Doing some vector operations | Coursera

Doing some vector operations

Practice Quiz • 30 min

Congratulations! You passed!

TO PASS 80% or higher

GRADE

100%

Doing some vector operations

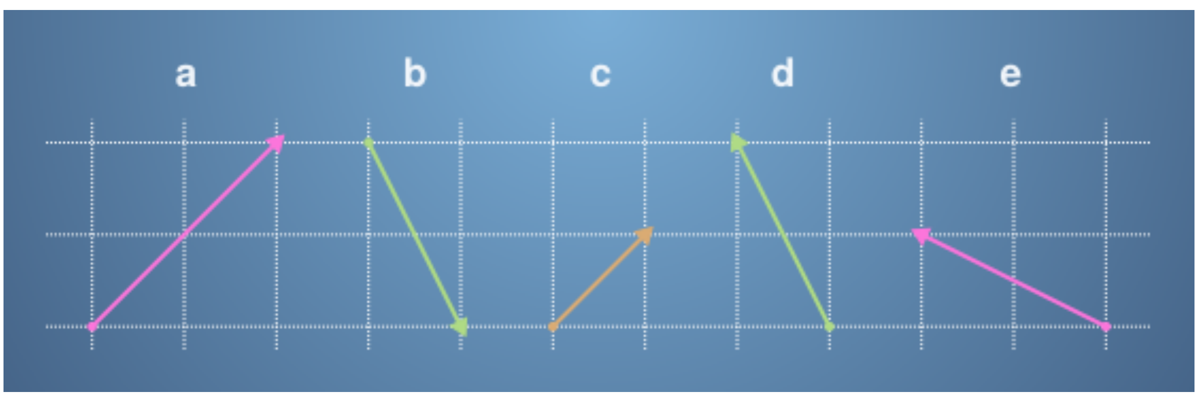
TOTAL POINTS 7

1.

Question 1

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

For the following questions, the vectors **a**, **b**, **c**, **d** and **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 **a**?

1 / 1 point

$\begin{bmatrix} 1 \\ 1 \end{bmatrix}$

1
[1]

$\begin{bmatrix} 1 \\ 2 \end{bmatrix}$

1
[2]

$\begin{bmatrix} 2 \\ 2 \end{bmatrix}$

2
[2]

$\begin{bmatrix} 2 \\ 1 \end{bmatrix}$

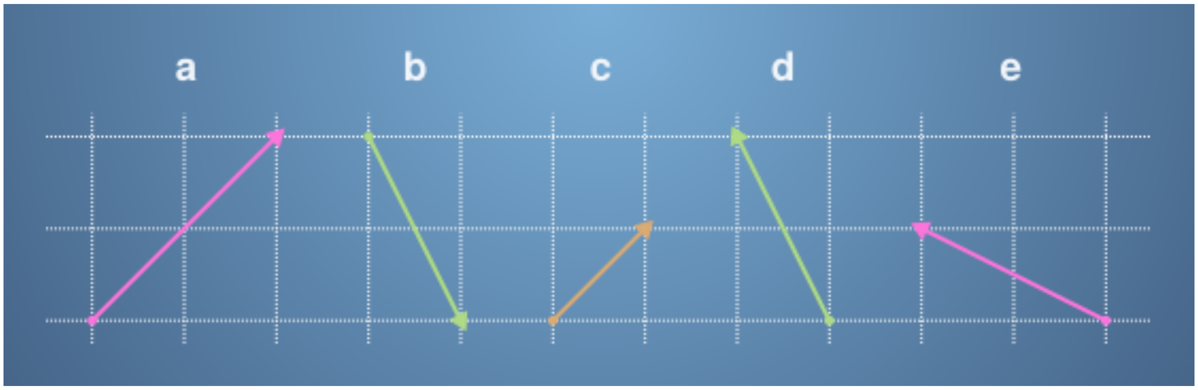
2
[1]

Correct

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

2.

Question 2



Which vector in the diagram corresponds to

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

−1
[2]?

