Vector operations assessment | Coursera

Vector operations assessment

Graded Quiz • 15 min

Due Mar 22, 2:59 AM EDT



Congratulations! You passed! **TO PASS** 80% or higher **GRADE**100%

Vector operations assessment

LATEST SUBMISSION GRADE

100%

1.

Question 1

In this assessment, you will be tested on all of the different topics you have in covered this module. Good luck!

A ship travels with velocity given by

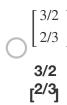
$$\left[\begin{array}{c} 1 \\ 2 \end{array} \right]$$

 $[^2]$, with current flowing in the direction given by $[^1]$ with respect to some co-ordinate

axes.

What is the velocity of the ship in the direction of the current?

1 / 1 point



✓ Correct

This is the vector projection of the velocity of the ship onto the velocity of the current.

Question 2

A ball travels with velocity given by

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

2

 $[^{1}]$, with wind blowing in the direction given by $[^{-4}]$ with respect to some co-ordinate

axes.

What is the size of the velocity of the ball in the direction of the wind?

1 / 1 point



 $-\frac{5}{2}$

 $\frac{5}{2}$

 $-\frac{2}{5}$

/

Correct

This is the scalar projection of the velocity of the ball onto the velocity of the wind.

3.

Question 3

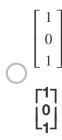
Given vectors

$$\begin{bmatrix} -4 \\ -3 \\ 8 \end{bmatrix}$$

$$\mathbf{v} = \begin{bmatrix} -4 \\ -3 \\ 8 \end{bmatrix}, \, \mathbf{b1} = \begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix}, \, \mathbf{b2} = \begin{bmatrix} -2 \\ 1 \\ 0 \end{bmatrix} \, \text{and} \, \mathbf{b3} = \begin{bmatrix} -3 \\ -6 \\ 5 \end{bmatrix} \, \text{all written in the standard basis,}$$

what is \mathbf{v} in the basis defined by $\mathbf{b1}$, $\mathbf{b2}$ and $\mathbf{b3}$? You are given that $\mathbf{b1}$, $\mathbf{b2}$ and $\mathbf{b3}$ are all pairwise orthogonal to each other.

1 / 1 point



✓ Correct

This is a change of basis in 3 dimensions.

4.

Question 4

Are the following vectors linearly independent?

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

$$\mathbf{a} = \begin{bmatrix} 1 \\ 2 \\ -1 \end{bmatrix}, \mathbf{b} = \begin{bmatrix} 3 \\ -4 \\ 5 \end{bmatrix} \text{ and } \mathbf{c} = \begin{bmatrix} 1 \\ -8 \\ 7 \end{bmatrix}.$$







One can be written as a linear combination of the other two.

5.

Question 5

At 12:00 pm, a spaceship is at position

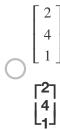
$$\begin{bmatrix} 3 \\ 2 \\ 4 \end{bmatrix}$$

 $\begin{bmatrix} 3 \\ 2 \\ 4 \end{bmatrix}$ km away from the origin with respect to some 3 dimensional co ordinate system.

The ship is travelling with velocity $\begin{bmatrix} -1 \\ 2 \\ -3 \end{bmatrix} km/h \text{ What is the location of the spaceship}$

after 2 hours have passed?

1 / 1 point



$$\begin{bmatrix} -2 \\ 4 \\ -1 \end{bmatrix}$$

$$\begin{bmatrix} -2 \\ 4 \\ -1 \end{bmatrix}$$

$$\begin{bmatrix} -1 \\ -6 \\ 2 \end{bmatrix}$$

$$\begin{bmatrix} -1 \\ -6 \\ 2 \end{bmatrix}$$

$$\bullet \begin{bmatrix}
1 \\
6 \\
-2
\end{bmatrix}$$

$$\begin{bmatrix}
1 \\
6 \\
-2
\end{bmatrix}$$

✓ Correct

This takes the idea of vectors in the context of a moving body.