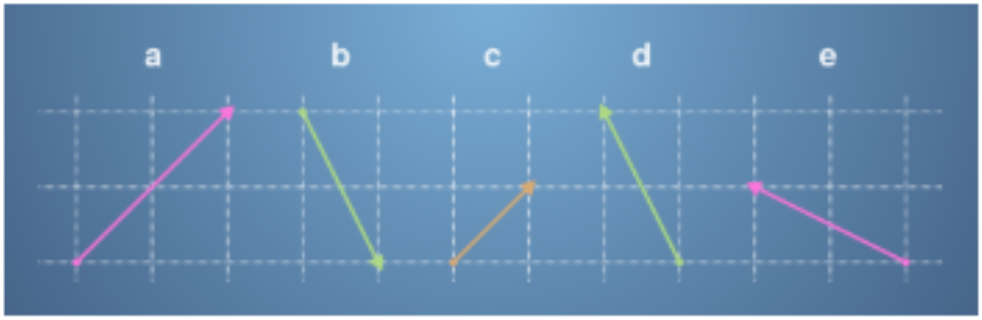
1. This aim of this quiz is to familiarise yourself with vectors and some basic vector operations.

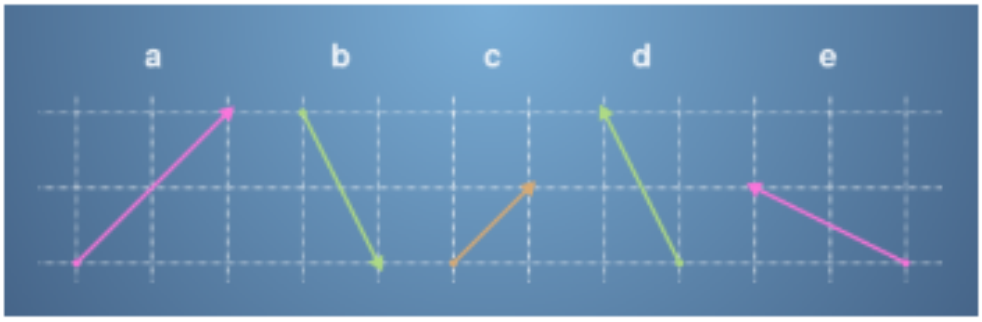
For the following questions, the vectors $\mathbf{a}$, $\mathbf{b}$, $\mathbf{c}$, $\mathbf{d}$ and $\mathbf{e}$ refer to those in this diagram:



The sides of each square on the grid are of length 1. What is the numerical representation of the vector $\mathbf{a}$?

- ○ $\begin{bmatrix}1\\1\end{bmatrix}$
- ○ $\begin{bmatrix}2\\1\end{bmatrix}$
- ○ $\begin{bmatrix}1\\2\end{bmatrix}$
- ◉ $\begin{bmatrix}2\\2\end{bmatrix}$

Correct
You can get the numerical representation by following the arrow along the grid.



2. Which vector in the diagram corresponds to $\begin{bmatrix}-1\\2\end{bmatrix}$?

- ○ Vector $\mathbf{a}$
- ○ Vector $\mathbf{b}$
- ○ Vector $\mathbf{c}$
- ◉ Vector $\mathbf{d}$

Correct
You can get the numerical representation by following the arrow along the grid.

3. What vector is $2\mathbf{c}$?

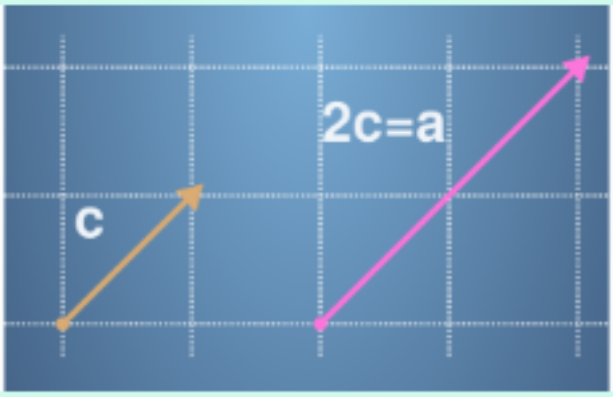
Please select all correct answers.

- [ ] $\begin{bmatrix} -2 \\ 2 \end{bmatrix}$
- [ ] e
- [x] $\begin{bmatrix} 2 \\ 2 \end{bmatrix}$

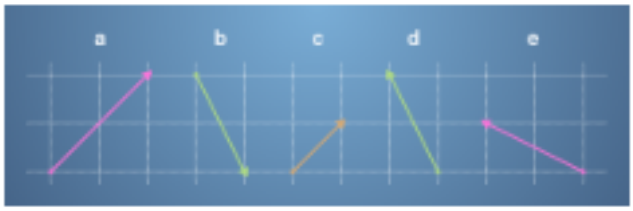
Correct
A scalar multiple of a vector can be calculated by multiplying each component.

- [x] a

Correct
Multiplying by a positive scalar is like stretching out a vector in the same direction.