1 / 1 point

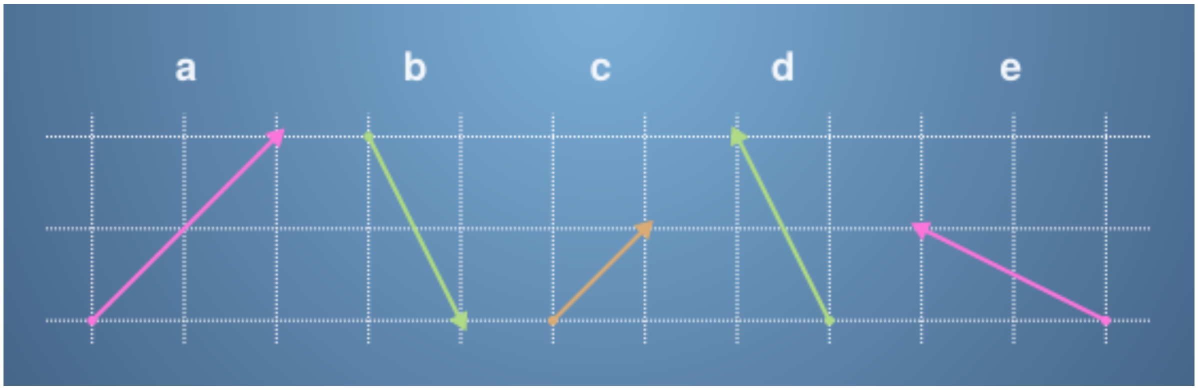
- ○ **Vector a**
- ○ **Vector b**
- ○ **Vector c**
- ◉ **Vector d**

Correct

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

3.

Question 3



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

Please select all correct answers.

1 / 1 point

$\begin{bmatrix} 2 \\ 2 \end{bmatrix}$

2

[2]

