Congratulations! You passed!

Grade received 100%

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Go to 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?

- $\bigcirc \quad \begin{bmatrix} 3/2 \\ 2/3 \end{bmatrix}$
- $\begin{array}{c}
 \begin{bmatrix} 2/3 \\ 2/3 \end{bmatrix}
 \end{array}$
- $\bigcirc \begin{bmatrix} 2/3 \\ 3/2 \end{bmatrix}$

⊘ Correct

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

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?

- 0
- \odot $\frac{2}{5}$
- 0 -
- $O_{-\frac{5}{2}}$
- **⊘** Correct

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

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,

1/1 point

1/1 point

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

- $\begin{array}{c|c}
 & \begin{bmatrix} 1 \\ 0 \\ 1 \end{bmatrix}
 \end{array}$
- $\bigcirc \begin{bmatrix} 1 \\ 1 \\ 0 \end{bmatrix}$
- **⊘** Correct

Correct

This is a change of basis in 3 dimensions.

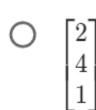
4. Are the following vectors linearly independent?

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

- O Yes
- No
- **⊘** Correct

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

At 12:00 pm, a spaceship is at position $\begin{bmatrix} 3 \\ 2 \\ 4 \end{bmatrix}$ 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 What is the location of the spaceship after 2 hours have passed?



- \bigcap_{4}^{-2}
- \bullet $\begin{bmatrix} 1 \\ 6 \\ 2 \end{bmatrix}$
- $\begin{array}{c|c}
 & \begin{bmatrix}
 -1 \\
 -6 \\
 2
 \end{array}$
- **⊘** Correct

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