✓ Congratulations! You passed!

Next Item



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

1/1 point

A ship travels with velocity given by $\begin{bmatrix} 1 \\ 2 \end{bmatrix}$, with current flowing in the direction given by $\begin{bmatrix} 1 \\ 1 \end{bmatrix}$ with respect to some co-ordinate axes.

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

- $\begin{bmatrix} 2/3 \\ 2/3 \end{bmatrix}$
- $\begin{bmatrix} 3/2 \\ 2/3 \end{bmatrix}$

Correct

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

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



1/1 point A ball travels with velocity given by $\begin{bmatrix} 2 \\ 1 \end{bmatrix}$, with wind blowing in the direction given by $\begin{bmatrix} 3 \\ -4 \end{bmatrix}$ with respect to some co-ordinate axes.

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



 $\frac{5}{2}$



Correct

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



$$-\frac{5}{2}$$







1/1 point

3

Given vectors
$$\mathbf{v}=\begin{bmatrix}-4\\-3\\8\end{bmatrix}$$
, $\mathbf{b_1}=\begin{bmatrix}1\\2\\3\end{bmatrix}$, $\mathbf{b_2}=\begin{bmatrix}-2\\1\\0\end{bmatrix}$ and $\mathbf{b_3}=\begin{bmatrix}-3\\-6\\5\end{bmatrix}$ all written in the

standard basis, what is \mathbf{v} in the basis defined by $\mathbf{b_1}$, $\mathbf{b_2}$ and $\mathbf{b_3}$? You are given that $\mathbf{b_1}$, $\mathbf{b_2}$ and $\mathbf{b_3}$ are all pairwise orthogonal to each other.

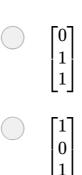


$$\begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix}$$



Correct

This is a change of basis in 3 dimensions.







4. Are the following vectors linearly independent?

1/1 point

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

Yes



Correct

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



5.

At 12:00 pm, a spaceship is at position
$$egin{bmatrix} 3 \\ 2 \\ 4 \end{bmatrix} km$$

1/1 point

away from the origin with respect to some 3 dimensional co ordinate system. The ship is

travelling with velocity $egin{bmatrix} -1 \ 2 \ -3 \end{bmatrix} km/h$ What is the

location of the spaceship after 2 hours have passed?

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





Correct

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