Correct

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

☐ $\begin{bmatrix} -2 \\ 2 \end{bmatrix}$

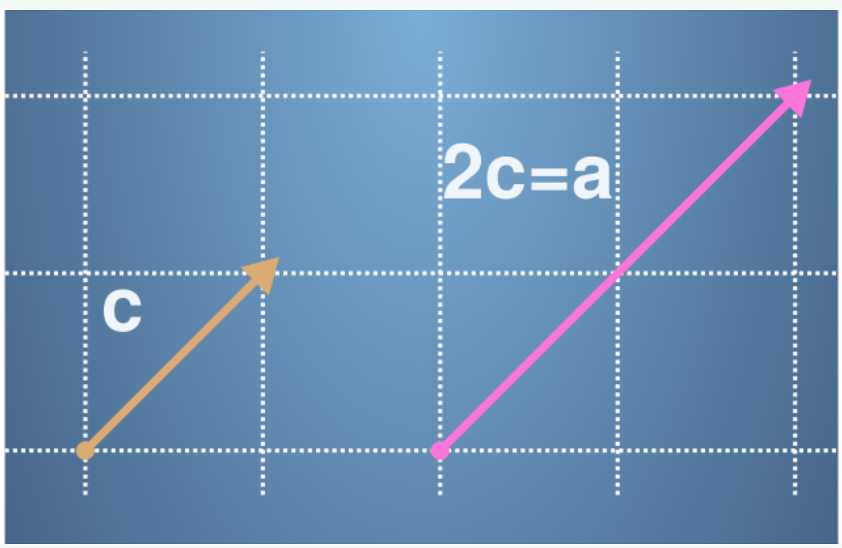
$\begin{bmatrix} -2 \\ 2 \end{bmatrix}$

☐ **e**

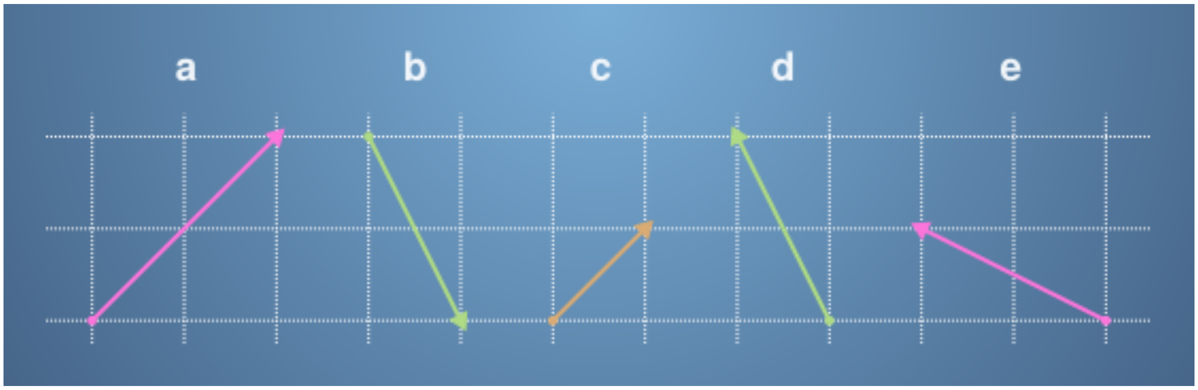
☑ **a**

Correct

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



4.
Question 4



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

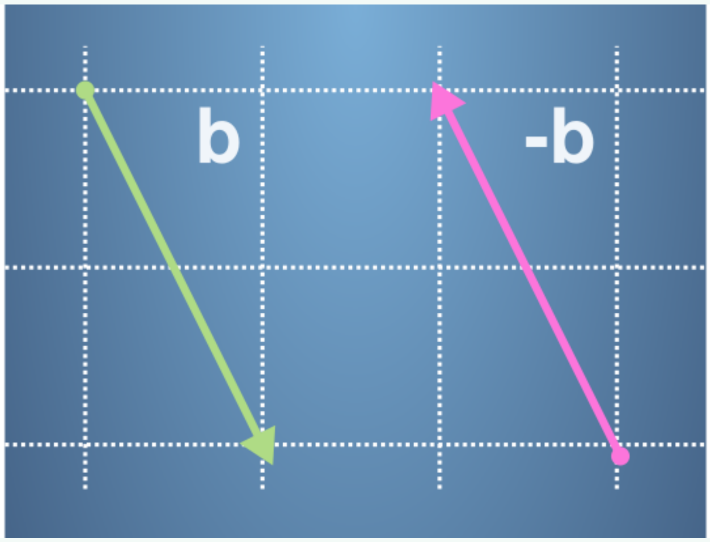
Please select all correct answers.