1 / 1 point



4. What vector is $-\mathbf{b}$?

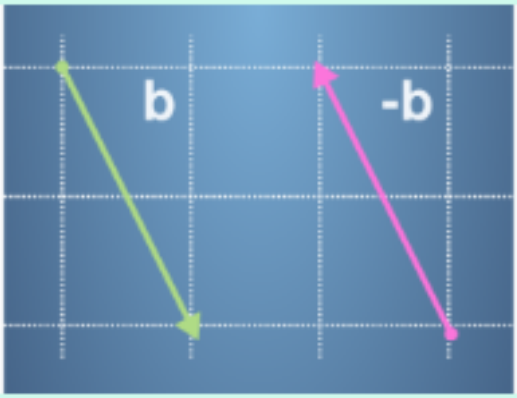
Please select all correct answers.

- [ ] $\begin{bmatrix} -2 \\ 1 \end{bmatrix}$
- [x] $\begin{bmatrix} -1 \\ 2 \end{bmatrix}$

Correct
A scalar multiple of a vector can be calculated by multiplying each component.

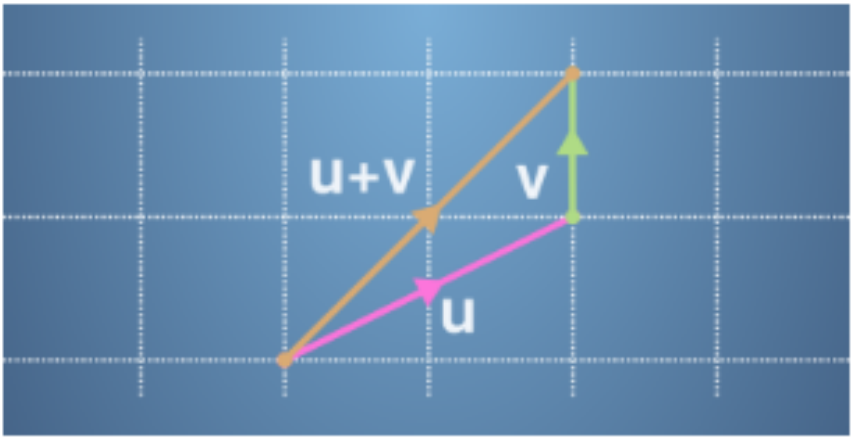
- [ ] e
- [x] d

Correct
Multiplying by a negative number points the vector in the opposite direction.



5. In the previous videos you saw that vectors can be added by placing them start-to-end. For example, the following diagram represents the sum of two new vectors, $\mathbf{u} + \mathbf{v}$:

1 / 1 point



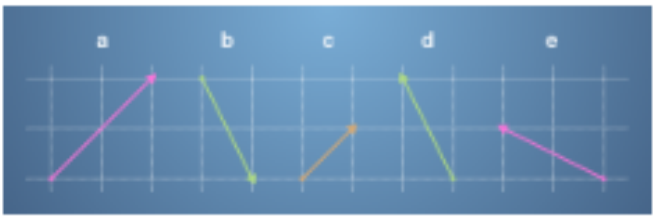
The sides of each square on the grid are still of length 1. Which of the following equations does the diagram represent?

- $\begin{bmatrix}1\\2\end{bmatrix} + \begin{bmatrix}1\\0\end{bmatrix} = \begin{bmatrix}2\\2\end{bmatrix}$
- (selected) $\begin{bmatrix}2\\1\end{bmatrix} + \begin{bmatrix}0\\1\end{bmatrix} = \begin{bmatrix}2\\2\end{bmatrix}$
- $\begin{bmatrix}1\\1\end{bmatrix} + \begin{bmatrix}1\\0\end{bmatrix} = \begin{bmatrix}2\\1\end{bmatrix}$
- $\begin{bmatrix}1\\2\end{bmatrix} + \begin{bmatrix}0\\1\end{bmatrix} = \begin{bmatrix}2\\2\end{bmatrix}$

Correct
We can see that summing the vectors by adding them start-to-end and adding up the individual components gives us the same answer.

6. Let's return to our vectors defined by the diagram below:

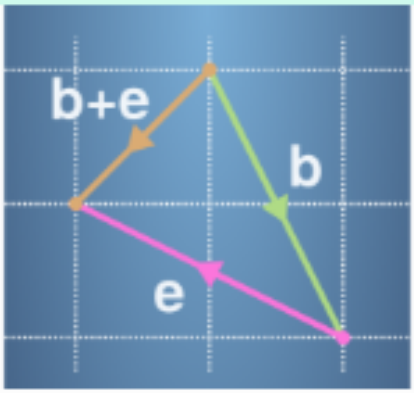
1 / 1 point



What is the vector $\mathbf{b} + \mathbf{e}$?

- (selected) $\begin{bmatrix}-1\\-1\end{bmatrix}$
- $\begin{bmatrix}1\\3\end{bmatrix}$
- $\begin{bmatrix}2\\-1\end{bmatrix}$
- $\begin{bmatrix}-1\\2\end{bmatrix}$

Correct
Vectors are added together entry by entry. They can also be thought of as adding start to end, like in the following diagram:



7. What is the vector $\mathbf{d} - \mathbf{b}$?

- ○ $\begin{bmatrix} -4 \\ 2 \end{bmatrix}$
- ◉ $\begin{bmatrix} -2 \\ 4 \end{bmatrix}$
- ○ $\begin{bmatrix} 4 \\ -2 \end{bmatrix}$
- ○ $\begin{bmatrix} 2 \\ -4 \end{bmatrix}$

Correct

Remember that vectors add by attaching the end of one to the start of the other, and that multiplying by a negative number points the vector in the opposite direction.