrightarrow{AB} = \overrightarrow{AC} + \overrightarrow{CB} = \mathbf{a} + \mathbf{b}.$$

So the required expression is **a + b**.

Worked Solution: Retrieve and Connect 1, Question 7

Question: Which vector would undo that journey? How many different ways can you write it?

Worked Solution: The vector that undoes $\overrightarrow{AB}$ is its reverse, $\overrightarrow{BA}$.
Since $\overrightarrow{AB} = \mathbf{a} + \mathbf{b}$,

$$\overrightarrow{BA} = -\overrightarrow{AB} = -(\mathbf{a} + \mathbf{b}) = -\mathbf{a} - \mathbf{b}.$$

So the undo vector can be written in two equivalent forms:

$$\overrightarrow{BA} = -(\mathbf{a} + \mathbf{b}) = -\mathbf{a} - \mathbf{b}.$$