1 / 1 point

- [ ] **e**
- [x] **d**

Correct

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



☐ $\begin{bmatrix} -2 \\ 1 \end{bmatrix}$

$[\,^{-2}_{1}\,]$

☑ $\begin{bmatrix} -1 \\ 2 \end{bmatrix}$

$[\,^{-1}_{2}\,]$

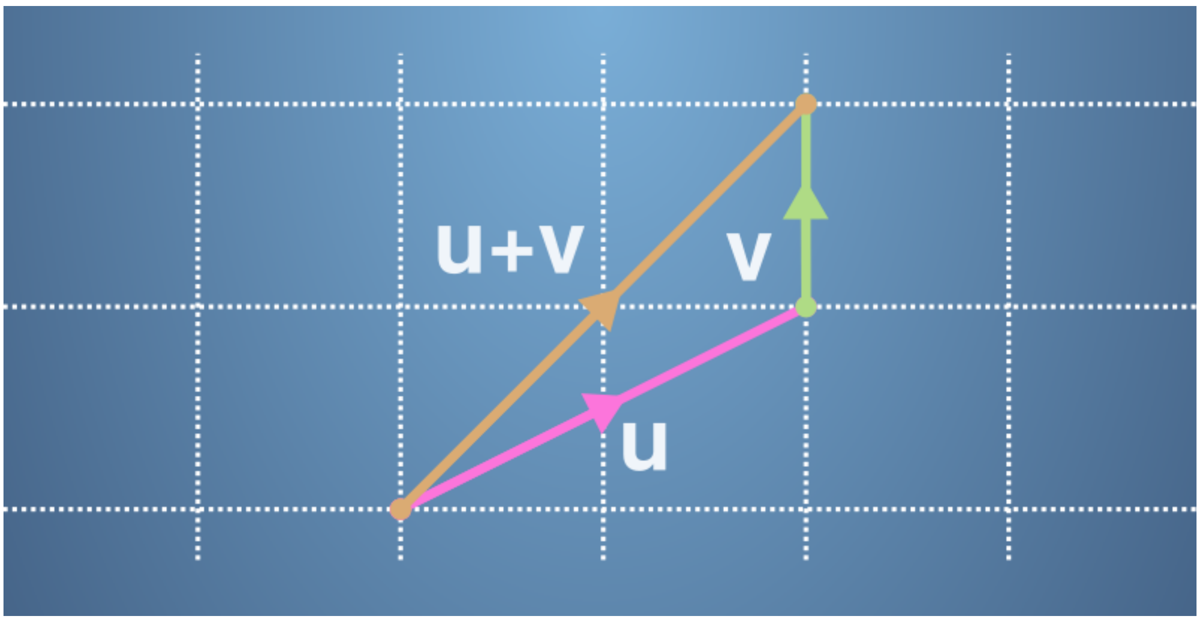
Correct

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

5.

Question 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, $\mathbf{u} + \mathbf{v}$:



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

1 / 1 point

$$\begin{bmatrix} 1 \\ 2 \end{bmatrix}$$

+

$$\begin{bmatrix} 0 \\ 1 \end{bmatrix}$$

=

$$\begin{bmatrix} 2 \\ 2 \end{bmatrix}$$

$\begin{bmatrix} 1 \\ 2 \end{bmatrix} + \begin{bmatrix} 0 \\ 1 \end{bmatrix} = \begin{bmatrix} 2 \\ 2 \end{bmatrix}$

$$\begin{bmatrix} 1 \\ 1 \end{bmatrix}$$

+

$$\begin{bmatrix} 1 \\ 0 \end{bmatrix}$$

=

$$\begin{bmatrix} 2 \\ 1 \end{bmatrix}$$

$\begin{bmatrix} 1 \\ 1 \end{bmatrix} + \begin{bmatrix} 1 \\ 0 \end{bmatrix} = \begin{bmatrix} 2 \\ 1 \end{bmatrix}$

$$\begin{bmatrix}1\\2\end{bmatrix} + \begin{bmatrix}1\\0\end{bmatrix} = \begin{bmatrix}2\\2\end{bmatrix}$$

$[\begin{smallmatrix}1\\2\end{smallmatrix}] + [\begin{smallmatrix}1\\0\end{smallmatrix}] = [\begin{smallmatrix}2\\2\end{smallmatrix}]$

$$\begin{bmatrix}2\\1\end{bmatrix} + \begin{bmatrix}0\\1\end{bmatrix} = \begin{bmatrix}2\\2\end{bmatrix}$$

$[\begin{smallmatrix}2\\1\end{smallmatrix}] + [\begin{smallmatrix}0\\1\end{smallmatrix}] = [\begin{smallmatrix}2\\2\end{smallmatrix}]$

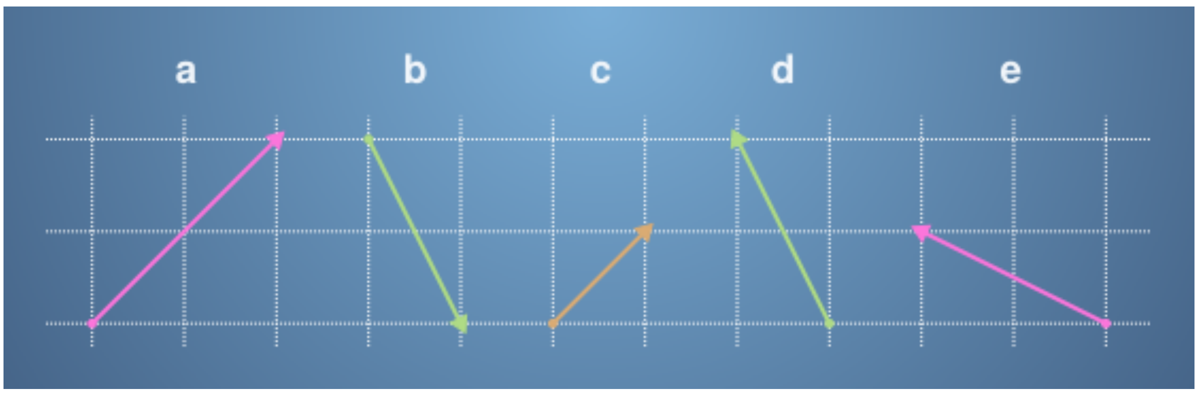
Correct

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.

Question 6

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



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

1 / 1 point

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

  $\begin{bmatrix} -1 \\ -1 \end{bmatrix}$

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

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

$\begin{bmatrix} 1 \\ 3 \end{bmatrix}$

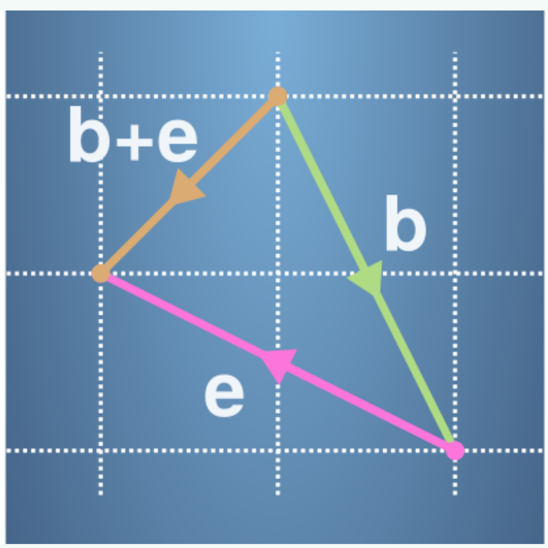
1
[3]

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

2
[−1]

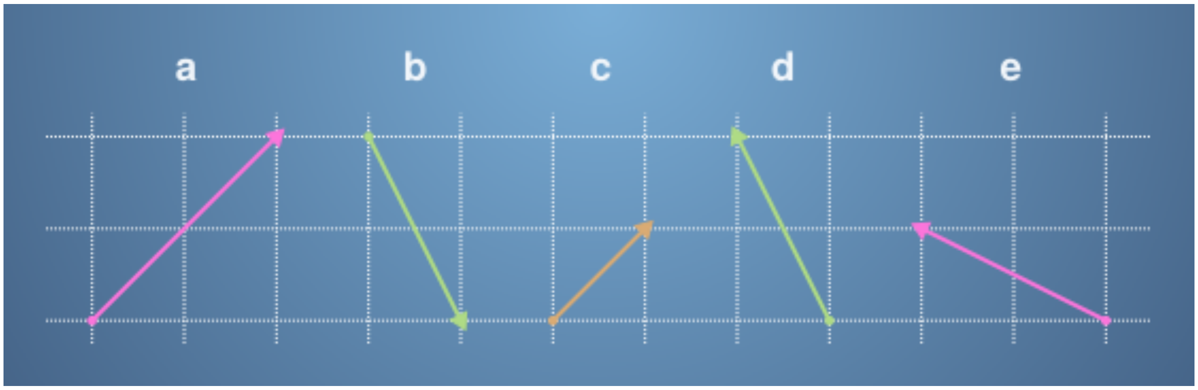
Correct

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



7.

Question 7



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

1 / 1 point

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

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

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

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

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

−4
[2]

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

2
[−4]

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.